

**Classroom Learning Community:  
A Co-mingling of Student and Teacher Voices in a Grade 5 Mathematics Classroom**

by

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## **ABSTRACT**

This study examined the impact of student voices mingling with the teacher voice in a Grade 5 mathematics classroom through Professional Learning Community (PLC) and Communities of Practice (CoP) lenses. The purpose was to identify the impacts of mingling of the voices of the teacher and the students on assessment practices, student achievement, student engagement, and learning processes. Participants included the classroom teacher and 15 Grade 5 mathematics students.

The literature review examined the roles of student voice, PLCs, and CoPs. This review highlighted a paucity of research done with upper elementary students to examine how their voices impact assessment practices and associated learning. A collaborative action inquiry (CAI) research study approach was used to develop this story. Three research questions guided this study: What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices? How do the relationships among the members of the classroom evolve as students are encouraged to act as co-constructors and co-decision makers of their learning? How do these shifts impact student achievement? Methods of data collection included individual participant reflective journals, interviews, photographs, and observations.

Truth about - and equity in - education are limited when the predominantly listened to voices are the adults involved. This CAI research shares one story of how children were listened to and how the children's voices significantly impacted their learning and their teacher in the classroom they shared.

Four findings highlighted this study. First, the children expressed the importance of fun in learning. Second, they indicated their preference for learning together rather than individually. Third, there was an increased resolve for the teacher to think critically about power relations in a classroom. For the teacher, it was important to advocate for all members of the classroom learning community to collaborate in assessment creation, tracking, and analysis to plan for learning. The development of Classroom Learning Community (CLC) questions guided collaboration. Fourth, the children affirmed how crucial it is to acknowledge that they can express what works for them in their learning. Therefore, it is critical for the teacher to remember to continue to listen to children's voices.

*Keywords:* student voice, Professional Learning Communities (PLCs), Communities of Practice (CoPs), collaborative action research, Mathematics, teaching.

## **DEDICATION**

For Peter

Your curiosity, intellect, and devotion are qualities that bring richness to our life together.

Thank you for listening to my voice, encouraging my dreams, believing in me, and supporting my learning.

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## CHAPTER 1: INTRODUCTION TO THE STUDY

This first chapter introduces the study. It provides a description of an initial classroom experience that generated my interest in an area for further study, the purpose of the study, the rationale for the study, and the research questions that guided the study.

### **Moment(s) of Lift**

On the Netflix series, *My Next Guest Needs No Introduction with David Letterman* (Chechin-De La Rosa et al., 2018-present), Melinda Gates (2019) discussed her book entitled *The Moment of Lift: How Empowering Women Changes the World*. She spoke of defining moments when women lifted their eyes and used their voices to impact their situations. I was struck by the similarity of this description to a classroom experience I was a part of in 2016. This experience has guided my research to examine how a classroom might work differently to include greater attention to students' voices in how it operates. My recollections of the initial classroom experience have led me to believe that there were various moments of lift when the students viewed themselves as having increased agency on how the classroom operated. It was in these moments of lift that I saw the line between the teacher and student relationship blur into relationships of "co": co-learning, co-decision-making, and co-leading. Upon reflecting on this experience, I have become curious.

I am curious about moments where, and classrooms in which, there is greater resonance to what the students contribute to the planning and implementing of learning in a classroom. I am curious about why, in the implementation of professional learning community (PLC) philosophy in my school, I had not previously committed to including student voice in the analysis of data and the development of plans to improve

achievement. And, ultimately, I am curious about how doing so might improve *achievement* as Linda Lambert (1998) “broadly conceived” (p. 23) it to encompass “academic achievement, positive involvement and resiliency” (p. 23). My understanding of academic achievement is the success with curriculum outcomes. For the purposes of this study, positive involvement includes being engaged in learning as an active participant, while I understand resiliency as recovery with learning in times of difficulty or challenges. Ungar (2013) defined resilience as “a separate but interdependent set of processes [that] reflect positive adaptations that individuals, families, and communities make regardless of the presence of disordered thoughts, feelings, and behaviors” (p. 255). It is moments of student contribution to planning and implementation of learning that I wish to explore more deeply in order to analyze, affirm, and, when appropriate, revise considerations as to how a Mathematics classroom might operate. I have come to view this as the possibility of providing a more socially just atmosphere for students to achieve within. Let me take you back to the initial experience that generated my interest in such a study.

### **The Initial Classroom Experience**

“Ha! Looks like we’re going to be teachers today.” These words, from a Grade 5 math student as he entered our classroom in February 2016, set a path to approach mathematics assessment and instruction through a PLC framework. This comment, and my response to it, created a pivotal moment and an emerging journey of thinking deeply, reading widely, and questioning continually about this and subsequent related classroom moments in an endeavour to enhance student achievement, my own teaching, and my role

as the principal and instructional leader in an elementary school engaging in the work of a PLC.

Following a disappointing performance on a district-wide assessment, our school-based Grade 5 math teaching team and district math mentor co-created a 10-item assessment tool based on the outcomes in the Grade 5 math curriculum document in an effort to improve our Grade 5 students' mathematical achievement. Initially, this assessment tool, and the work associated with it, focused on the students' academic achievement with provincial math outcomes. The plan was to administer, and re-administer, the assessment (varying aspects of the questions but maintaining each question's outcome) as a formative tool for the teachers to analyze and use to plan our instructional practices until the students' success rate with the questions was satisfactory. Upon the students' achievement of a satisfactory level, our plan was then to move on to further assessments focused on other Mathematical outcomes.

What originated as a teacher-driven plan of action developed into a teacher and student co-driven action plan, a partnership focused on our learning. Our pedagogical focus formed the impetus to deepening an exploration of students' voices within assessment and a PLC framework, areas which traditionally had not prioritized these voices. Including these voices informed what we did in our classroom and made a positive impact on student engagement, achievement, and learning processes.

On the day that a student wondered if he and his classmates were going to be teachers, the students had entered our classroom where Table 1, which noted their achievement following the first completed assessment, was projected onto the Smart

board. The green rectangles indicated correct responses to questions and red indicated incorrect responses.

**Table 1**

*Student Achievement on Initial Assessment (2016)*

<b>Student:</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q5</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>	<b>Q9</b>	<b>Q10</b>
<b>A</b>	Green	Green	Red	Red	Green	Red	Red	Red	Red	Red
<b>B</b>	Green	Green	Red							
<b>C</b>	Green	Red	Red	Green	Red	Red	Red	Red	Red	Red
<b>D</b>	Green	Red	Green	Red	Green	Red	Red	Red	Red	Red
<b>E</b>	Red	Green	Red	Green	Green	Red	Red	Red	Red	Red
<b>F</b>	Green	Red	Green	Red	Green	Green	Red	Red	Red	Red
<b>G</b>	Green	Green	Green	Red	Green	Red	Green	Green	Red	Red
<b>H</b>	Green	Green	Green	Green	Green	Green	Red	Green	Red	Red
<b>I</b>	Green	Red								
<b>J</b>	Green	Green	Green	Red	Green	Red	Red	Green	Green	Red
<b>K</b>	Green	Green	Green	Red						
<b>L</b>	Green	Red	Red	Red	Green	Green	Red	Red	Red	Red

Approximately 6 weeks later, after students had talked about the results, worked together to improve them by generating ideas on how to positively impact them, and supported one another in their learning, the results were significantly improved (see Table 2). This discussion of results in combination with the generation of action plans and valuing learners as resources for one another, contributes to a socially just learning

environment through the cultivation of positive interdependence, interpersonal and small group skills in combination with individual accountability (Leahy & Wiliam, 2015).

These are strong learning, assessment, and life dispositions.

**Table 2**

*Student Achievement on Subsequent Assessment (2016)*

<b>Student:</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q5</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>	<b>Q9</b>	<b>Q10</b>
<b>A</b>	Green									
<b>B</b>	Green	Green	Green	Green	Green	Green	Red	Green	Red	Red
<b>C</b>	Green	Green	Green	Green	Green	Green	Red	Green	Green	Green
<b>D</b>	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green
<b>E</b>	Green	Green	Green	Green	Green	Green	Red	Red	Red	Red
<b>F</b>	Green	Green	Green	Green	Green	Green	Red	Red	Green	Red
<b>G</b>	Green									
<b>H</b>	Green									
<b>I</b>	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green
<b>J</b>	Green									
<b>K</b>	Green									
<b>L</b>	Green									

Not only had the academic results improved; so had the learning environment. Students had engaged in a common purpose, supported one another through learning processes, and shared in the responsibility of impacting the learning dictated by the curricular outcomes for Grade 5 Mathematics. This experience encouraged me to reflect on how the

components of a PLC were mirrored within the mathematics classroom and how allowing students collaborative opportunities that are often not present instructional environments might engage them more fully in their learning. These interests and queries associated with them led me to this study. Let me now outline the purpose of the research.

### **Purpose of the Study**

Through collaborative action research, I have studied a Grade 5 Mathematics classroom as it endeavoured to operate using the principles of PLCs and Communities of Practice (CoPs). In particular, I was interested in the relationship between myself as the classroom teacher and the students I learned with. How did encouraging students to use their voices to make decisions about their learning impact their achievement, engagement, sense of belonging, and resiliency in a Mathematics class?

I worked collaboratively with the students to examine how what we did in our classroom might positively impact their achievement and engagement with Mathematical learning. The goal of this research was primarily to impact and enhance my own professional practice and enhance the learning of Mathematics with students. I hoped, too, that other educators might consider their context in relation to my learnings and that they might add to the conversation around creating more socially just classrooms where students are supported to use their voices to enhance their learning. To proceed with this, I viewed the research as having three primary goals:

1. To study the impact of operating a Grade 5 Mathematics classroom as a learning environment which incorporated aspects of PLCs, CoPs, and the greater involvement of students' voices.

2. To study the relationship between myself as the classroom teacher and the students I learned with, as well as the relationships amongst the students, to understand their impacts on student engagement and achievement.
3. To exit our research with annotated learnings to inform future classroom endeavours and to generate further conversations involving and evolving from my learnings.

To work toward these goals, I was guided by the following research questions:

1. What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices?
2. How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision makers of their learning?
3. How do these shifts impact student achievement?

### **Rationale for the Research**

I have been preoccupied. This preoccupation comes in the form of asking adult friends and family members to recall if they were children who had wanted, or had been given, opportunities to have a say in decisions that impacted them. I was a child with such a desire and, on occasion, one who fortunately had such opportunities.

I recall my mother frequently asking me, from a very young age, whom I wanted to babysit my brother and me. At school, I remember Mrs. Bethia Scott, my Scottish Grade 3 teacher with immaculately coiffed white hair, giving me the choice as to whether I would use marshmallows to create an igloo model or Popsicle sticks to create a log

cabin one. I can still recall the feelings associated with proposing a whole school activity idea to Mr. Brunnet, our Grade 9 student council advisor, being given the go-ahead, and the unprecedented access I had to stay indoors in the school library over the lunch hour to work on a Family Feud Winter Carnival event. In each of these instances I felt liberated, trusted, happy, engaged.

In response to my preoccupation with questioning friends and family about instances such as these in their own lives, they have relayed their own riffs on similar stories and resultant feelings. This preoccupation and curiosity drew me into considering how greater student voice in my particular teaching situation may impact and empower the students that I have the opportunity to learn with.

I am interested in student voice not as a symbolic practice but as a pragmatic occupation where individual and collective students' voices are sought, and utilized, beyond a nod of benevolence, or tokenism, in order to elicit students' feelings of engagement, where these voices are listened to so that their understandings, perspectives, and choices may in turn positively impact the learning environment in the Mathematics classrooms we share.

For me, the inclusion of student voice is a matter of social justice. Denzin and Lincoln (2018) have stated:

While the field of qualitative research is defined by constant breaks and ruptures, there is a shifting center to the project: the avowed humanistic and social justice commitment to study the social world from the perspective of the interacting individual.

(Locations 308-315)

My desire to include students' voices is more than a personal preference based on my history, values, or positive classroom experiences. Too often, students' voices are not invited into the practices within a classroom despite the reality that it is well within their right to be heard. As Cook-Sather (2018) stated:

The United Nations Convention on the Rights of the Child in 1989 was the most explicit statement of children's rights to have informed student voice work. The rights framework gives legal and/or ethical weight to student voice, but the operation of power is infinitely more complex and negotiated in an ongoing way within the relationships created by student voice work. (p. 20)

Lansdown (2004), Tangen (2008), Schiller and Einarsdottir (2009), Hayward (2013), and Horgan (2017) are among those who have written about this significant benchmark in the framing of childhood with the *United Nations Convention on the Rights of the Child* (UNCRC, 1989). The first component of Article 12 addresses the topic of voice:

States Parties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child.

According to UNICEF Canada (n.d.), on December 13th, 1991, Canada ratified the UNCRC affirming parents' and government agencies' roles in administering children's rights under this document. In response to the question of why there is a need for children to have separate rights, UNICEF Canada (n.d.) noted children's vulnerability, their reliance on the adults in their lives, and their exclusion from voting: "Without special

attention to children in decisions affecting them, there is a risk that the impacts on children will be harmful.” Six years after Canada ratified the UNCRC, Thiessen (1997) wrote that functioning on behalf of students’ perspectives is a method which is supported by “defenders of [students’] right to be individually and collectively heard— to have their voices respected, their preferences considered, their critiques engaged, and their choices matter” (p. 191). This research project takes these individual rights seriously as a resource for co-constructing interdependent learning communities.

## CHAPTER 2: LITERATURE REVIEW

This chapter presents a review of literature on student voice, professional learning communities (PLCs), and communities of practice (CoPs), which are the key areas of knowledge that informed this research.

### Approach to Literature Review

In my literature review I approached searching for the literature on student voice and CoPs by inserting the key phrases of student voice and Communities of Practice into the EBSCO search engine. I then sifted through the titles that came up and read through abstracts to determine which articles to read to inform my study. Regarding student voice there were limited findings linked to elementary Mathematics classrooms. Research by Cook-Sather (2002, 2006, 2018, 2020) proved instrumental in guiding my initial reading on this topic. References from these articles, and offshoots from these pieces of research, further expanded this literature review.

My approach to the literature on PLCs was different as it was first informed by the training and accompanying literature I has received as a member of my district's PLC Coaching Team. I reread these pieces of literature and then through discussions with my supervisor received advice on Canadian researchers studying PLCs and accessed their writing by searching for these authors. Finally, I did a general search with the keyword *professional learning communities*, and it was there that I accessed international literature on this topic.

## **Student Voice**

Reach me with more than words from textbooks—but words from the soul and the mind connected to the heart. What got you to teach me? Wasn't it to reach me? ... Relate to me, debate with me, respect me. (Strucker et al., 2001, p. 162)

Within this research as I considered altering the way in which learning was constructed within the classroom I inhabited as the *teacher*, I was cognizant of listening to the voices of other individuals who resided there with me, the students. In this research I was committed to listen to the voices of the students to hear their perspectives on accomplishing Math learning and to use these perspectives to change how we learned together and met the curricular outcomes set by the province of New Brunswick. To have attempted to make changes in how Math learning took place in our classroom without acknowledging and honouring the perspectives of those with whom I cohabited struck me as incomplete and disrespectful. As Cook-Sather (2002) noted: “There is something fundamentally amiss about building and rebuilding an entire system without consulting at any point those it is ostensibly designed to serve” (p. 3). I turn now to the literature on including student voice in educational decision making, outlining the shift that has occurred where children are viewed as individuals who are not only capable of offering insightful perspectives on their world but who also have the right to do so.

### **The Emergence of the Term *Student Voice***

Cook-Sather (2006) stated that beginning in “the early 1990s, a number of educators and social critics noted the exclusion of student voices from conversations about learning, teaching, and schooling, called for a rethinking of this exclusion, and began to take steps toward redressing it” (p. 261). In 1991, Canadian educator Michael

Fullan wrote: “What would happen if we treated the student as someone whose opinion mattered?” (p. 170). Cook-Sather (2006) has reported that since that time through the early 21<sup>st</sup> century the term *student voice* has been part of educational research and reform landscape in Canada, Australia, England, and the USA, indicating a “cultural shift—a retuning of ears” (p. 362) to listen to the perspectives and opinions of students as active participants in educational processes. Norwegian professor Kari Smith’s (2009) work illustrated one example of students as active participants using their voices to shape a learning component in which student voice is not traditionally heard.

### **Students’ Participation in Assessment Processes**

Kari Smith’s (2009) work has highlighted the benefits of students participating in assessment processes. These processes included creating tests, taking tests (including in unconventional ways such as group testing), and marking tests. Her experiences demonstrated that the inclusion of such measures contributed invaluable to the process of assessment for learning, rather than assessment of learning, as students are engaged as partners. She noted that such practices —ones that include learners as active participants in assessment—are counter-hegemonic to passive assessment practices where teachers, or persons other than students, hold the power. Including students as partners in the processes of assessment, while more time consuming, engages students in focusing on the learning rather than on a score or mark, and offers the insightful opportunity for teachers to reflect on their teaching through the lens of the students’ perspectives, knowledge, and strategies.

I appreciate the assessment possibilities Smith (2009) outlined as getting to the heart of classroom life and the goal of focusing on learning. Too often I have witnessed

students focusing solely on a mark that they deemed too low, which resulted in them feeling deflated or defeated and engaging in self, and other, blaming. As I reflected on our Math classroom, I recognized that I did not partner with the students to co-create an assessment tool or have them take a test as a group. I was anxious to return to the classroom to do so and expand upon the efforts I made to collaborate with Math students which to date revolved, and evolved, around the assessment process of feedback.

In their examination of students' perceptions regarding the assessment process of classroom feedback, Gamlem and Smith (2013) reported on a typology of classroom feedback that came from their study involving Norwegian 13- to 15-year-olds. The typology was documented as a quadrant with the vertical axis of the quadrant graded from passive recipient to active participant of feedback, while the bisecting horizontal axis ranged from low to high verbal interaction. Gamlem and Smith (2013) categorized the most influential feedback as the top right-hand quadrant (Type D) where there was both active participation and high verbal interaction:

Type D feedback (constructing achievement – dialogic feedback interaction – constructing the way forward) is rarely used in class, but when practised, students refer to it as useful. It generates learning, provides information about achievement, gives targeted individual information to proceed and develop understanding, and is used as an interactive dialogue between the teacher and the student(s) or among the students. (p. 16)

I am cognisant of the impact of assessment upon learning identities. In their study of the impact of the high stakes Key Stage 2 National Curriculum tests in the United Kingdom, Reay and Wiliam (1999) indicated that “students as young as 11 have very

clear perceptions about the influence of external assessment on curriculum” (p. 350). Although their study revolved around a summative external assessment, and the work I studied was internal and formative, I am appreciative of the students’ voices this study shared as a cautionary tale of which to be mindful. In Reay and Wiliam’s study, emotions such as fear and anxiety surfaced regarding the testing vehicle and preparations for it, as well as concerns about an undesirable impact on student identities. Students exhibited negative feelings about their current selves and negativity regarding their prospects of success. It was my intention that, by inviting students into deeper conversations about assessment in this era of encouraging distributed leadership within educational communities, students might feel and be empowered to garner a greater sense of agency with their learning. I am cognisant that, even through opening this door, I was exerting and exhibiting my power within, and imposing my values upon, the classroom. I believed this use of my power was ethical because opening these conversations holds the promise of increased understanding of the aim of assessment to inform continued improvement and growth, moving beyond the receiving of a grade or mark as static, final, and indicative of anything more than a point on a continuum of personal learning.

Just as Warton (2001) noted that the time had come for “the forgotten voices” (p. 164) of students to be listened to in order to understand how homework might be an “opportunity to truly engage seamless learning across home and school contexts” (p. 164), I sought to involve students’ voices regarding Mathematical assessment and learning within the classroom. Regarding homework, Warton (2001) suggested that “it is time students were encouraged to understand why they are required to complete a task that, for so many, is unpleasant” (p. 164). What might be accomplished if we facilitated

such an understanding about assessment and the value of practice for Mathematical learning?

Lundy (2007) found that young people and children's voices had much to offer in discussions about assessment, teaching, and learning in classrooms where they were given authentic opportunities to do so. Her analysis categorized four important characteristics to facilitating such sharing: space, voice, audience, and influence. Students require the opportunity to share their views (space), their views to be facilitated (voice), people to listen to what they say (audience), and for their voices to be heard and acted upon when appropriate (influence). I believe that creating an environment where these four aspects are part of the culture of a classroom have the added benefits of motivating students to focus on not only their own learning but also the learning of their classmates and a desire to be involved in making decisions that positively affect that learning. In this way there is a sharing or redistribution of power as students use their power to engage in a shared responsibility to practice and support one another's learning goals. As Kay (2018) noted: "Student power is an active thing" (p. 97). Kay (2018) encouraged us to note that students have had power since they began communicating with others, even though many classroom cultures suppress, develop, or prune this power (p. 97). How might a classroom be enacted that honors student power through listening to students' voices and implementing their ideas on aspects of learning that impact them?

Serriere et al. (2011) noted that, when studying how to foster student voice to get students to talk about why they are in school and how school can be better for them, we must consider and welcome changes in relationships between teachers and students, and among students while remaining watchful for the "degree to which student voice may

privilege the already privileged” (p. 567). Children with the most cultural capital are often those who speak the most. Teachers must be strategic in the use of small group, pair share, and other conversation strategies so that others can hear the voices of students who may be uncomfortable speaking in a large group. Additionally, teachers may strategically and purposefully prioritize students’ voices, agency, engagement, and power in the classroom space.

### **A Paradigm Shift**

“I’m big – you’re little. I’m right – you’re wrong. I’m old – you’re young and there’s nothing you can do about it.” Lansdown (2004) cited these harsh words uttered by a father (played by actor Danny DeVito) to his 5-year-old daughter (played by actress Mara Wilson) in the movie version of Roald Dahl’s (1996) *Matilda*. She noted that the father’s perspective “encapsulates, albeit somewhat brutishly, assumptions held about the status and capacities of young children” (Lansdown, 2004, p. 4). The view that adults, by virtue of their age and experience, hold the authority even on those matters that most significantly impact children is one which affects power relations within educational facilities such as an elementary school.

MacNaughton et al. (2007, 2008) and Gallacher and Gallagher (2008) have noted a paradigm shift, however, which began in the 1990s. The shift was one in which children’s competencies as capable social actors with the ability to contribute to our social world began to take hold. Holloway and Valentine (2000), Lansdown (2004), and Tangen (2008), among others, have discussed the notion of children being increasingly viewed as “beings” (Tangen, 2008, p. 157) and not as “becomings” toward adulthood (Tangen, 2008, p. 157). Tangen (2008) referred to this as the “new sociology of

childhood” (p. 157) and noted that the concept of “the competent child” (p. 158) has become part of the Western worldview, “increasing adult interest in children’s lives and learning” (Kryger, 2004, as cited in Tangen, 2008, p. 158). Barker and Weller (2003) were among the others who also noted this shift. MacNaughton et al. (2003) noted three key ideas associated with this newer image of childhood (p. 15):

- Young children can construct valid meanings about their world and their place in it.
- Young children know the world in alternative (not “inferior”) ways to adults.
- Young children’s perspectives and insights can help adults to understand their experiences better.

Challenges to this ontology included being able to recognize my own truth and having the courage to speak it, particularly when that view may be contested. An additional challenge to recognize was that of negotiating the power relations in a classroom to move past the teacher-student binary to provide a forum for the students to collaborate with each other to share their evolving truths. Developing compassionate processes to open a forum for pluralistic views to be explored was not an easy or straightforward task. I was aware of the need to work to provide a forum where privilege is examined in a way that allowed the marginalized or underprivileged to be explored and their voices heard.

Drawing from critical, feminist, and postmodern frameworks, Susan A. Tilley (2016) cautioned that conducting respectful research “can be demonstrated when student researchers understand the fine line between supporting and enabling participants’ rights to make their own decisions and patronizing them” (p. 17). She noted that recognizing

this fine line may be especially important and difficult when working with, among others, students in schools, and she encouraged researchers to pause for a moment to consider if they would be willing to volunteer to participate in their study.

### **A Right and Responsibility**

I firmly believe that children have a right to have a say in decisions that affect them. This belief is supported by the United Nation Convention on the Rights of the Child (1989) cited earlier. They are increasingly seen as people who are competent and capable of informing how their lives are experienced. According to Phillips et al. (2020):

A children's rights frame, combined with studies in the sociology of childhood and the worldwide attention to on philosophy of early childhood centres in Reggio Emilia, Italy, has witnessed a significant move to acknowledge young children as competent and capable learners. (p. 37)

The opportunity for children to have a voice is important to the situations that they are currently in and those they will experience in the future (Clark & Moss, 2011; Lansdown, 2004). Early childhood researchers Clark and Moss (2011), who developed the Mosaic Approach, a creative research framework for listening to children's voices, noted that one of the benefits of adults listening to children in a way that values their contributions was that this may enhance children's confidence. As Lansdown (2004) shared, "unless adults listen, children's lives are diminished. Participation enhances children's self-esteem and confidence, promotes their overall capacities, produces better outcomes, strengthens understanding of and commitment to democratic processes" (pp. 12-13). The ramifications of listening to students' voices, or not listening, reach beyond impacting a child's current reality. Having their voice heard impacts their well-being and future roles.

In order to effectively enable this to happen Lansdown (2004) noted that a partnership between children and the adults in their lives was needed where children's "perspectives are included, respected, and valued" (p. 13).

Coleman and Davies (2018) in their New Zealand study with 7- and 8-year-olds engaged students in Mathematical learning within a framework of a student-chosen dramatic theme of a pirate adventure. Their inquiry involved listening to their students' suggestions in developing the fictional framework within which Math learning was accomplished. The authors noted that their "position as participants within the drama relieved [them] from the roles of 'all-knowing teachers' and emboldened student voice" (Coleman & Davies, 2018, p. 16).

In this research, I was inspired by the work of Cook-Sather (2020) and her case study in which student voices and staff voices mingled to form pedagogical partnerships in higher education where the "co-creation of teaching and learning [brought] staff and student voices together, legitimating and supporting the further development of both" (p. 888). Her learning provoked questions for me about the possibilities with forming pedagogical and research partnerships with Grade 5 students. In her chapter in *Radical Collegiality through Student Voice*, Cook-Sather (2018) discussed the evolution of student voice in educational research and concluded thus:

As we continue to expand the range of voices elicited and choose modes of presentation that are inclusive, complexities of representation will remain a challenge, provoking us to engage in ongoing negotiation, with careful attention to rights, power and responsibility every step of the way as we advance our collective effort to progress and proliferate student voice across contexts and

continents in ways that take seriously diverse students' presence, participation and power in educational research. (p. 30)

Cook-Sather's observations about rights, power and responsibility in higher education resonated with my approach with the Grade 5 students.

Clark and Moss (2011) offered guidance when conferencing in order to truly listen to children. They noted the importance of choosing a setting for the conference carefully so that it is familiar and comfortable to the children. They encouraged researchers to be flexible and open to conferences that happen when children are on the move. Being thoughtful about the number of children involved in a conference and remaining sensitive to the children to allow them to stop answering questions or end the conference at any time were also important considerations the authors alerted researchers to. Lastly, Clark and Moss suggested taking time to repeat a conference after a time lapse so that the children can think about their previous responses and note any changes about how they felt or their situation.

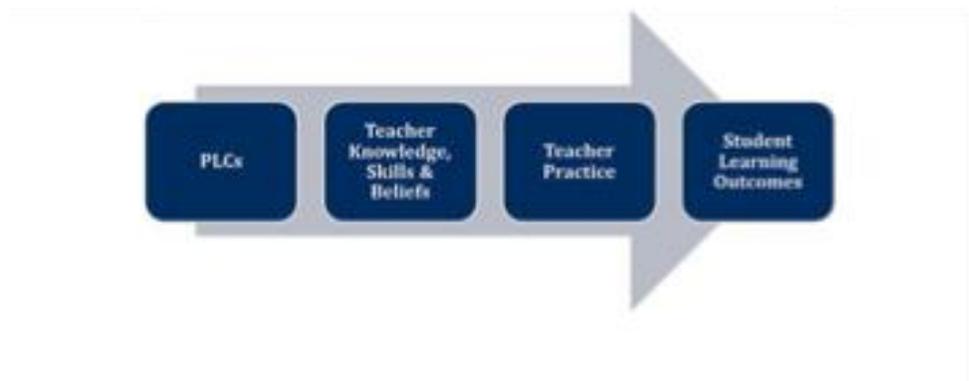
As I considered the guidance Clark and Moss offered, I was struck by the similarities to how groups of teachers in our school learned through their PLCs and the thought that went into constructing the groups for these learning communities. At the beginning of the school year, teachers and administration made decisions about how many, and which, teachers would meet in a group to look at aspects of learning in their classrooms. They co-constructed norms for meeting times, set recurring meeting dates and agendas, and used their voices to make plans for learning in the classrooms they inhabited. Could it be that the students in a classroom could operate in a manner like that

of a PLC to impact their learning? I looked to the literature on PLCs to consider this possibility.

### Professional Learning Communities (PLCs)

**Figure 1**

*Hairon et al.'s (2017) Impact of the PLC*



PLCs have been defined as groupings of teachers who meet to collaboratively engage in regular, systematic, and ongoing cycles of collective inquiry, with the intention to further develop their individual and collective capacity to improve learning outcomes for the students they serve (Brodie, 2021; DuFour et al., 2010; Hairon et al., 2017; Stoll et al., 2006). DuFour (2004) stated that initiating and sustaining a PLC revolves around three big ideas requiring “the school staff to focus on learning rather than teaching, work collaboratively on matters related to learning, and hold itself accountable for the kind of results that fuel continual improvement” (p. 11). Within these three big ideas, DuFour et al. (2008, pp. 183 - 184) encouraged teachers to focus on four questions:

1. What do we want each student to learn?
2. How will we know when each student has learned it?
3. How will we respond when a student has difficulty in learning?

4. How will we respond when a student has learned it?

The idea of professional teachers working in collaborative groups to assume greater responsibility for educational decisions in order to impact student achievement is central to the work of numerous educators from around the world, including Stoll et al. (2006) from the United Kingdom, Bezzina and Testa (2005) from Malta, DuFour et al. (2005) and Tobia and Hord (2012) from the United States, and Mitchell and Sackney (2015) from Canada. In my home province of New Brunswick, Canada, Dr. Ken Brien (University of New Brunswick) and Dr. Ray Williams (St. Thomas University) have been researching PLCs since 2007 and have created instruments to measure the implementation of PLCs at the school, district, and provincial levels. Over 70 schools in New Brunswick, as well as schools in the United States and Finland, have used these instruments.

My personal experience with PLCs began in 2007 with the New Brunswick Department of Education establishing PLC Coaching Teams from each district within our province. From 2007 to 2009, these teams received training from Solution Tree, a professional development company established in 1998. In 2007, I was invited by my school district's director to be a member of our district's PLC Coaching Team. The training that our team received promoted improved student learning through a shift in organizational structure. This shift focused on the collaborative voices of teachers working together to have a broader impact in decision-making about school improvement items such as student achievement. Many schools across our province, including my former school, have adopted the concept of PLCs. Teachers at our school worked collaboratively, focusing on student learning and data to inform what was done within

their classrooms. We had not, to date, included students in these discussions. Nor, to the best of my recollection, was including students part of the training sessions offered by Solution Tree that I attended.

As Watson (2014) noted: “While communities of learning in schools will necessarily involve participation of teachers as professionals ... there are interesting discussions to be had around the wider participation in PLCs and the implications of this for schools” (p. 20). Hairon et al. (2017) noted that “although international research on PLCs is relatively extensive, covering about three decades, there are still gaps in its research base; specifically on the concept of community and the effects of PLCs” (p. 72). Their writing meshed with my research interest in the possibilities in structuring the concept of community to include students intentionally and authentically in collaborations with teachers to examine and improve learning in their classroom. As Fisher et al. (2021) wrote regarding student learning communities as springboards for both academic and social-emotional development, it is important to have “active involvement of each member of a learning team” (p. 2).

As I considered my research focus centering on the work done in a classroom, including students’ voices working according to PLC principles, I considered if it may be more apt to drop the term *professional*. Would doing so alter my ability to claim that the work we accomplished was done as a PLC? Perhaps the answer lay in defining a PLC.

In looking to define a PLC, I am conscious of the assertion by Stoll et al. (2006) that there was no universal definition of PLCs. As Brien et al. (2009) noted, these authors have “summarized the literature on PLCs by highlighting five key characteristics: shared values and vision, collective responsibility, reflective professional inquiry, collaboration,

and the promotion of group and individual learning” (p. 3). It is these traits that identify work as a PLC. If we drop the word *professional* from the third characteristic are these now also the traits connected to many learning communities across a range of subject disciplines and cultures beyond schools?

Coral Mitchell and Larry Sackney (2000) talked about the “life world of school people” (p. xi) and their belief that schools should not serve externally determined purposes and goals, but rather “be structured such that the central purpose is the learning of the individuals who are engaged in the process of schooling” (p. xiii). They discussed in depth how the search for knowledge and the building of a learning community climate through practices such as shared leadership and team building develop the professionals in the community and thereby enhance student achievement. They asserted that not only students but all participants within a school also need to be learners. They addressed how teachers and administrators within a school can develop a community focused on collaborating in a caring and trusting environment and how this holds the potential to improve learning. They defined a *learning community* as “teachers and administrators who take an active, reflective, collaborative learning-oriented, growth-promoting approach toward the mysteries, problems, and perplexities of teaching and learning” (Mitchell & Sackney, 2000, p. 4). And as is the impetus for PLCs, learning is the topic that drives decisions about what does and does not happen in school life. I considered the possibility that while their work uses slightly different terminology by detaching the word *professional* from learning communities, their focus on learning and discussions on capacity building at three levels (personal, interpersonal, and organizational) was perhaps another moniker for groups engaged in the same kinds of learning. Below I examine each

of the three levels of capacity building in relation to our experiences in the Math classroom.

Mitchell and Sackney (2000) noted that the building of capacity begins first at the personal level where the professionals utilize critical reflection within a network of critical colleagues to engage in action research to build the capacity of their learning community. One example occurred within our Math classroom, when the students and I engaged in critical reflection as we examined data on how they did with assessments. Students considered which Math questions required further investigation, learning, or practice. They also considered which classroom activities would best support their learning. Would a tutorial from the teacher or a peer help them achieve better? Would added practice help them master a concept? Could a Math game be the answer to helping them nail down a skill? Students posed these and other questions for themselves as they reflected on their personal needs for learning.

The second level to build capacity, according to Mitchell and Sackney (2000), is an interpersonal development centering on reflective conversations and the building of trusting relationships. When students first began to examine their data, they were unable to immediately discern who had made an error on a particular question. As they worked to improve their personal achievement, there was a comradery that developed in the classroom. Students began to spontaneously share with other classmates where they were experiencing challenges and ask one another for support. As they worked together toward a common goal of improving our class assessment data, they were heard encouraging one another. There was a heightened sense of caring about each other's learning within their efforts to achieve this common goal. The celebrations we had when even small gains of

improvement were made supported the development of positive, trusting, relationships in the classroom and fueled motivation for continued growth.

Mitchell and Sackney (2000) described the third level of capacity building as organizational development focused on implementing learning teams, providing professional development, and expanding the trusting critical relationships amongst team members. In our work together in the Math classroom, students were often organized into learning teams which focused on the development of a skill such as three-digit by one-digit division. At times, I organized the teams. At others, the students would do so. At all times, the focus was on learning skills to improve the achievement of the class. This common goal united classmates. Trust was built as class members became closer in the work toward this common goal and the understanding that we would all speak and treat each other in a respectful manner. Further study in how the building of capacity at each of these three levels within a classroom became an important component of my research.

How might these three levels of capacity building be transposed into future classroom learning communities? How can I, and other teachers, facilitate a classroom environment where students engage in activities such as discussing the learning goals of the curriculum, reflecting on how they will achieve these goals, cultivating interpersonal skills as they collaborate with classmates, and organizing themselves to improve not only their own skills with Math but each class member's Mathematical understanding? These are very different conversations than the somewhat more typical classroom conversations between one student and his or her teacher about setting personal learning goals. My experience in 2016 led me to believe that developing the personal, interpersonal, and organizational levels of capacity within a classroom may hold great promise for improved

student achievement. As I developed my research focus, I wondered if I could classify this work as that of a PLC?

There were indeed aspects of how we approached our work in 2016 that were in line with a PLC. Group and individual learning were promoted and collaboration occurred. However, the students could not be classified as professionals, collective responsibility was intermittent, and more work might be done in future classrooms to develop stronger shared values and vision. In addition, while there was a focus on capacity building at the three levels outlined by Mitchell and Sackney (2000), this was done at the classroom level rather than outside the classroom in order to impact classroom learning. In a PLC the barriers among individuals are broken down and there is no single leader. My experiences at the school level entailed learning with other teachers to influence learning goals within our building. My wonderings had turned to how this dynamic can occur within a classroom when student voice influences classroom decision-making. In our Math classroom, the students' voices were a major driving force behind the activities they engaged in and the direction their learning took. While there are definite similarities, our work in 2016 did not fit precisely into the PLC framework. Could our work more closely align with another framework? To address this question, I looked to the theory of social learning and an offshoot of this theory, the concept of *communities of practice* (CoPs), for insights to further develop my understandings and to inform future practice.

### **Social Learning Theory and Communities of Practice (CoPs)**

The concept of Communities of Practice (CoP) was originated by Jean Lave and Etienne Wenger (1991) with the publication of *Situated Learning: Legitimate Peripheral*

*Participation.* In this text, they put forth their argument that learning is not just receiving or absorbing information but rather learning is the “increasing participation in communities of practice” (Lave & Wenger, 1991, p. 49).

In a more recent interview, Etienne Wenger-Trayner (formerly Wenger) spoke about the difference between cognitive learning theory and social learning theory (Wenger-Trayner & Wenger-Trayner, 2016b). While cognitive theory is focused on what happens in an individual’s head as one learns, social learning theory examines the reality that learning occurs when humans who are social beings are interacting with others. It is, however, about more than how people learn in groups. Social learning theory is about how

as social beings we engage with the world, with the social world to make sense of what we do and what needs to be achieved. So basically, a learning theory that takes very seriously that at the center is human beings and human beings are social beings. (Wenger-Trayner & Wenger-Trayner, 2016b, 0:15)

Etienne and Beverly Wenger-Trayner are internationally renowned social learning theorists who discussed how humans engage with the world as social beings and how this connects with the process of learning. One concept within social learning theory focuses on learning spaces. These spaces are what E. Wenger has named as *communities of practice* (CoPs). Smith et al. (2017) have called it “one of the most widely cited and influential conceptions of social learning” (p. 209). Did our 2016 classroom learning space fit within the framework of a CoP? I turn now to the literature on CoPs to see how our experience aligned and diverged from the concept of CoPs.

Lave and Wenger (1991) described a process of “legitimate peripheral participation” (LPP), where newcomers to a community move towards greater participation and membership by assuming factors such as the practices, tools, and language of the community (p. 40). Wenger (1998) defined a CoP as a construct in which members engage in a collective learning that is sustained by the pursuit of common goals and social interactions. Gellert (2013) noted that “social situations in which participants talk together, work together, generate ideas, build on others’ ideas, reason, explore, and discover together are reflective learning environments” (p. 114). The experience that occurred in our Math classroom for 6 weeks in 2020 was reminiscent of many of the descriptors Wenger used to define a CoP and which Gellert expanded upon. As I considered these descriptors, I questioned my overall classroom practices. These questions included: How often do I establish classroom routines that enable such a learning space to be created? How often do I remind students to work silently and independently? How often do I provide the space for students to reflect on their learning – individually, in small groups, and as a whole class? What does a learning space need to look like to be defined as a CoP?

“Communities of practice are as diverse as the situations that give rise to them” (Wenger & Snyder, 2000, p. 141). The concept of a CoP has been discussed in terms as varied as soccer moms to international banks or companies such as Hewlett-Packard. Within the literature on the utility of CoPs for knowledge creation and learning in organizations, researchers such as Roberts (2021), Smith et al. (2017), and Freeburg (2018) have examined CoPs in educational settings. Roberts examined the role of a librarian-researcher in an existing CoP of doctoral students, Smith et al. performed a

critical review on the use of Wenger's CoPs framework in blended and online learning within professional development and higher education, while Freeburg's (2018) paper investigated turning classrooms into CoPs, stating that in so doing it was "unique in introducing it to classroom instruction" (p. 79). Freeburg's (2018) research looked at

turning classrooms into an adapted CoP, [in which] instructors are situated to move beyond the texts or canons of their disciplines. This occurs as they a) invite unique student contributions to *create* ideas and knowledge that go beyond existing texts, b) develop trust and community among students that goes beyond simple icebreakers and standard group work, and c) engage consistently in action that recognizes the practical utility of what is learned. (p. 79)

While Freeburg's (2018) research looked at classrooms of higher education, it served as inspiration particularly when considering his concluding statement and its alignment with the interest in student voice within this research project: "More than mere pedagogical techniques, this is an approach to how instructors view classrooms and the students within them. Instructors recognize and trust the unique insights of students as they bring them into the practice of knowledge creation" (p. 92). As I focused on examining our classroom through the lens of a CoP, I considered questions such as: How does looking at what occurred in our Math class through the lens of the concept of a CoP inform my understandings? How might this concept illuminate qualities to be conscious of in further educational endeavours? Smith et al. (2017) noted three important concepts that underpin the principles of CoPs. Using Smith et al.'s words, each of these concepts is briefly explored in Figure 2 below.

**Figure 2**

*Smith et al.'s (2017) Descriptions of the Underpinning Concepts of CoPs*

<b>The Domain</b>	For Wenger (2004), the domain of a CoP constitutes “the area of knowledge that brings the community together, gives it its identity, and defines the key issues that members need to address” (para. 13). The domain, therefore, is what gives a group its identity and distinguishes it from a club of friends or a network of connections between people. (p. 211)
<b>The Community</b>	For Wenger (2004), the community constitutes “the group of people for whom the domain is relevant, the quality of the relationships among members, and the definition of the boundary between the inside and the outside” (para. 14). For a group of people to constitute a CoP, its members must come together around ideas or topics of interest (the domain) and interact with each other to learn together. (p. 211)
<b>The Practice</b>	Wenger (2004) defined practice as “the body of knowledge, methods, tools, stories, cases, documents, which members share and develop together” to address recurring problems in their specific contexts (para. 15). To our knowledge, the most recent attempt to define this construct from a Wengerian perspective came from Consalvo et al. (2015). These authors defined practice as “a way of acting in the world” and as “a field of endeavor and expertise” (p. 3). Combined, these definitions suggested that practice implies knowledge of and engagement with a domain. (p. 211)

E. Wenger-Trayner highlighted a significant factor that informed my thinking about our classroom work (Wenger-Trayner & Wenger-Trayner, 2016a). This factor came when he noted that the concept of CoPs could be used as an analytical lens to view the classroom. In doing so, he proposed looking at how professors or teachers construct what they do with their students and asked: “Do you, by inviting them in to interact with you, give them a window on who you are as a practitioner? Or are you simply an

instrument of curriculum delivery?” (Wenger-Trayner & Wenger-Trayner, 2016a, 1:20). It was by reflecting on this seminal question that I was able to see with greater clarity how the actions within our mathematics classroom in 2016 aligned with the concept of a CoP.

From the student’s initial comment that the students were going to be teachers that day to my willingness to “roll with it,” I created the conditions that invited the students in. No longer was I solely in charge of setting the classroom agenda, analyzing data on achievement, and making instructional choices. The students were invited to participate in making these key decisions, their voices were honoured, their suggestions enacted, as we collaborated to further Mathematical learning in our room. Students had been brought into an inner sanctum previously populated by the adults in the school. Perhaps most importantly, the students *felt* that they were on the inside. This contributed to greater engagement with the learning and an improved resilience to accomplish the learning, qualities I had not witnessed with these students in the months leading up to this. It was through this invitation that a profound difference was made. As E. Wenger-Trayner noted: “The professors and teachers, even in primary school, that I remember are the ones who invited me into the meaningfulness of what they were trying to teach” (Wenger-Trayner & Wenger-Trayner, 2016a, 1:39). What might the students say about how they feel about being invited into future classroom endeavours? This question guided the development of this research project.

E. Wenger-Trayner noted that the CoP concept might be appropriately used as a “way to create a learning space” (Wenger-Trayner & Wenger-Trayner, 2016a, 2:29) and “bring people together who can improve their practice by establishing a learning

partnership” (Wenger-Trayner & Wenger-Trayner, 2016a, 2:49). He cited groups such as teachers or personnel within human resources as benefiting from a CoP. As I considered how this concept linked with my research it was helpful to also consider what a CoP is not.

Farnsworth et al. (2016) differentiated between a CoP and a team: “A team is defined by a joint task, something they have to accomplish together. It is a task-driven partnership, whereas a community of practice is a learning partnership related to a domain of practice” (p. 143). In the Mathematics classroom, while the students and I were engaged in the joint task of impacting their learning outcomes, the day-to-day practices over the 6-week period were often different from one group of students to the next as they engaged in learning and practice directed by their personal learning needs. These learning partnerships within the domain of Mathematics placed our work within the field of a CoP.

According to Farnsworth et al. (2016):

Communities of practice will include a network aspect in that people need connections with each other to form a community; but not all networks are communities of practice in the sense that not all networks entail identification with a mutually negotiated competence around a domain of practice. (p. 143)

It is the phrase *mutually negotiated competence* that I struggled with in relation to identifying our work in the Mathematics classroom as a CoP. Could I state that their competence was mutually negotiated in a classroom where power relations, not only of the teacher-student binary but also that of the employer-employee (i.e., the expectations placed on classroom teachers and students by the Department of Education’s curricular

outcomes) were components of the learning environment? Typically, it is the teacher that directs learning in the classroom. The teacher makes many, if not all, decisions regarding what is done in the classroom, including, but not limited to, when and how learning, practice, and assessment are done. Guiding the teacher is the Department of Education, that holds the power of establishing mandated curriculum outcomes. In between these bodies lies an array of administration at the school (principal and vice-principal) and district (superintendent, director of schools, curriculum supervisors, and mentors) levels that exert forces on classroom learning decisions. Mutually negotiated competence in a classroom? Even in a classroom experience such as ours in 2016, where students held some power in decision-making, we were conscious of set curricular demands. I wondered what the students' perspective was on how much power they actually wielded.

As Hatchman and Rolland (2001) found, "When decisions are carried out in classrooms the only voices that are heard or listened to are adults, yet, it is the student who experiences what we adults view as the way to do business" (p. 3). As I moved forward with my research, I was cognisant of examining the inclusion of students' voices in making decisions and the concept of mutually negotiating competence. It was my hope that by including students' voices in my research we could tell of their perceptions, thoughts, and feelings and contribute to a body of knowledge that counteracts what Hatchman and Rolland (2001) went on to note: "Educators continue doing this [only listening to adult voices] even though some basic premises of teaching are to know your students, engage, challenge, and empower them in their own learning" (p. 2). How often would a group of teachers discuss the power of including students' voices when examining learning data and collaborating on how learning might be accomplished or

enhanced in a classroom? How often is an invitation for their power into learning processes provided? Had I as an individual teacher ever truly considered the power that such a shift in classroom dynamics might reveal until the student joked about his class doing the “work” of teachers?

Moving forward I was conscious of approaching further classroom situations as a CoP. What did this mean? I believe it begins with approaching the classroom as a learning environment where everyone in it is viewed as a learner *and* a teacher, a social environment where we endeavour to establish norms that support us in working toward a common goal, albeit in various manners uniquely suited to the individuals that make up our group. For the group members to mutually cultivate each other’s competence as members of a learning community.

I wondered if it would be possible to set aside the traditional model of teacher-student dynamic? Realistically, maybe not completely. But perhaps, as Sewell et al. (2013) demonstrated in their research project with four classrooms in a large New Zealand urban state primary school, “joint participation interactions were shown to co-exist with more traditional pedagogies” (p. 54). To begin, I needed to do as they suggested and confront my “long held assumptions about how learning happens” (Sewell et al., 2013, p. 53) and acknowledge the importance of the socio-emotional factors which impact the Mathematical conceptual understanding I sought to improve.

Sewell et al. (2013) acknowledged the energy required of teachers interested in working to create joint participation learning communities in their classrooms. The traditional paradigm of the teacher as the transporter of knowledge shifts to one which models greater reciprocity and the joint participation of teacher and students as co-

creators of learning. This requires these individuals to enter into an “enterprise of enquiry that is dialogically co-constructed” (p. 52). These authors clarify this by providing examples of teacher-led conversations (Appendix A) and teacher-student co-constructed conversations (Appendix B). In a dialogically co-constructed classroom, where the teacher and the students are collaborating as co-learners and genuinely engaged in purposeful activity, socio-emotional factors of the classroom environment are very important.

My research questions flowed from this literature review. And so, it was all these aspects of student voice, PLCs, and CoPs that informed my thinking as I turned to considering the methodology that might best suit this research project.

### **CHAPTER 3: RESEARCH DESIGN, METHODOLOGY, AND METHODS**

It is by no means a matter of plucking a methodology off the shelf. We acquaint ourselves with the various methodologies. We evaluate their presuppositions. We weigh their strengths and weaknesses. Having done all that and more besides, we still have to forge a methodology that will meet *our* particular purposes in *this* research. (Crotty, 1998, p. 14)

The aim of this study was to tell the story of one classroom's experience as I, the teacher, and the students I served undertook our learning collaboratively. Central to this aim was listening to the students' perspectives on Mathematical learning and how the classroom might operate best to encourage the highest levels of student achievement. To do this, I chose to forge a qualitative research methodology which fell within the realm of action research known as *collaborative action inquiry* (CAI). The primary purposes behind this choice were twofold: (a) to set a space for the students to learn collaboratively with me and (b) to set a space for me to examine my practices.

This chapter outlines the ontological and epistemological underpinnings to the research methodology of CAI. I discuss various iterations of action research which informed the pivotal attributes for the study's methodology. Three key rationales for the use of this methodology are then presented along with a discussion of the research quality criteria and an outline of the methods used to collect and analyze data. Finally, I will share an unanticipated aspect of the study that arose as the study was nearing completion.

#### **A Qualitative Choice**

Creswell and Creswell (2018) encouraged researchers to view quantitative and qualitative research approaches not as "distinct categories, polar opposites, or

dichotomies” (p. 3), but rather as on a continuum with a study tending to be either more qualitative or quantitative and with mixed methods research residing at the midpoint of the continuum. Tilley (2016) stated, “If the purpose of the research is to better understand the social world and human experience, qualitative methodology is an appropriate choice to make” (p. 28). She noted that “qualitative researchers frequently generate knowledge to get to deeper meanings of experience while acknowledging the contextual, value-laden character of the knowledge constructed as a result of the research” (Tilley, 2016, p. 28). I recognize that the context of my study impacts the story I tell about the research which may not be as generalizable as studies conducted through quantitative methodology. In order to be most certain of the qualitative path I embarked on, I turned to considering the philosophical beliefs that a qualitative researcher brings to a study to determine if they meshed with my stance as a researcher. To do so, I have examined the ontological and epistemological beliefs that correspond to my worldview and researcher perspective.

My understanding of research is informed by the work of McNiff and Whitehead (2002), who noted the importance of examining the researcher’s values and the intentions behind the research. They stated that research is “generally held to involve” (McNiff & Whitehead, 2002, p. 16):

- Ontology – the way we view ourselves, a theory of being;
- Epistemology – how we understand knowledge, including how knowledge is acquired;
- Methodology – how we do things.

In examining my views in relation to the classroom experience of 2016, I understood that research within the action research framework was best suited to my research plan. It was

important to me to revisit the classroom experience with a group of students to engage in research that would capture our combined perspectives of how a Math classroom might operate differently to positively impact achievement. I share now the ideas that came to shape this decision.

The core of this research was an understanding of how the students and I viewed our lived experiences in the Math classroom. Popper (as cited by Crotty, 1998) stated that “interpretivism entails an ontology in which social reality is regarded as the product of processes by which social actors together negotiate the meanings for actions and situations” (p. 11). How did the students view their learning? Before developing this understanding in the study, it was important to examine my preconceived notions of how we know what is. In examining my perspectives on what it means to know, I related closely to a constructivist approach to knowing.

My theoretical perspective is impacted by the epistemology of the constructivism view of human knowledge. Crotty (1998) defined this perspective by stating that there “is no objective truth waiting for us to discover it. Truth, or meaning, comes into existence in and out of our engagement with the realities in our world” (p. 8). It is the truths and meanings associated with how one particular classroom operated in a collaborative manner that are at the heart of my research. What truths did our story provide? How did we make meaning from our experiences that affirmed the practices we engaged in, critiqued them, and how might all of these inform future endeavours?

Methodology refers to the overall research strategy informed by our worldviews, our ontology, and our epistemology. With a vast array of methodologies to choose from, it was not a matter of choosing one that was better than another but of choosing one

which meshed best with the context under investigation and adapting it to the study. For this study, which aimed to make sense of the situation enabling the students and me to be co-constructors of a classroom learning community, I determined that a study involving collaborative action inquiry was most suitable to our needs and aims.

### **Iterations Toward Collaborative Action Inquiry**

In my readings around CAI, I have encountered various names for comparable methodologies reflecting similar intentions, principles, or tenets. I have come to the stance that whether researchers name their methodology as *collaborative action inquiry* (Purcell, 2014), *evidence-informed collaborative inquiry* (Sinnema et al., 2011), *collaborative action research* (Sewell et al., 2013), *collaborative inquiry* (Briscoe, 2017), *authentic collaborative inquiry* (Hauver James et al., 2015), or *participatory action research* (Tuck & McKenzie, 2015; Tuck, 2022), they are methodologies similar enough to have collectively informed my research project. As I proceeded, I drew from each of these methodologies to construct my research design. I state this now so that any generalizations I make are acknowledged as part of the meaning-making process I have undertaken and are not intended to show anything but respect for the works which have informed my understandings.

### **Defining Collaborative Action Inquiry**

My understandings of CAI are informed by studies such as those of Sinnema et al. (2011), Sewell et al. (2013), Hauver James et al. (2015), Briscoe (2017), and Stone (2017), as well as the writing of Donohoo and Katz (2017). In each of these studies, tenets reoccur as part of the methodology of CAI. These tenets include: (a) research that takes place within the space it endeavours to improve, (b) an observance of a need, (c) the

participation of different educational stakeholders in dialogue and reflection to transform practice, (d) educators involved in a collaborative process, (e) scholarship and theory linked to practice, (f) a quest for deeper understanding to enhance insight into a plan that improves teaching and student achievement, and, finally, (g) action. I turn now to examine these tenets, using the cited studies to help illuminate each.

### **Research in Place**

In each of the studies reviewed for this dissertation, the collaborators inquired into a determined need, within their specific context, which they were endeavouring to improve. In the study by Sinnema and colleagues (2011), the academic researcher and teacher participants were linked to the New Zealand Ministry of Education as they engaged in using evidence-informed collaborative inquiry to help improve learning and teaching practice for diverse social studies learners. For Hauver James et al. (2015), the collaborators were situated in a school in the southeastern United States, while Stone (2017) collaborated with her primary classroom colleagues in a private Christian school in the southern suburbs of a major metropolitan area in the southeastern United States to examine the use of electronic children's books in relation to their instructional practices. Briscoe's (2017) work revolved around three rural elementary school teachers in the province of Newfoundland and Labrador in Canada. In each of these studies, the place or location in which it occurred was an important factor in the research or inquiry.

To further illustrate this tenet, I draw from the work of Tuck and McKenzie (2015). The methodology of CAI is similar to other pieces of research such as participatory action research (PAR) and I request that readers not be distracted by the inclusion of other names for the research. Whether the researcher is describing work in

which others participated or in which others collaborated, the research included the involvement of others in shaping the work. I have sought to include these research methodologies to help illuminate the various tenets for the reader and myself. To this end, Tuck and McKenzie (2015) described the methodology of PAR as an approach to “gathering and validating information, making decisions, and beliefs about knowledge and knowing” (p. 88) in which “those who would be subjects of research---community members, young people, Indigenous peoples, people with disabilities, people in prison, migrants and countless other groups---are instead engaged as co-researchers” (p. 88). PAR involves the efforts of “real people in real places” and as such “yield[s] real and useful knowledge” (Tuck & McKenzie, 2015, p. 89).

### **Observance of a Need**

The yielded knowledge stems from a question or observed need which frames the inquiry. Briscoe’s (2017) study stemmed from the frustration she and her teaching partners felt regarding their struggle to improve student learning in their classrooms. Over the course of three annual reviews prior to her research project, their students’ test scores in both language arts and mathematics remained well below the average provincial level. It was this need and the desire for positive change that marked the beginning of her inquiry.

Donohoo and Katz (2017) wrote of the structure underlying collaborative teacher inquiry. They stated that it begins with an inquiry question, which involves the identification of an evidence-based student learning need. The collaborating teachers framed this question as a challenge of their professional practice and developed a working hypothesis. This working hypothesis formed a theory of action which outlined

how the teachers planned to conduct their research. They noted that this structure showcased the interconnection between, or causality of, the team's actions and the impact on the identified student learning need. The authors also noted that a particular strength to collaborative teacher inquiry which springs from the observance of a need is the collective teacher efficacy it generates: "Collaborative teacher inquiry provides a structure for meaningful collaboration, increases teachers' knowledge about their collective work, and contributes to the cohesion of a team of educators, all of which enable collective teacher efficacy to flourish" (Donohoo & Katz, 2017, p. 25).

Goddard et al. (2004) defined collective teacher efficacy as "the judgment of teachers in a school that the faculty as a whole can organize and execute the courses of action required to have a positive effect on students" (p. 4). Donohoo et al. (2018) reported that:

According to [John Hattie's] Visible Learning research, based on a synthesis of more than 1500 meta-analyses, collective teacher efficacy is greater than three times more powerful and predictive of student achievement than socioeconomic status. It is more than double the effect of prior achievement and more than triple the effect of home environment and parental involvement. It is also greater than three times more predictive of student achievement than student motivation and concentration, persistence, and engagement. (p. 41)

The strength of collective teacher efficacy is a powerful influencer into the benefits of collaborative inquiry. Educators observe a need and generate an inquiry question to guide their actions. The work that these educators then engage in positively impacts their beliefs in student learning and the actual growth in student learning. Both impacts are

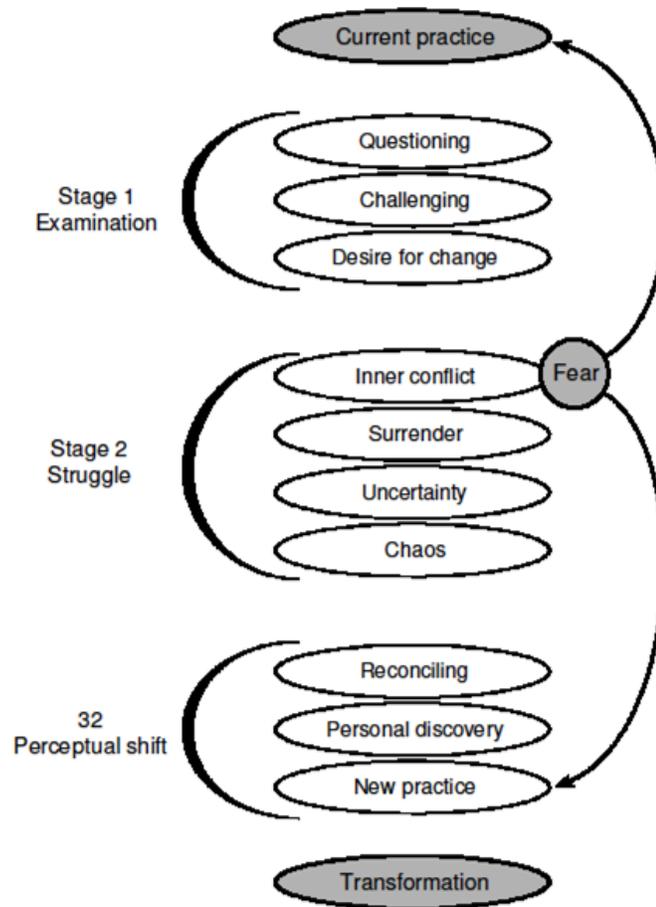
worthy offshoots of the work educators engage in once a need has been observed and targeted. Of note throughout an inquiry is the important role of dialogue and reflection amongst the collaborators. My collaborators within this research project included the children I was teaching, the researchers I was reading, colleagues, and members of my committee.

### **Dialogue and Reflection**

All the studies referred to earlier in this section incorporated various forms of reflection and dialogue among the participants. Briscoe (2017) was interested in how this was accomplished. In her study, the teachers employed a critical reflection framework to think deliberately about certain topics and to articulate the rationale underlying their thinking and affecting their teaching decisions, choices, and practices. Their critical reflections involved naming and addressing the challenges they encountered. These included synthesizing experiences, integrating information and feedback, uncovering underlying reasons, and discovering new meaning (Larrivee, 2000). Figure 2 outlines the framework for this critical reflection.

**Figure 3**

*Critical Reflection Framework*



Whether participants in a study use this critical reflection framework, or reflect and dialogue through conversations as spontaneous as the classroom or staffroom conversations which partially informed the study of Sewell et al. (2013), or even the “porch sitting chatting” (Hauver James et al., 2015, p. 54) engaged in by the participants of Hauver James et al. (2015), the exploring that the participants engaged in through their processes was used as a way to imagine a better way forward. Dialogue and reflection

capitalizing on the collective experience of the research participants within a study is a hallmark and strength of CAI.

### **Collaboration of Educational Stakeholders**

Nelson and Slavit (2008) noted that, while structures such as PLCs have sometimes been incorporated into school life, opportunities for teachers to collaborate to engage in inquiry are atypical to many educators' daily work lives. The authors have framed collaborative inquiry as teachers working together and engaging in a cyclical collaborative process of action and reflection which facilitates ongoing dialogue around teaching practices and their effect on student learning. As McNiff and Whitehead (2002) noted: "Traditional researchers enquire into other people's lives and speak about other people as data. Action researchers enquire into their own lives and speak with other people as colleagues" (p. 1).

Hauver James et al. (2015) noted, "Theory and practice are inherently intertwined. Research that seeks to understand the intersection of theory and practice can best be served by those steeped in both" (p. 54). I discuss the tenet of scholarship and theory linked to practice more fully in the next section. I refer to it now, as their research shared the story of how two elementary school teachers, a principal, and a graduate research assistant engaged in an authentic collaborative inquiry that explored the evolution of a shared vision of teaching which prioritized attention to students' emotional and social growth, in addition to their academic learning. They cited the fluid and flexible collaborative relationship between the university and the school that the teachers, principal, and research assistant belonged to as being central to their inquiry. One of the

teachers in the study noted that point when discussing the benefits of various educational stakeholders coming together to inquire into a teaching matter:

I think working with other organizations is a great way to do that. Keeping to yourself gives you nothing to compare yourself to. You start thinking alike, coming up with the same solutions to the same problem. You stop asking yourself the tough questions. You tend to make excuses or be satisfied. Observing in other schools, *collaborating* with colleagues, outside the school, gives one a moment to pause, to reflect, to consider other possibilities. (Hauver James et al., 2015, p. 57)

As this study engaged students from the classroom community, of which I was a part, I collaborated *with* the students as education stakeholders who, I believed, had valuable insights on their lived experiences in our Math classroom. To borrow from Indigenous scholar Eve Tuck (2022) in her talk for the Centre for Teaching and Learning, “to embody the epistemology of researching with rather than on to engage in meaning-making with is to believe that young people and community members are experts in their own lives” (39:16).

### **Scholarship and Theory Linked to Practice**

As noted in the previous section, there is an interwoven quality to practice and theory that is a critical component of inquiry. Briscoe (2017) was in a unique situation to meld the worlds of theory and practice, as she was both a practising academic and teacher at the time of her study. She was able to draw upon her experiences in the classroom, as well as her work with the Knowledge Network of Applied Educational Research (KNAER), an Ontario Ministry-funded initiative whose purpose was to increase knowledge mobilization between research and practice. Linking theory to practice may

also come in other forms, such as collaborators performing literature reviews (Briscoe, 2017) or inquiry as professional development opportunities (Briscoe, 2017; Hauver James et al., 2015; Sinnema et al., 2011). In addition to researching theoretical components of the inquiry, there is also the consideration of the scholarship of the inquiry and collaborators holding themselves accountable to gathering relevant and valid data.

Sinnema et al. (2011) classified their research as “evidence-informed collaborative inquiry” (p. 247), noting that neither the collaborative nor the evidence-informed aspects of inquiry, on their own, are optimal for substantive improvement to either teaching practice or student achievement. As the study collaborators reflected, planned, and acted to enhance the environment they were seeking to impact, they were gathering evidence through observations, work samples, and other data to analyse and reflect upon as they considered next steps and directions.

### **A Quest for Deeper Understanding that Enhances a Plan**

Another common thread noted within my review of collaborative inquiry literature was a quest for a deeper understanding of an aspect of teaching and learning. Briscoe (2017) stated: “We used current literature and a critical reflection framework to understand why our teaching approaches were not resulting in increased student learning. This allowed us to examine our previously unrecognized and uninterrupted—and often, problematic—beliefs and values” (p. 43). Sinnema et al.’s (2011) study revealed how “collaborative inquiry supported and challenged teachers to improve their classroom practice” (p. 247), while Hauver et al. (2015) positioned their study as a “quest for understanding critical issues at the heart of teaching and learning” (p. 53). It is this potentially deeper understanding of the fields of teaching and learning through my lens as

a teacher and researcher, as well as the lenses of the individuals I plan to collaborate with, that supports my capacity to examine and interrupt unrecognized habitual learning processes for teaching Mathematics.

### **Action**

The educators involved in the studies were all engaged in some form of action with the goal being to impact positive change on the environment they were researching. Teachers in the study by Sinnema et al. (2011), for example, engaged in a year-long professional development project in which 26 social studies teachers worked with academic researchers to inquire into and collaborate on improving learning for Māori and Pasifika students in New Zealand. The authors pinpointed three primary forms of action between the participating researchers and teacher stakeholders. The first was a postgraduate university course, which included a dialogic online component to the course work. In this course, teachers were encouraged to engage with relevant research. The second was in-class support, which provided the teachers with the opportunity to view their teaching through the observations and data that the academic researchers brought to their teaching situations. Links were formed between the classroom-based findings and research literature. Additionally, as teachers shared their engagement with these findings in their online discussions, insights were gained. Thirdly, there were four reflection and planning (RaP) days held at the university. These days highlighted not only the tenet of *action*, the coming together to collectively think, share, and plan regarding their work to implement pedagogical change, but also the tenets of the collaborative nature of CAI and the important role of dialogue and reflection.

In each of these studies, the participants were focused on how their inquiry might alter their practice and what actions they might put into place to impact positive change. Through reflection, action, and planning, they engaged in change that transformed teaching within their contexts and enhanced the learning of the students they worked with. Additionally, in each of the examples cited in this section, the inquiry benefited from the inclusion of the consideration of research or evidence to support the changes they were making to their practices. I turn now to examine the strengths and limitations of CAI.

### **Strengths and Limitations of Collaborative Action Inquiry**

The contextual, value-laden character of the knowledge generated through a research methodology such as CAI may be viewed as a limitation. The knowledge generated may not be generalizable. Generalizability is not the intent. However, aspects of the knowledge may be transferable or adapted by readers to other contexts. While CAI studies offer a window on contextual experiences, their value may come primarily to those individuals involved in the collaboration of the study. As Stone (2017) noted, “There is no one solution to every teaching problem, but only a solution in the context of the individual classroom” (p. 57).

It is this deeper understanding of the individual educational situation that provides insight to the collaborators within a study, pointing them toward a recommended course of action for themselves and the students they serve. Will this insight lead the way to improvement? For the classroom or site involved in the study, this is likely so. For others who may learn of the study and seek to replicate it, the results may not prove to be replicable or generalizable. It is also acknowledged that objective reality will not be

captured in such a study. The strength of the stories generated by CAI may perhaps be viewed more as an impetus to other conversations, reflections, or further study of other contexts by those who inhabit them. I have come to learn that the procedural strengths of CAI include the collective use of the existing expertise of the participants and the strengthening of the studied context developed through the inquiry, both of which enhanced engagement and efficacy for those involved in the research.

Donohoo and Katz (2017) described collaborative teacher inquiry to involve “teachers working together to tackle challenges of professional practice by questioning what they already know and do” (p. 23) and “requires that teams consider whether or not the evidence shows that their actions have had an effect on student learning” (p. 23). Whether the collaborators are teachers, a cohort of other educational stakeholders, or other individuals in another field of study undertaking a collaborative action inquiry, these individuals bring their perspectives and expertise to inform the study, determining the actions taken and engaging in reflecting on the success and next steps of the path they have embarked on.

Sewell et al. (2013) noted that the aim of collaborative action research is “to bring together action and reflection, theory and practice in participation with others in order to bring about change and develop practical understandings” (p. 47). In doing so, I argue that the context under study is strengthened. Collaborators are focused on understanding their context more deeply in order to implement positive change. With the success of positive change come other positive impacts for those involved.

Perhaps one of the most powerful possible impacts of CAI is the potential for invigorating a sense of engagement in the work under examination. As participants

examine their practices, reflect on their context, and take actions to improve the situations under inquiry, there can be positive feelings associated with the inquiry that positively influence the individuals involved. As Hume (2001) shared,

I have become familiar with the exhilaration, the pure rush of adrenalin that overtakes me, when I feel myself creating new knowledge and taking new actions in my work, based on a close examination of collected data and stimulating conversations with like-minded colleagues. (p. 150)

She went on to discuss her hopes that this was the sort of engagement and power she aspired to create with her students through co-researching with them. It is this promise that influenced the rationale for my research.

Hauver James et al. (2015) noted that research “in its many iterations can seek to do many things --- explain, prove, disprove” (p. 54) and their use of the word *inquiry* is an intentional choice “of representing our quest for understanding” (p. 54). They offered the explanation of what inquiry is not to clarify their point, stating that it is not a “top-down research initiative undertaken to prove the worth of a particular intervention” (Hauver James et al., 2015, p. 54). Nor is it “research that seeks to document and compare attrition rates or test scores” (Hauver James et al, 2015, p. 54). Instead, they noted that inquiry involves practitioners re-conceptualizing their role and the work they do. The challenge, they stated, in the work of re-conceptualizing is for the collaborators to hold a shared vision and to come together, seeing each other as valuable sources of knowledge, working together in a democratic and authentic manner. To achieve this is not a simple task. The tasks of time management and scheduling are of particular

importance. If not handled effectively, the authors noted, there is a significant impact on the inquiry.

Dana (2015) attributed the coining of the phrase *inquiry as stance* to scholars Marilyn Cochran-Smith and Susan Lytle. Cochran-Smith and Lytle (1999) offered the term to “describe the positions teachers and others who work together in inquiry communities take toward knowledge and its relationships” (pp. 288-289). They noted that the term is “intended to capture the ways we stand, the ways we see, and the lenses we see through” (Cochran-Smith & Lytle, 1999, pp. 288-289). It was in the choosing of the word *inquiry* to describe my research that I hoped to emulate this stance as I sought to learn more about building a classroom learning community to honour the voices within it in order to improve the learning for all who resided there.

Dana (2015) described the essence of inquiry as a stance as “a way to live one’s life as an educator to maximize impact, making life and learning conditions better for all the children we teach” (pp. 164-165). It is indeed this essence that I sought to embody in our classroom, not only for the students that I have a responsibility to and for but also for myself as their teacher so that my learning might evolve too.

### **Rationales for Collaborative Action Inquiry**

In this next section, I offer three rationales for using CAI for my study: a practical purpose, collaborating with students, and links to the tenets of CAI.

#### **Rationale 1: A Practical Purpose**

McNiff and Whitehead (2002) noted that the “methodology of action research is that people ask questions such as ‘How do I do this better? How do we understand?’” (p. 18). As a teaching principal these questions were central to my leadership goals. Whether

my focus was on the classroom community I was a part of, or the broader school community I inhabited, I was consistently assessing how I did things, learning from how others did things, and contemplating to understand more deeply what was happening around me. Reflective practice is a concept that McNiff and Whitehead noted as being popularized by Donald Schön in 1983. It is a value that permeates the daily life of teachers within our province, as we are expected to be reflective practitioners within our classrooms.

Teachers in New Brunswick are encouraged to use a cyclical process of “Plan, Do, Check and Act” (New Brunswick Department of Education and Early Childhood Development, 2016) when creating plans for their classrooms (See Appendix C: Teaching Process Map). At each point on the teaching process map, teachers are asked to make decisions about what is to be done based on their professional judgement. This teaching process is very similar to the action research process outlined by McNiff and Whitehead (2002), where researchers are engaged in their own cyclical process of reviewing current practice to choose an area to improve upon, planning a way forward (Plan), implementing it (Do), and engaging with others to assess the plan and its results (Check), and then determining the next steps forward (Act) – a cyclic process that cultivates professional judgement. It is perhaps not a surprise that the methodology I have chosen is linked so directly to the reflective practice that is an integral component of my professional responsibilities to support children and educators. It is linked to a pull that I felt when making the decision to pursue further studies.

My interest in pursuing a Ph.D. was spurred by my desire to use the experience I have gained in my educational career to look deeply at a component of my work so that I

might hone it to the best of my ability during the final years of my time in public school education and in support of educators in my next professional endeavors. I viewed the key questions posed by McNiff and Whitehead (2002) as central to my research project. Through questioning “How do I do this better? How do I understand?”, I sought to examine, reflect, and theorize my own classroom practices with the goal of improving the quality of learning that happens within the classrooms I inhabit.

### **Rationale 2: Collaborating with Students**

I recognize that the situation I studied included more than myself and my role as an educator. There were others in the classroom who held a significant place in the research. To reflect more fully on the practices we engaged in, I viewed it as important to include the students’ voices in this study and therefore engaged in a collaborative action research project with them. As I proceeded, I acknowledged this as a challenge to the hegemony of prioritizing adult or educator voices in studies about the classroom. I believe, however, that students’ insights can have a profound effect on how we might proceed in a classroom.

Particularly, I was interested in student voice not as a symbolic practice but as a pragmatic occupation, one in which students’ voices were sought and utilized to elicit their understandings and perspectives to, in turn, positively impact the learning environment in our mathematics classroom. I was interested in what students could tell me about their experience within a math classroom. How might their perspectives shape how learning happened? What could my experiences in teaching and my own studies, coupled with my students’ perspectives, teach me? How could the inquiry into such a bridge between the individuals within a classroom community inform us?

The addition of the term *collaborative* to the methodology of action research spoke to me as I considered my research. As I engaged in the process of planning, acting, reflecting, and collecting data, I engaged with the students in this process and utilized their unique perspectives to inform what we did in our classroom. I believe there is much to be gained by capitalizing on their expertise as learners in a classroom community. And rather than designing research which aimed to gather information on the students, I endeavoured to research with them. I believe that together our inquiry may develop practical applications to create a fuller picture on how to improve math learning, and perhaps learning in a broader sense beyond the subject area of math. As Hauver James et al. (2015) found:

Too often, research on teaching and learning is de-contextualized or fails to capitalize on the expertise of diverse individuals. What is needed, instead, is a way to bring scattered conversations and lines of inquiry together – to connect scholarship and theory building with practice, to bridge the rarely traversed space where the two speak to one another. (p. 53)

Mertler (2016) noted that action research is often designed, implemented, and conducted in a collaborative manner. There are several key characteristics of *collaborative action research* (Clauzet et al., 2008, p. 2). It consists of practitioners learning together as a team focusing on a common issue, problem, or goal. Through this learning, a synergy develops, which inspires the team. Additionally, momentum develops, which provides insight into the issue along with greater learning and growth relative to the problem under examination by the team. My research defined the collaborators or practitioners to include the Grade 5 students along with myself. There is

a paucity of research studies that have included elementary students as collaborators. I hope to broaden this field with my research. My 35 years of teaching experience have led me to the belief that the development of an environment in which the teacher and students inform each other is among the most satisfying and relevant of learning experiences. For, as Fielding (2004) noted:

In its most creative form, students as researchers involves staff and students learning with and from each other and in doing so the traditional roles of teacher and student become much less firmly fixed, much more malleable, much more explicitly and joyfully interdependent. (p. 304)

The goal of including students as collaborators was to collect rich data that included a genuine student perspective. How are their perspectives different from or complementary to the teacher, adult, or professional perspective, and what can their insights add to the understanding of how learning takes place in the classroom? At the heart of our collaboration, I wanted to know what it was like to be a Math student in our classroom and work collaboratively to see what we could do to perhaps better their experiences.

My plans were guided by the four sociocultural principles that guided Sewell's (2011) study on dialogue in the classroom (p. 272):

- We are all learners and we are all teachers.
- We share decisions about learning.
- We share responsibilities for learning.
- We have learning conversations.

When using this approach to gathering and validating information, the validity of participants' perspectives or perceptions is an area of possible debate (Tuck & McKenzie, 2015). I recognize that, for some, this debate may be heightened because of the age of the student participants and the perspective that children may not be viewed as research partners able to provide valid information. I viewed this differently and saw students as providing valuable expertise in providing information on how they learn best. This view was, in part, informed by researchers.

As stated earlier in this chapter, MacNaughton et al. (2007, 2008) and Gallacher and Gallagher (2008) noted a paradigm shift which began in the 1990s in which children's competencies as capable social actors with the ability to contribute to our social world began to take hold. As a reminder, researchers Holloway and Valentine (2000), Lansdown (2004), and Tangen (2008) discussed the notion of children being increasingly viewed as "beings" (Tangen, 2008, p. 157) and not as "becomings" toward adulthood (Tangen, 2008, p. 157). Tangen (2008) referred to this as the "new sociology of childhood" (p. 157) and noted that the concept of "the competent child" (p. 158) had become part of the Western worldview.

Challenges to this ontology include being able to recognize my own truth and having the courage to speak their truth particularly when that view may be contested. Additionally, negotiating the power relations in a classroom to move past the teacher-student binary to provide a forum for the students I am collaborating with to share their truths, with each other and myself, was a challenge I faced. Developing compassionate processes to open a forum for pluralistic views to be explored was not an easy or straightforward task. I was cognizant of working to provide a forum where privilege was

examined in a way which allowed the marginalized or underprivileged to explore having their voices listened to.

Tilley (2016) cautioned that conducting respectful research “can be demonstrated when student researchers understand the fine line between supporting and enabling participants’ rights to make their own decisions and patronizing them” (p. 17). She noted that recognizing this fine line may be especially important and difficult when working with, among others, students in schools and she encouraged researchers to pause for a moment to consider if they would be willing to volunteer to participate in their own research project. It is this advice that I kept at the forefront of my mind as I proceeded with my research.

### **Rationale 3: Links to the Tenets of CAI**

As stated earlier, my path to claiming CAI stemmed from an educational experience involving myself and the Grade 5 Mathematics students during the winter of 2016. It was through reflecting on this experience, reading about studies that used CAI methodology, and talking with fellow classmates and our professors that I came to the realization that CAI was the methodology that best suited my research project. A study that would become an extension of the 2016 educational experience. I will now share with you why I felt this to be so.

A literature review of the overarching field of action research, which includes CAI, revealed it as a methodology of inquiry in which practitioners engage in a process of self-reflection in order for practitioners to improve their own professional practice (Hendricks, 2017; Kitchen & Stevens, 2008) as well as the greater school improvement (Hendricks, 2017; McNiff & Whitehead, 2002; Robins, 2015). McNiff et al. (as cited in

McNiff & Whitehead, 2002) noted that a basic action research process can be described as follows:

We review our current practice, identify an aspect we want to improve, imagine a way forward, try it out, and take stock of what happens. We modify our plan in light of what we have found and continue with the ‘action’, evaluate the modified action, and so on until we are satisfied with that aspect of our work. (p. 71)

Exploring this framework of the action research process with the students as we collaborated and inquired into how our classroom might operate differently to positively impact student achievement with set curricular Mathematics outcomes was the goal of my research project.

### **Research Quality Criteria**

In this section I share how the study meets the required research quality criteria. On the topic of research quality, Crotty (1998) offered these comments:

In the end, we want outcomes that merit respect. We want the observers of our research to recognise it as sound research. Our conclusions need to stand up. On some understandings of research (and of truth), this will mean we are after objective, valid and generalizable conclusions as the outcome of our research. On other understandings, this is never realisable. Human knowledge is not like that. At best, our outcomes will be suggestive rather than conclusive. They will be plausible, perhaps even convincing, ways of seeing things --- and, to be sure, helpful ways of seeing things --- but certainly not any “one true way” of seeing things. (p. 13)

These words reflected my hopes and understandings of what I wanted to achieve with my research. In this section I will examine how traditional quantitative research constructs such as validity and reliability may be adapted to discern the standards of a qualitative research project. As well, I will consider how the criteria of replicability and generalizability are viewed as impacting the standard of legitimacy and, finally, we will look at alternative quality criteria for qualitative research.

Research is often evaluated on traits such as validity and reliability. Creswell and Creswell (2018) stated that qualitative validity demands “that the researcher checks for the accuracy of the findings by employing certain procedures” (p. 250). They noted eight main strategies and listed them from those most frequently used and easiest to implement to those which are more difficult to implement, and which are used more occasionally. These strategies include triangulation, use of member checking, use of rich and thick description, clarifying researcher bias, presenting negative or discrepant information, spending prolonged time in the field, use of peer debriefing, and use of an external auditor.

Within the qualitative field, validity may be assessed as a trait of trustworthiness or authenticity. Lincoln et al. (2018) encouraged researchers to ask questions such as: “Are these findings sufficiently authentic (isomorphic to some reality, trustworthy, related to the way others construct their social worlds) that I may trust myself acting on their implications?” (Locations 4535-4541). Linked to trustworthiness, fairness has been likened to “balance; that is, all stakeholder views, perspectives, values, claims, concerns, and voices should be apparent in the text” (Lincoln et al., 2018, Locations 4605-4612). Researchers must be mindful of holding their research projects to rigorous standards and

enacting processes such as those outlined by Creswell and Creswell (2018) to ensure their legitimacy.

When respondents in Bryman et al.’s (2008) study on legitimacy criteria in quantitative, qualitative, and mixed methods research were asked “whether quantitative research criteria should be applied to qualitative research” (p. 266), 75% of these social policy researcher respondents indicated that validity was regarded as a criterion for qualitative research. As their table below indicates, there was less support for the criteria of reliability and considerably less support for replicability, and generalizability.

**Table 3**

*Relevance of Traditional Criteria for Qualitative Research* (Bryman et al., 2008, p. 266)

	<b>Number (n/251):</b>	<b>Percentage:</b>
<b>Validity</b>	190	75.7
<b>Reliability</b>	142	56.8
<b>Replicability</b>	80	31.9
<b>Generalizability</b>	77	30.7

Creswell and Creswell (2018) defined qualitative reliability as indicating “that a particular approach is consistent across different researchers and different projects” (p. 250). Approximately half of the respondents to Bryman et al.’s (2008) study noted reliability as a criterion of legitimacy with less than a third of respondents’ support given to the aspects of replicability and generalizability. As Creswell and Creswell (2018) noted, the “value of qualitative research lies in the particular description and themes

developed in the context of the specific site” (p. 202). While they acknowledge the limited use of the term *qualitative generalizability*, the intent of qualitative inquiry is not to be able to “generalize findings to individuals, sites, or places outside of those under study” (Creswell & Creswell, 2018, p. 202). The corresponding term for generalizability within the qualitative research field is *transferability*. This refers to the reader being able to transfer learning from the context described to another one.

Bryman et al. (2008) noted that the findings in Table 3 “beg the question of which criteria respondents feel *should* be applied to qualitative research” (p. 266). Table 4 showcases the criteria endorsed by a large percentage of the respondents. It indicates that credibility and confirmability are supported by large percentages of the social policy researcher respondents. These criteria are concerned with how believable the findings are and whether personal biases have been controlled throughout the research process. The findings associated with relevance to other settings (transferability) and likeliness to occur at other times were criteria which received less validation. These findings parallel with the low percentage for generalizability indicated in Table 3.

**Table 4**

*Relevance of Alternative Criteria for Qualitative Research* (Bryman et al., 2008, p. 267)

	<b>Number (n/251):</b>	<b>Percentage:</b>
<b>Credibility</b>	199	79.3
<b>Transferability</b>	111	44.2
<b>Dependability</b>	101	40.2
<b>Confirmability</b>	163	64.9

As I moved forward with my research project, the criteria of credibility and confirmability were at the forefront of consideration. So too were the traits of balance, trustworthiness, and the use of rich, thick descriptions to showcase the specificity of the context under study.

### **Research Setting and Participants**

This research was conducted in my school in Anglophone School District North. The school had a population of 246 students and is in a small urban area. I was learning with a Grade 5 Mathematics class of 21 students, and I was the sole adult in this classroom. There were no Educational Assistants or co-teachers with us in our classroom. While the study aimed to focus on a 2-month period (mid-January to mid-March 2020), it was cut short by 2 weeks due to COVID-19, which I will discuss shortly. I was the classroom teacher for this subject area for the school year. As the teacher, throughout that school year, I was establishing a classroom which incorporated the four sociocultural

principles which I wrote of earlier, and which guided Sewell's (2011) study on dialogue in the classroom. As a reminder these were:

- We are all learners and we are all teachers.
- We share decisions about learning.
- We share responsibilities for learning.
- We have learning conversations. (p. 272)

I endeavoured to establish a classroom environment that honored and embodied these principles since we began our learning together in September 2019.

I was also the principal of the school and, as such, was aware of the power this position held both within the classroom and the school at large. This was an added layer to the roles the Math students saw me in and it held the potential to bring with it the perception of authority and an uneven distribution of power in decision-making. It was important for me to be aware of and consider these factors as I learned with the Math students. A key factor in the success of the research rested in the degree of trustworthiness I was able to facilitate between the students and myself, as well as among the students themselves.

### **Trust, Reflexivity, and Reciprocity**

Paramount to the study was the establishment of a trusting environment where the participants could share authentically without fear of recrimination. It was important to work at creating an environment to enable this so that those involved in the study felt safe to share their perceptions on how the classroom operated. I anticipated that being part of a research project was a new role for the students I planned to learn with. Points of conversation with them included questioning them about whether they had been involved

in a study before and letting them know, without applying overt pressure, how crucial it was to the process that they feel a sense of ownership to it, comfortable to share their thoughts, and free to state their desire to not have their perspectives examined or reported on.

Another consideration of trustworthiness was that of understanding that the comments and thoughts of the participants formed the basis of the dissertation that others may read. The value of the final dissertation will rest in the reader's ability to trust that the depicted is authentic. Having the honest thoughts of participants to draw upon to construct a meaningful text which examined a situation was the basis of this dissertation that is not only built on trustworthiness but is also trustworthy.

Throughout this meaning-making process, it was important to establish the role of reflexivity. Xerri (2018) stated that "given my deep immersion in the research context, the need to engage in reflexivity was of fundamental importance" (p. 38). He noted the importance of being constantly aware of his dual role as a researcher and teacher, a situation which in this respect mirrors this one. In my context, it was important for me to be aware of the various roles I held within the Mathematics classroom: teacher, learner, researcher, and principal. Being vigilantly aware of these roles and acknowledging the biases I carried based on my personal background, experiences, and values were important to my role as a participant in this collaborative action research project. These are areas that I anticipated impacting my participation. I remained alert and watchful for ways in which I may not have originally anticipated impacting my role to manifest themselves as the project progressed. I remained mindful of, and watchful for, the

unexpected, the unanticipated, the out of the ordinary, and the confusing, and examined these aspects with diligence.

Matthews et al. (2019), in their work on Students as Partners (SaP), noted that while “SaP can represent many practices, it is fundamentally about relationships between teachers and learners underpinned by particular principles and values” (p. 281). Cook-Sather et al. (2014, as cited by Matthews et al., 2019) highlighted three guiding principles of respect, reciprocity, and relationships that underlie partnerships. Drawing on this work, Cook-Sather and Felten (2017, as cited by Matthews et al., 2019) noted that partnership occurs within “an ethic of reciprocity,” a “process of balanced give and take not of commodities but rather of contributions, perceptions, insights, forms of participation” (p. 282). It is these tenets of reciprocity that I was mindful of as I approached this research. I sought to be mindful of creating an atmosphere where there was give and take in how we proceeded, where all contributions were valued to establish a classroom where the students and I co-created plans and collaborated on decisions integral to our Math learning. I sought to establish an environment where respect was valued, relationships were nurtured, and reciprocity underlined the way we conducted our learning. Encompassing all these attributes were the ethical considerations for conducting research with children.

### **Ethical Considerations**

This study received approval from the UNB Research Ethics Board and followed the expectations of UNB’s research ethics policies. As the participants for this research project were recruited from the Grade 5 Math class in which I was the teacher, particular

ethical considerations were important due to the age of the participants (children) and my role as their teacher and principal, which held significant power.

The students were informed of the research through an information session with me. In this session I gave them the student friendly newsletter (see appendix D) and explained the study. I gave them two versions of a student permission letter, one in student friendly language (see appendices E and F). I told them that if they wished to participate in the research, I needed them to complete and return one of these letters. The students who agreed to participate in the study used only the student friendly version. The package that was sent home included copies of the newsletter, the two versions of the student permission letter, and a parent consent letter (see appendix G). In order for a student to be considered a participant in the research, consent was required from both the students and their parents/guardians.

Acknowledging the power relationship between me, as teacher and principal, and the students, I aimed to be very transparent about this relationship within the writing of this research dissertation. From the initial information session with the students, through the student friendly newsletter, and information letters seeking consent, I stated that I was inviting the students to participate, that they were to make this decision freely knowing that they may withdraw their consent at any time and that there would be no negative repercussions to making the decision to not be part of the project. Inducements were not given to entice the students to participate.

Written consent was also sought and obtained from the superintendent of our school district (see appendix H) whose position entails looking out for the best interests of all the students within it.

Ethical considerations for this project were guided by UNB's Early Childhood Centre's 2008 document entitled *The New Brunswick Curriculum Framework for Early Learning and Child Care*, which set a precedent for using children's voices and child-produced artifacts. This curriculum was produced out of a research project where the early childhood team applied to ethically include children's first names, drawings, and photos in recognition that children contributed to knowledge, meaning making, and pedagogical practices in early childhood sites. Guided by this, the students within this study were invited to provide consent to the specific categories of the use of journal entries, photographs, interview data, and achievement data within the final dissertation document. The students also had the choice, at various points throughout this study, to use their actual first name or a pseudonym within the write-up of this research. I ensured that each individual student's choices were honoured in the writing of this dissertation.

The research was carried out for the participants' direct benefit, in that it sought to enhance the classroom learning environment they were part of and with the ideal that our contributions to research might benefit other classrooms in the future. This leads to a discussion of data collection methods utilized.

### **Data Collection Methods**

Clark and Moss (2011) through their "mosaic" approach utilized information-gathering tools such as disposable cameras, mapping, tours, role playing, interviews, and observations to garner children's perspectives. When brought together these various pieces of the mosaic formed a detailed picture to be dialogued about, reflected upon, and interpreted to inform a deeper understanding of their area of study. To provide

participants in this study with multiple ways to share their thoughts, feelings, and ideas, I used observations, interviews, reflective journals, and image capturing.

Throughout the process of data collection, I was mindful of a powerful statement written by Jo Vance (2016) on her blog regarding New Year resolutions:

As a new year beckons, I've decided to eschew lists and resolutions and simply choose a word to hold close to my heart in the coming year. I am choosing *presence*. May I be present to what is in front of me. May I not turn away. May I keep my feet touching the ground. May I lean into hope and trust. (para. 4)

I inserted this quote at the front of my reflective journal as a reminder to be present throughout the research.

## **Observations**

As Clark and Moss (2011) reminded readers, “in searching for new ways of listening to young children it is important we do not abandon established practices such as observations which can contribute to our understanding of children’s lives” (p. 18). Creswell and Creswell (2018) noted that a qualitative observation occurs “when the researcher takes field notes on the behavior and activities of the individuals at the research site” (p. 186). The field notes I scribed focused on the behaviors and activities of both myself and the students during our one hour of Math class which occurred from Monday to Friday from mid-January to the end of February 2020. As reported in Chapter 1, we were guided by the following research questions:

1. What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students’ voices?

2. How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision makers of their learning?
3. How do these shifts impact student achievement?

I recorded the activities that occurred in the class, my observations of the relationships within our classroom, as well as instances of positive involvement and resiliency with learning. I consciously noted items that surprised me or seemed out of the ordinary.

Records of academic achievement with the Grade 5 Mathematics program supplemented these observations and tracked student progress with mandatory curricular outcomes.

I kept these field notes in my reflective journal and began the coding process by identifying observations such as “portraits of the participants, a reconstruction of a dialogue, a description of the physical setting, accounts of particular events or activities” (Creswell & Creswell, 2018, p. 190) on the left-hand pages of my journal, and reflection notes and thoughts such as “speculation, feelings, problems, ideas, hunches, impressions, and prejudices” (Bogdan & Biklen, 1992, as cited in Creswell & Creswell, 2018, p. 190) on the right-hand pages of my reflective journal.

### **Interviews**

Svanbjörnsdóttir et al. (2016) noted that “leaders and teams have to explore their collaboration to promote discussions, not least with students” (p. 605). It was my hope that, with a few guiding questions and probes, I would be able to extend the collaboration with the students in a discussion around how our classroom operated, how this made them feel, as well as gather their impressions regarding if this was effective for them and how we might change what we did if we were to do this again.

Toward the end of the research project timeframe, I planned to conduct face-to-face interviews in the research setting of the classroom. I believed that holding the interviews in the classroom where we did our learning would facilitate meaningful conversations about our activities in the place where they occurred. This however did not transpire. Two weeks shy of the scheduled end of our research project, schools in New Brunswick closed due to concern with COVID-19. I was thankful that one of the students, Daniel, and his father established a weekly Zoom call for anyone in our class to connect during this time. Through Zoom, I was able to conduct interviews with small groups of students. For those students who were not able to connect via Zoom, I conducted one-on-one interviews over the phone. There were four small group Zoom interviews, four individual phone call interviews, and one student who was not able to be interviewed.

### **An Unanticipated Research Participant**

Something strange happened on an unremarkable day

just before the season changed.

Everybody who was outside ...

...went inside.

Everyone.

Everywhere.

All over the world.

(Pham, 2021)

Dr. Kim Stewart introduced me to Pham's (2021) picture book *Outside, Inside*. The words above from the beginning of the book reflect the situation that impacted the

world and our study. On February 28<sup>th</sup>, 2020, the students and I, like so many New Brunswick students and school staff, headed out of school for a much-anticipated March Break. I was set to return to school on March 16<sup>th</sup> for a final 2-week period of collaborating and data collecting with the students. I did not anticipate that these plans would be necessarily set aside, impacted by COVID-19 with the world in the midst of a pandemic. It is not possible for me to write about this research project without acknowledging the impact that this virus, and the concern about it, had on our learning. I have come to view COVID-19 as another research participant, albeit an unwelcomed and unanticipated one, in this study.

On Friday, March 13<sup>th</sup>, 2020, as I crossed the United States/Canada border, it was announced that schools in New Brunswick would close for a 2-week period. I had just arrived back in New Brunswick from an extended March Break trip with my family and was learning that I would be isolating for 14 days. With these two realities, the world felt like it had stopped as I, along with so many others, waited to see how school would proceed for the final months of the 2019-20 school year. Amidst questions of how school in general would evolve, I was questioning what would become of our research project amidst worry about so many aspects of the unfolding and uncertain situation in the world. The changing landscape of life at that time was unlike any other time in my career. In the end, schools in the anglophone sector of New Brunswick were shut down for 3 weeks with online learning beginning the week of April 6<sup>th</sup> and a preliminary focus of staff reaching out to students to reconnect and check in on how they were doing. A focus on academic outcomes was not a reality until later in that month.

As we began to reconnect with our students in April, I found myself further immersed in wondering what to do regarding our study. Would I set aside the learning that had been completed to date and begin anew next year with another cohort of students? At the time, this was a very real consideration. And yet, as I lived with that thought for a bit, it did not settle well with me. I had invested time and energy with this cohort of students and, more importantly, the students I was learning with had devoted time and energy and had become invested in this project. To set our learning aside would feel dismissive of what had transpired in our classroom, and in a study considering student voice, to toss aside this group's voice felt disingenuous.

In consultation with my supervisor and in conversation with trusted colleagues I determined that I would report on our learnings and perspectives, acknowledging the impact of COVID-19 on them. And so, I share with you this unique twist on our research so that COVID-19's impact is acknowledged in this description of our methodology and given voice alongside the anticipated voices of the students and myself. For, as I have come to realize, as with so many situations under this pandemic, there is no avoiding it. COVID-19 impacted the term of the study, my reflections and ruminations with the data, and my wonderings of the students' perspectives of our in-class time.

### **Interviews (Continued)**

The interviews with the students took place in May and June 2020, 2 and 3 months after our in-class time. There were four video interviews. Two of these included two students each and two included three students each. Anticipating varying degrees of eloquence among the participants, I had planned to engage with two to three participants at a time with the hope that having peers come together might spark deeper conversation

amongst the group and also allow for the students to feel more comfortable sharing their ideas. Unfortunately, it was not possible to arrange for all students to be interviewed in a group setting. Schedules and the varying availability of technology to students at home impacted our ability to connect, exposing a socio-cultural inequity experienced by some learners through COVID. There were also four phone call interviews with one student each.

All the interviews were semi-structured and focused on the following questions:

1. Tell me what it was like to be a math student in our classroom.
2. What words would you use to describe the relationships between the members of our classroom?
3. How did our math classroom operate differently than other math classrooms you have been a part of?
4. What did we do in class that was most helpful to you learning more about math?
5. What did we do in class that has not been helpful to you learning more about math?

As students shared their thoughts, I probed and used the phrases “Tell me more about \_\_\_\_\_” or “Explain what you meant by \_\_\_\_\_” to obtain more information or an explanation. While my goal was to make the interview both comfortable and enjoyable for the students so that they were at ease to share their ideas, the time span between our classroom experiences and the interviews, the worry about COVID-19, as well as the new format of video or phone calls had an impact on these.

A detailed interview protocol based on Creswell and Creswell's (2018) sample interview protocol was used in all interviews (see appendix I).

### **Reflective Journals**

The students and I had the opportunity to share our thoughts, feelings, and ideas in personal reflective journals. My reflective journal was a key source of ongoing data collection and provided me with an outlet to document happenings in the classroom and thoughts about these. It provided a space for me to think through ideas and in so doing revealed insights into our classroom experiences.

As there were different aptitudes for writing amongst the student participants, I discussed with them that their journal was a safe place for them to write, draw, or create a text in whatever manner they felt comfortable with to describe what they were thinking about regarding our Math classroom experiences. These documents supplemented my observations and the interviews.

### **Image Capturing**

As I established a procedure that valued not only writing, but also drawing or using other mediums to represent the students' perceptions, I captured images to share in my dissertation such as a photograph of a journal entry to further illuminate a point. While I planned to have a camera available to the students to capture images that they felt were important to show others about how our classroom operated, what actually happened was that the students would ask me to take a picture of them or a piece of their learning. This allowed me to strategically frame photos of students learning together that did not include students who had not agreed to be part of the study without students having to discern this and potentially fragment the class dynamic. I found it useful to

reflect on the image(s) that we felt were important enough to capture as I analyzed the data.

### **Student Achievement Data**

Student achievement data was an integral component of this research project. This data was both summative and formative in nature. Summative data was collected and is displayed in tables within this document to share the resulting student achievement. This data is shared to highlight achievement for students at the beginning and end of the project (see Tables 5 & 6). The data also held a formative role. Periodically throughout the project, I shared achievement data with the students based on their most recent achievement with the questions associated with the outcomes we were learning with. Together the students and I would reflect on accomplishments and further areas to focus on to guide us in planning our future Math learning opportunities together.

Students also collected and tracked their personal achievement with the 1-minute quizzes (see appendix J). Each student created a progressive bar graph by adding to it each time they had completed a quiz. This tracked their progress with this aspect of data over the duration of our project. A sample of one of these graphs can be found in Figure 8.

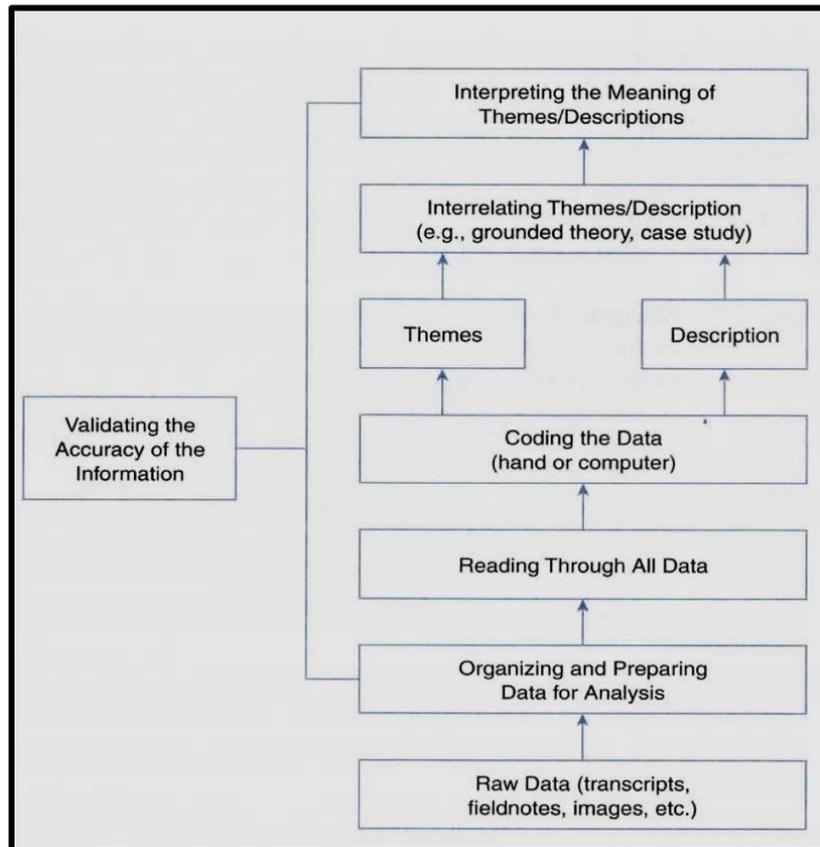
### **Data Analysis**

In the months following the interviews with the students I analyzed the various forms of collected data to make sense and construct meaning of the texts and images collected throughout the study. As Creswell and Creswell (2018) noted, this “involves segmenting and taking apart the data (like peeling back the layers of an onion) ... as well as putting it back together again” (pp. 190, 192). This was not a linear course endeavour.

However, instituting a data analysis plan which incorporated sequential steps as recommended by Creswell and Creswell (2018) helped to make this process streamlined and manageable. Figure 4 illustrates their proposed data analysis plan for qualitative research.

**Figure 4**

*Data Analysis Plan*



(Creswell & Creswell, 2018, p. 194)

The raw data that I gathered included the digital recordings and eventual transcriptions of the interviews with the students, the reflective journals of the students and myself, the assessments the students completed, the students' logs of data from their 1-minute quizzes along with these quizzes, and digital images which were housed on my

phone. All these pieces of data, other than the digital recordings and images which were stored on my phone, were sorted into like categories. For example, all the students' assessments were organized alphabetically by student name and kept in one pile. Each category of data was stored in my work area in my home.

I found it helpful to transcribe the interviews myself. Themes that I had noticed while doing the interviews became obvious through the transcription process. I also looked for items that appeared to be surprising. While transcribing the interviews, I would take breaks from this and read through portions of the reflective journals and began to flag items that coordinated with the themes emerging in the interviews. Once the data had been gathered, sorted, organized, and prepared for analysis, I took a break to walk away from it to return to it with what I hoped would be a fresh perspective.

I read all of the data to get a general sense of the information in its entirety and began to reflect on the overarching questions of: "What general ideas are participants saying? What is the tone of the ideas? What is the impression of the overall depth, credibility, and use of the information?" (Creswell & Creswell, 2018, p. 193). I recorded thoughts on these questions in the margins of the transcripts and continued to use my reflective journal to record ideas. This turned out to be a cyclical process that I would reflect on and return to over a period of months as I read and reread the data to allow the time I needed to feel that I had a thorough feel for the data. Once I felt comfortable that I had lived with this process to feel a sense of completion, the process of coding began.

Creswell and Creswell (2018) noted that:

**Coding** is the process of organizing the data by bracketing chunks (or text or image segments) and writing a word representing a category in the margins

(Rossmann & Rallis, 2012). It involves taking text data or pictures gathered during data collection, segmenting sentences (or paragraphs) or images into categories, and labeling those categories with a term, often based in the actual language of the participant (called an *in vivo* term). (pp. 193-194)

The authors noted that researchers found codes to fall into three categories: expected codes, surprising codes, and codes of unusual or of conceptual interest. I used these categories in the coding process by inserting an “E” (expected), “S” (surprising), or “U” (unique) as a prefix to each code. As with the transcribing process, I found it most helpful to do this coding by hand. While doing so, I kept Tesch’s (1990, cited by Creswell & Creswell, 2018) eight steps typically used in forming codes in mind. These steps are outlined in Figure 5 below, as found in Creswell and Creswell (2018, p. 196).

**Figure 5**

*Tesch’s Eight Steps in the Coding Process*

<b>Tesch’s Eight Steps in the Coding Process</b>
1. Get a sense of the whole. Read all the transcripts carefully. Perhaps jot down some ideas as they come to mind as you read.
2. Pick one document (i.e., one interview) --- the most interesting one, the shortest, the one on top of the pile. Go through it, asking yourself, “What is this about?” Do not think about the substance of the information but its underlying meaning. Write thoughts in the margin.
3. When you have completed this task for several participants, make a list of all topics. Cluster together similar topics. Form these topics into columns, perhaps arrayed as major, unique, and leftover topics

4. Now take this list and go back to your data. Abbreviate the topics as codes and write the codes next to the appropriate segments of the text. Try this preliminary organizing scheme to see if new categories and codes emerge.
5. Find the most descriptive wording for your topics and turn them into categories. Look for ways of reducing your total list of categories by grouping topics that relate to each other. Perhaps draw lines between your categories to show interrelationships.
6. Make a final decision on the abbreviation for each category and alphabetize these codes.
7. Assemble the data material belonging to each category in one place and perform a preliminary analysis.
8. If necessary, recode your existing data.

I found it helpful through the coding process to have these eight steps printed out and taped on the wall in front of me. I began the coding process with the transcripts of the interviews and chose the interview that was the most robust to start with. While I became anxious at various points through this process, concerned about the abbreviated term of the study and my perception that the students were struggling with being away from school amidst worries about the pandemic, codes did emerge. These codes generated themes to share. Through this process, various headings to use in the writing of Chapter 4 for this dissertation became clear to me. As this process unfolded, I sorted and reorganized the data under these headings. I included specific evidence such as an image, a quotation, or an assessment sample to build the narrative of this research and to answer the research questions.

I found it helpful to transcribe the interviews and the students' reflective journals myself to provide another opportunity for me to think with the student's thoughts and observations. To begin to develop a deeper sense of the data, I read the transcripts as a whole several times over several days and thought about the information provided by the students. Initially, I found that doing this with a paper copy of the transcripts was most helpful. After the initial few readings, however, I gravitated to the transcripts saved on my computer. I found it helpful to use the highlighting tool to select various colours to begin colour coding topics that were emerging e.g., the use of the word *fun* and perspectives about co-creating quizzes. I soon found that within these topics there were differences and my understanding about how numerous codes could emerge within the data became apparent.

I began with the longest, most robust interview and proceeded through each of the eight interviews being mindful of Tesch's direction to not think about the substance of the information but to focus on the meaning of what the students had shared. I found it helpful to concentrate on the question: *What are the students telling me?* This was a challenging task. I was concerned about the depth and breadth of the interview data. Trusting that there were messages to be revealed in what the students had shared during a very unusual and uncertain time for us was a very real component that I grappled with, weeks removed from our actual in-class time together. This issue was a result of a pandemic that prevented regular operations in New Brunswick schools.

Periodically, I would jot notes in the margins via the comment boxes in the review tab within the Word document to note questions or thoughts that occurred to me. Once this was completed for each of the interviews, I used Tesch's suggested categories

of major, unique, and leftover topics to organize the colour-coded phrases of the transcript. These topics were then assigned codes such as FwG (Fun with Games) and I returned to the transcripts to note the segments within the text that exemplified the code topic, placing the code next to each. While no new categories or codes emerged through this process, I did adjust the codes to connect to the category columns particularly those identified as major or unique. For example, the code for fun became FwG-M, indicating that it was repeated often and I determined it to fall within the major category.

Consolidating categories came next. Sticking with the theme of fun as an example, there were five categories associated with fun. They were fun with games, fun getting to choose with whom they learned with, fun choosing quiz questions, fun being in Math class, and fun in achievement. These categories were determined to fall under the coding category of F! I used these codes to create a document with the alphabetized codes and coordinating phrases from the interviews and compiled all of the data belonging to a code to read and analyze.

While Tesch outlined eight steps to the coding process which I read as linear, I found it to be a process that was not so. I often circled back through the steps, rereading the transcripts further analyzing the data, adjusting codes, and sometimes combining categories as I searched to make meaning from the organized fragments of the student's voices.

I then moved on to perform these steps with the students' reflective journals, using coloured pens to highlight topics on the hard copies of the journals to get a sense of their thoughts initially before deciding how to transcribe them. The phrases and statements that coordinated with the codes were determined while coding the transcripts

and then placed within the document. There were many statements within the journals that I determined to be outside the focus of the study, and these were placed within the leftover category.

The coding process was also instrumental in reviewing the information within my own reflective journal. As a singular data source of this type I veered from following Tesch's steps and relied on reading my journal as a whole. I used the codes that emerged from the interviews and student's reflective journals to jot notes in the margins of my journal. Items that I had written about merged with the codes from these two sources. The categories of major and unique also featured into these readings and the analysis of my journal. I noted items that were similar and repeatedly mentioned as major and items that stood out as different or unique. I turn now to sharing specific information that emerged in each of the data sources.

## CHAPTER 4: FINDINGS

In this chapter I will share the data that emerged through the course of this study via interviews, images, reflections, and observations from the students and myself, as well as the achievement data that inform our three research questions:

1. What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices?
2. How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision-makers of their learning?
3. How do these shifts impact student achievement?

In this chapter, I begin with the interview data and then turn to the achievement data gathered over the course of 6 weeks. Coding from the data was identified from data from the students' reflective journals as well as my own. Images from our study are shared throughout this chapter to provide readers with connections among student co-researchers and to further articulate the findings from the conversations, writings, observations, and achievement data that portray the story of our 6-week study.

### Interview Data

As I did with the data analysis process, I begin with sharing the findings from the interviews completed with the students. These interviews occurred 2 to 2.5 months after our last in-class session together on February 28<sup>th</sup>, 2020. This time was characterized by emergency fully remote learning and mandates for social distancing, that included the restriction to maintain a single household bubble. Fourteen of the participating students

were interviewed and one student was unable to be reached for an interview. These interviews had the challenging aspects of a time lapse between our in-class time with the study and discussing our observations and thoughts about the study. Additionally, the mediums of Zoom and phone calls, which were not familiar practices for communication between the students and me, were introduced. The originally intended face-to-face interview sessions conducted in our Math classroom were not to be, and I mourned this reality. Despite these challenges the students shared their perspectives, and I leaned in to trusting that the thoughts and observations they were sharing were important and indicative of the specificity of the time we were learning in.

In the interviews with the students the first question posed was this: “Tell me what it was like to be a Math student in our classroom.” In response to this question, eight of the 15 interviewees used the word *fun* to describe Math class. Along with these eight, four other students who were involved in a small group interview nodded or voiced their agreement when another student used this word. One student recalled a favourite game that he had played in class. One student said that it was exciting because he thought it was an important class and he liked Math.

The next interview question was this: “How did our Math classroom operate either differently than, or the same as, other Math classrooms you have been a part of?” In response to this question, nine students noted that being able to choose the questions for their 1-minute quizzes was different than other years. While one student spoke about this not being helpful because all the questions were hard for her in January and

February, four students used the word *helpful* to describe this aspect of class and one referred to it as *fun*.

Four students spoke about journals being a different component to Math class.

Here are two sample comments about journals:

Tara: “Usually Math wasn’t my favourite subject but for some reason this year it was really fun and writing in the journal just to say how I feel, it feels good!”

Haley: “Yeah, we got to express our mind like before or after we were done Math.”

Four students noted that the playing of games was different for them that year, with one of these students comparing it to the use of a textbook from previous year:

Ella: “We did a lot more learning out of the textbook before this year.”

Charlotte: “We played more games, and we were enjoying ourselves more because we found it was a little more easier for using our stuff [learning].”

The third and fourth interview questions merged as: “What did we do that was most helpful (or that was not helpful) to you learning more about Math?” They elicited a variety of responses. Comments ranged from the use of a Math tool such as the Mira, learning the finger trick to multiplying by nine, using the online computer program Dreambox, and reiterating the usefulness of games, 1-minute quizzes, and journals. One student shared a piece of advice with me about considerations around what was helpful and what was not. I will return to share her words in the conclusion of this dissertation.

This was the final interview question: “What words would you use to describe the relationships between the members of our classroom?” This was a challenging question for the students to answer, which elicited few responses. The descriptor *kindness* was

used by three students, *helpful* was used by three students, and *respectful* was used by two students. One student spoke about how things ran differently when there was a supply teacher and another student spoke about how she is usually “cranky” in the morning (Math class ran from 9-10 am) but that she “warmed up” as the class got going.

### **Achievement Data**

**Figure 6**

*Showing Her Learning on an Assessment*



The students and I focused on specific curricular outcomes through a learning community lens. This saw us analyzing the initial data (from a district formative assessment) together, choosing outcomes to target, and planning for how to improve our results. Tables 5 and 6 below show the results of both our initial assessment and the results just prior to schools being closed for March Break and COVID-19 regulations.

Tables 5 and 6 show the academic achievement for each of the outcomes for which data were gathered for each student participant. A green block indicates achievement of an outcome, and a red block indicates an outcome requiring further

learning. White blocks indicate a question that was not completed. In Figure 7 I share the specific outcomes assessed. I draw the reader's attention to the final column in Tables 5 and 6. This column showcases students' achievement with multiplication and division facts. By the end of Grade 5 it is our school district's expectation that students are able to correctly answer 11 or 12 multiplication or division fact equations on a 1-minute quiz. This is a district expectation as evidenced on the benchmark assessments completed in December and usually June (not in June 2020 due COVID-19) of the students' Grade 5 school year.

The equations on the assessments extended up to and including  $9 \times 9 = 81$  or  $81 \div 9 = 9$ . A green-coloured block in Tables 5 and 6 indicates that this expectation was met. The yellow-coloured blocks indicate that a student was approaching this achievement and scored 9 or 10 on the timed quiz. Each quiz the students completed during our Math classes was composed of six multiplication facts and six division facts (Please see Appendix J for an example of a quiz). The column in Tables 5 and 6 for this part of the assessment is larger. This is indicative of the role multiplication and division fact skills played in other outcomes. For example, to be proficient at performing 3-digit by 1-digit division in a problem-solving context (outcome N6 in the tables), it was helpful to have a command of multiplication and division facts.

While I have come to question the timed aspect of this portion of the assessment, this was an expectation by our district up until the 2020-21 school year. The New Brunswick Department of Education's (2009) *Mathematics Grade 5 Curriculum Guide* promotes the concept of students developing "computational fluency" (p. 10) and while it

does not specifically state that students need to be able to answer 11 or 12 questions out of 12, it does note that the

goal for Grade 5 is automaticity, which means that students are able to recall multiplication facts with little or no effort. The fact recall should be automatic as a result of thinking about the relationship between the facts and extensive use of strategies. (p. 22)

While computational fluency and automaticity are noted in the New Brunswick Mathematics Grade 5 Curriculum Guide, it also includes outcome N3 (Number 3) which states that students be able to

apply mental mathematics strategies and number properties, such as: skip counting from a known fact, using doubling or halving, using patterns in the 9s facts, [and] using repeated doubling or halving to determine answers for basic multiplication facts to 81 and related division facts. (New Brunswick Department of Education, 2009, p. 22)

These and other conceptual strategies are essential in combination with mastery tasks for computational fluency, automaticity, and numerical understanding. In Chapter 5 I will further explore the question of timed tests.

**Table 5**

*Initial Assessment*

<b>Outcome:</b>	<b>N1</b>	<b>N2</b>	<b>N5</b>	<b>N6</b>	<b>N7</b>	<b>N8</b>	<b>N9</b>	<b>N11</b>	<b>PR1</b>	<b>SS1</b>	<b>SS4</b>	<b>SS6</b>	<b>SP2</b>	<b>SS7</b>	<b>N3 Basic Facts: (x &amp; ÷)</b>
Student A	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Student B	Green	Red	Green	Red	Green	Green	Green	Green	Green	Green	Red	Red	Green	Red	Red
Student C	Green	Red	Red	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Red	Red
Student D	Green	Green	Red	Red	Green	Green	Red	Green	Red	Red	Red	Red	Red	Red	Yellow
Student E	Green	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Red	Green	Red	Green
Student F	Red	Green	Green	Green	Green	Red	Red	Green	Green	Red	Green	Green	Green	Green	Red
Student G	Red	Red	Red	Red	Red	Green	Green	Green	Red	Red	Red	Red	Green	Red	Red
Student H	Green	Red	Red	Red	Red	Green	Green	Green	Green	Red	Green	Red	Green	Red	Red
Student I	Green	Red	Red	Red	Green	Green	Green	Green	Red	Red	Green	Red	Red	Red	Red
Student J	Green	Green	Red	Green	Green	Red	Red	Green	Red	Red	Red	Red	Green	Red	Red
Student K	Green	Green	Red	Red	Green	Red	Red	Red	Green	Red	Green	Red	Green	Red	Red
Student L	Green	Green	Red	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	Green	Red
Student M	Green	Red	Red	Red	Green	Red	Green	Green	Red	Red	Green	Green	Green	Red	Red
Student N	Green	Red	Red	Green	Green	Red	Green	Green	Red	Red	Green	Green	Red	Red	Red
Student O	Green	Red	Red	Green	Green	Red	Red	Red	Green	Green	Green	Green	Green	Green	Red
<b>Total /15:</b>	<b>13</b>	<b>6</b>	<b>2</b>	<b>6</b>	<b>12</b>	<b>7</b>	<b>7</b>	<b>10</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>5</b>	<b>11</b>	<b>3</b>	<b>1</b>
<b>Total: (100/225) 44.4%</b>															

**Table 6**

*February 25<sup>th</sup>, 2020, Assessment*

Outcome	N1	N2	N5	N6	N7	N8	N9	N11	PR1	SS1	SS4	SS6	SP2	SS7	N3 Basic Facts: (x & ÷)
Student A	Green	Green	Green	Green	Green	Green	Red	Red	Green	Green	Red	Green	Red	Green	Red
Student B	Green	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow
Student C	Green	Green	Green	Green	Green	Red	Red	Red	Green	Green	Red	Green	Green	Green	Green
Student D	Green	Green	Green	Red	Green	Green	Green	Green	Red	Red	Red	Green	Red	Green	Green
Student E	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Red	Green	Green	Green	Green
Student F	Green	Green	Green	Green	Green	Green	Red	Green	Green	Red	Red	White	Green	Green	Yellow
Student G	Green	Red	Green	Red	Green	Red	Green	Green	Red	Red	Green	Green	Red	Green	Green
Student H	Green	Green	Red	Green	Green	Green	Red	Red	Green	Red	Green	Green	Red	Green	Red
Student I	Green	Green	Red	Green	Green	Red	Green	Red	Green	Red	Red	Green	Red	Green	Green
Student J	Green	Green	Red	Red	Green	Red	Red	Red	Green	Green	Red	Green	Red	Green	Green
Student K	Green	Green	Green	Red	Green	Red	Green	Green	Green	Green	Green	Red	Green	Red	Green
Student L	Green	Green	Green	Green	Green	Red	Red	Green	Red	Red	Green	Green	Green	Green	Yellow
Student M	Red	Green	Red	Green	Green	Green	Green	Red	Red	Green	Green	Green	Green	Red	Green
Student N	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Student O	Red	Green	Green	Green	Green	Green	Red	Red	Green	Red	Green	Green	Green	Green	Green
<b>Total /15:</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>11</b>	<b>15</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>13</b>	<b>9</b>	<b>13</b>	<b>10</b>

**Total: (159/225) 70.7%**

**Figure 7***Specific New Brunswick Grade 5 Math Outcomes on the Assessment*

<b>Specific Curriculum Outcome Abbreviation</b>	<b>Strand</b>	<b>Outcome</b>
N1	Number	Represent and describe whole numbers to 1 000 000.
N2	Number	Use estimation strategies including front-end rounding, compensation, and compatible numbers in problem-solving contexts.
N3	Number	Apply mental mathematics strategies and number properties, such as: skip counting from a known fact, using doubling or halving, using patterns in the 9s facts, and using repeated doubling or halving to determine answers for basic multiplication facts to 81 and related division facts.
N5	Number	Demonstrate an understanding of multiplication (2-digit by 2-digit) to solve problems.
N6	Number	Demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit) and interpret remainders to solve problems.
N7	Number	Demonstrate an understanding of fractions by using concrete and pictorial representations to: create sets of equivalent fractions & compare fractions with like and unlike denominators.
N8	Number	Describe and represent decimals (tenths, hundredths, thousandths) concretely, pictorially, and symbolically.
N9	Number	Relate decimals to fractions (to thousandths).
N11	Number	Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths).

SS1	Shape & Space	Design and construct different rectangles given either perimeter or area, or both (whole numbers) and draw conclusions.
SS4	Shape & Space	Demonstrate an understanding of capacity by: describing the relationship between mL and L, selecting and justifying referents for mL or L units, estimating capacity by using referents for mL or L & measuring and recording capacity (mL or L).
SS6	Shape & Space	Identify and sort quadrilaterals, including rectangles, squares, trapezoids, parallelograms & rhombuses according to their attributes.
SP2	Statistics & Probability	Construct and interpret double bar graphs to draw conclusions.
SS7	Shape & Space	Perform a single transformation (translation, rotation, or reflection) of a 2-D shape (with and without technology) and draw and describe the image.

The results shown in Tables 5 and 6 indicated success as evidenced by consistency or growth with all but two outcomes (N11 and SP2). As I have reflected on the results, I have come to see that the greatest successes were in the area where the students appeared to feel most comfortable selecting a method to help them improve. The game Multiplication Squares was a favourite among the students and was often their go-to when choosing a game to practise with. Multiplication Squares is a game in which the players roll two dice, multiply the numbers together to get a product, and then create a line on one side of the product on the gameboard. When a player has enclosed a specific product on all four sides of it to create a square, the player claims it as their own. The player with the most squares at the end of a game is declared the winner. Games such as this one provide opportunities for conceptual understanding produced through reasoning

to develop and allow for practice to achieve fluency. Educators circulate and ask players to discuss their thinking strategies, ask what they learned, ask what challenges they experienced, ask about the patterns they are noticing, and ask what they might try the next time they play. Playing a game more than once helps students practise their Math skills and apply a range of strategies as they move toward deeper conceptual understanding of the various ways that numbers can be composed, decomposed, and recomposed. Multiplication Squares offered the opportunity for students to engage with a range of strategies. For example, students might use a doubling strategy to know that if  $2 \times 7 = 14$  then  $4 \times 7 = 28$ . Or they may speak of the pattern in the 5x table where the products end with alternating 0s and 5s. Interestingly it was also the area in which they tracked their own data (see Figure 8).

While reflecting on the process of learners tracking their own progress with assessments, I thought about the benefits of doing so as related to the research I wrote about in Chapter 2. This research contained Smith's (2009) observation of the benefits of including students as partners in assessment processes. It also noted Warton's (2001) findings on the benefits of supporting learners' understandings of why they are completing tasks such as homework that learners often felt negatively toward. Quizzes taken in our classroom were often met earlier on in the year with demonstrations of sighs or groans. Additionally, my reflections recalled Reay and Wiliam's (1999) conversations about the importance of developing deeper understandings about assessments to counteract fear and anxiety regarding testing vehicles and the development of negative impacts on learners' identities.



with outcomes and make decisions about which outcomes to focus on next. Additionally, in our discussions about how to improve their fluency with multiplication and division facts once strategies for these had been explored and developed, we discussed a couple of memorization tactics, including quizzing each other and writing facts out to increase their fluency. These were often the tasks students chose to engage in during the minutes of preparation given before a quiz. This was a practical choice as tasks such as getting organized and playing a game would be better suited for other times during the class that were longer in duration. I reflect on these moments knowing that as the educator in the room I play a key role in putting forward and teaching a range of strategies for conceptual learning such as with multiplication and division facts. It is key to student success that, while making space for students to choose strategies and activities, I remain diligent in highlighting a broad range of strategies from which the students can select strategies that help build their computational fluency in a manner that works for them.

### **Students' Reflective Journals**

At the beginning of the research project each student was given a writing journal as an invitation in which to share their thoughts and ideas about the study. Further writing ideas or prompts were not given to direct each student's thoughts and writing. Each week, time was allocated toward the end of class for students to write in their journals. At all other times, the journals were visible and available to the students should they wish to write in them. Within the student journal writing, two major and several leftover categories emerged.

The two major categories which emerged were the concept of fun in math class and the appreciation, enjoyment, and surprise of making decisions. Nine of the 15

students shared that they had fun playing games and/or stated that they found Math to be fun. Here are a few examples of the students' writing on the category of fun:

Charlotte: I have fun playing games.

Kate: I find Math is fun.

Haley: Math is really fun when you got a great teacher.

I noted that one student wrote a contradicting statement to this major category:

Brandon: Math 4 fun (lie).

Eight students wrote that they liked or enjoyed the opportunity to make decisions.

Examples of what the students wrote on the topic of making decisions are included here.

Writing about decisions included the choosing of questions for a quiz:

Charlotte: I love how we got to decide our quiz.

Logan: It was cool that we got to pick our answers [questions] on the 1-minute quiz

Julia: Yesterday Mrs. Smith-Ellis let us pick our division and mx [multiplication].

I raised my hand and said  $81 \div 9 = 9$  and I said  $7 \times 5 = 35$ . That was awesome. I hope she does that again.

They also included making decisions on which game they could play and with whom they would play it:

Daniel: Today Math was good. I got to choose Sumoku to play with Khaled. I'm good at Sumoku. I really like it!

Finally, they wrote about deciding about how they would practice for a quiz:

Julia: I like that we get to make our own decisions on how to practice for our Math quiz.

I noted that one student wrote of his surprise in being able to decide about the questions on a quiz:

Wyatt: I was surprised when she let us pick the number sentence.

By contrast, two students expressed their hesitancy or dislike in making decisions:

Bella: I kind of like making decisions but I also like Mrs. Smith-Ellis making them. I find our quiz questions I don't like. I like Mrs. Smith-Ellis picking our questions instead.

Ella: I don't like to make decisions. Decisions make me nervous. I'm noticing that ALL OF THE STUDENTS IN MY CLASS PICK THE HARDEST QUESTIONS. Quite annoying.

Several of what I determined to be leftover categories made up the balance of the writing by the students. Leftover does not indicate that the students' writings were not valued, but rather that these statements veered from the major or unique categories the data revealed. A large portion of the writings were documentation of what the students were doing in Math such as: "I learned about all the shapes that have 4 sides.

Parallelogram is my favorite. It is really cool" (Logan). There were several affirmations of me as their teacher such as: "Mrs. Smith-Ellis is nice to us anyway" (Brandon) and "Mrs. Smith-Ellis is a good teacher. She helps me and my friends if we need help" (Julia). Additionally, a few of the students' written statements reported:

- Their results on a quiz: "I got 9 out of 12 correct but that's ok. I will get one more try today" (Haley).
- Their preferences of one subject area over another: "I'd rather gym than Math but I guess I won't die" (Brandon).

- Their thoughts stating math as *easy* or *hard*: “I fine [find] Math is ... easy” (Kate), “The one thing I find hard is division” (Wyatt).
- Haley wrote multiplication equations as practice in her journal:

$$2 \times 8 = 16$$

$$2 \times 16 = 32$$

Three unique pieces of data came from students’ writing. The first was a piece that Ella wrote about our classroom learning community questions (in italics below) and her thoughts with them in her journal:

*What do we want to learn?*

Whatever we’re supposed to learn I guess.

*How will we know when we have learned it?*

It will come easier?

*What will we do to learn it?*

Practice?

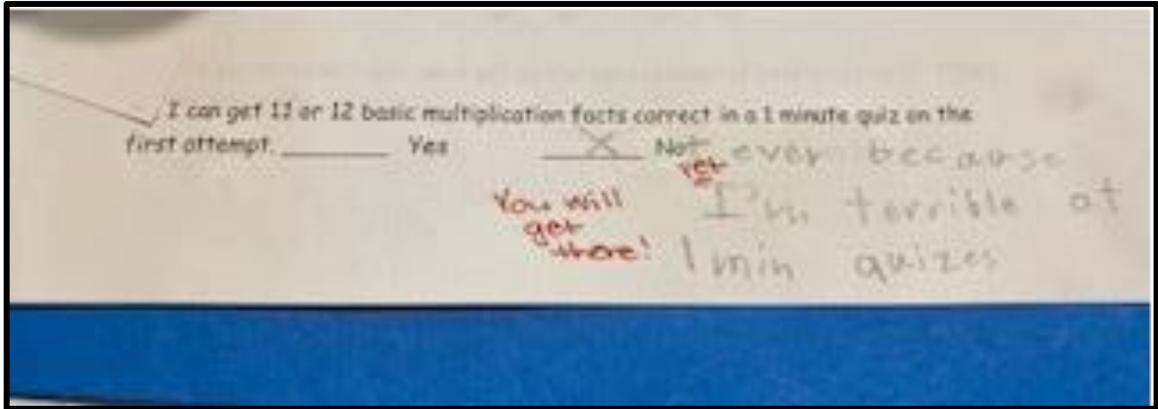
*What do we do when we have learned it?*

I guess I’ll find out.

The second unique piece came from a message that Khaled shared on one of his assessments (see Figure 9).

## Figure 9

### *A Message From Khaled*



On January 23<sup>rd</sup>, Georgia wrote in her journal expressing her feelings about 1-minute quizzes: “I don’t like 1-minute Math tests because they get me stressed out.” Since I viewed this statement as coordinating with Khaled’s message above, I have shared it here.

The third unique piece of data spoke about confidence in Math abilities and came from Ella when she shared:

I’m nervous. I wish I could have more practise but I kinda have a feeling it will go well? I’m probably wrong. Eh ... I’ll just have to keep practising. Mis Smith-Ellis told me to practise. Not sure if it even worked. I guess I’ll find out! #No Confidence!

### **My Reflective Journal**

My reflective journal looked identical to the students’. When they had structured weekly in-class time to write in their journal I wrote in mine. Additionally, periodically I would jot notes in my journal after the students had left our Math classroom to return to

their homeroom classroom. I wrote of my observations of interactions or moments within our classroom that I felt were noteworthy, such as Daniel commenting on the day the study was introduced that he thought this would be “important,” or the day of Charlotte’s joy and excitement in the achievement data shared, or the demeanour of Khaled on the day he wrote the note in Figure 9.

From the first day of the study, I wrote about how I was noticing a change in the atmosphere in the classroom. I referred to this as engagement. This was a topic that appeared frequently in my observations. On that first day of introducing the study I wrote about how most of the students appeared interested in doing research with me. Their interest was displayed through questions and affirmations from many that they were willing to sign the permission slip to proceed. Other days this engagement took the form of what I described as a *productive hum* in the classroom as they played a Math game with classmates, worked together to select questions for a quiz, or got ready for a quiz by asking each other specific multiplication or division equations. My observations on engagement also noted the upswing in energy with which the students entered our Math classroom.

Math class took place from 9:00-10:00 AM each weekday morning. The students’ homeroom was next to our Math classroom and the students would enter our classroom following a half hour of learning with their homeroom teacher. I wrote of observations on how the students were entering the classroom with heightened focus. My journal shares, on three separate occasions, my reflections on how the students who, before the study would enter the classroom asking: “What are we going to do today?”, now began entering asking different questions. At the beginning of the study students asked: “Can I play a

game with (student's name)?" This question evolved over the course of the study to "Today (student's name) and I are going to play Multiplication Squares." I wrote:

The classroom learning environment is moving from being one in which I am a responsive educator, noting students' preferences and aptitudes to inform *my* planning to a classroom where students are entering the room with their own plans for learning.

The journal was also a place for me to question. A significant portion of what I recorded in my journal included questions that I was thinking about throughout the 6-week study such as: "Does having the students record their achievement results support their agency with Math learning?" and "How else might I co-create space for sharing the power in decisions about how we accomplish Math learning?" and "Do the students feel an increased sense of agency?" These moments and questions became the impetus for thinking about the data while writing this dissertation.

### **Emerging Shifts**

Let me now share with you how I see these data pieces coming together to create understandings arising from the three research questions for this study. In this section, I offer responses to the first research question.

Research Question #1: What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices? Over the course of the study, shifts emerged in

how our classroom operated, the guiding questions associated with PLCs, in our learning roles, and in the construction of classroom community.

### **Setting the Stage: Shifts in Operation**

On January 20<sup>th</sup>, 2020, I introduced this research project to the 17 students in our Grade 5 Math class. On that morning, I arrived in class with the Student Friendly Newsletters (see Appendix D), as well as the student (see Appendices E and F) and parent (see Appendix G) permission slips. Additionally, in a spur of the moment decision as I left my home that morning, I brought with me my master's thesis. This thesis turned out to be an instrumental tool in developing the students' understanding about the project. In this initial conversation I talked about being a student at UNB and that, just as they have writing assignments, I too have a writing assignment to complete. I wrote in my reflective journal that day that it felt like there had been a shift in how the students viewed me. Gallagher and Kittle (2018) wrote of how teachers who share their writing, about the writing processes and their written pieces, are respected as a writer and learner by the students they engage with. I too was sharing the writing I had completed and discussing the piece of writing I was embarking on in the hope that this demonstration would connect with the students and establish further credibility with them. I came to that classroom with many labels, including those of teacher and principal. After our discussion that day, the students had a window on another component of who I am—a student—learning, thinking, writing, and completing assignments in a manner similar to what they do. Sharing my red bound master's thesis garnered from many of the students what I interpreted as allegiance to a task similar in nature to what the students are often

responsible for, a bit of sympathy regarding the volume of the expected task, and perhaps a bit of appreciation for the writing I was setting out to complete.

Ella: You really wrote all of that by yourself?

Daniel: You're going to do *another* one?

There were numerous looks of concern on students' faces as we discussed the task. I shared with them that I had learned a lot by writing my master's thesis and that I was really looking forward to learning more with them through this research project. I noted that I felt they had perspectives on Math learning that would help me, and perhaps others, be thoughtful about how we approach our role as teachers. I shared that what most excited me was writing about how they feel about our learning and their roles in collaborating and making decisions about how we do our learning. That day their roles shifted from student-to-student researcher. Daniel's comment on his way out of class summed up the feelings I had observed in the room as our discussion proceeded: "I like that we get to do this! It's important."

### **A Shift in Perspective**

As we began our study, one of the conversations we had was about why we were learning the items we were. As I shared the data from the district's December formative assessment with the students it formed the basis of what we were learning in class, I posed the question: "Why are we focusing on learning these Math outcomes?" Students' responses included many variations of "I don't know" and "Because you think they're important." Charlotte: "Because you think that we need this stuff to do well when we go to [the middle school that our school feeds into]?" What struck me about their responses was how they were indicating that decisions about their Math learning were determined

by the teacher. They believed that what we were doing in Math was based on what *I* thought was important. I wondered how these thoughts could be shifted. How could there be a space for the students to view learning the Math outcomes in a manner that supported their voices in the learning? How could their voices be acknowledged and contribute to decisions about Math learning planning and assessment?

I shared with the students that when making decisions about what we do in class, I am responsible to follow a curriculum document that all Grade 5 Math teachers in the province of New Brunswick follow. I pulled up this document on the Smart board so that they could view it. This was the first time I had shared this document with the class, a step that marked a significant change in my practice as an educator. Additionally, I shared a site called *Math Improvement* that has ideas to help New Brunswick Math teachers design lessons that meet the outcomes outlined in the curriculum document. This discussion afforded the opportunity to show the curriculum document and the Math Improvement site to the students and invite them into an aspect of the Grade 5 Math world that to date they had not had access to or were aware of. It was this access, and the conversations that arose from this access, that modelled aspects of a PLC within our classroom.

On the day following our class discussion of the link between what we did in Math class to the curriculum document and the Math Improvement Site, I wrote in my reflective journal:

It is early days yet, but I can feel a change in the atmosphere of our classroom.

Could it be our conversation yesterday about our responsibilities for learning from the curriculum document? I think it is this in combination with the students'

engagement in being part of our research project. I am seeing an increase in focus on what we are doing and an attitude that has more to do with a desire to accomplish learning and less of a burden to do Mathematics.

The curriculum document, the Math Improvement site, and the data from the district formative assessment formed the basis for the PLC questions that guided our in-class learning. As with the shifts in the operation of our classroom and the change in perspective there were subtle shifts in the PLC guiding questions that became very important to inviting and including the student's voices. Let me share with you how these shifts in questions came about.

### **A Shift in Guiding Questions**

When I met with other teachers in a PLC, we had considered the questions established by DuFour et al. (2008, pp. 183 – 184) as we worked to improve student achievement in our classrooms:

1. What do we want each student to learn?
2. How will we know when each student has learned it?
3. How will we respond when a student has difficulty in learning?
4. How will we respond when a student has learned it?

It was on December 9th, 2019, during the follow-up question session of my proposal presentation, when Dr. Sherry Rose suggested that, considering my study's focus on student voice, I may wish to consider rewriting DuFour et al.'s four PLC questions. As the students and I looked at our data and made plans on how to proceed, Dr. Rose's advice was put into action and the PLC questions I had previously been guided by evolved. This evolution acknowledged the students' voices, recognized the communal

responsibility to Mathematical learning, and the aspect of a CoP where the participants are invited in. Our questions became:

1. What do we need to learn?
2. How will we know when we have learned it?
3. What will we do when we have difficulty learning?
4. What will we do when we have learned it?

With these key questions guiding our days, our classroom began to operate as what I have come to call a Classroom Learning Community (CLC). A shift occurred in which our activities became guided by the voices of many in the room versus a classroom operating under the planning and organization of a teacher who periodically engaged in learning conversations with other professionals. The shifts in these questions invited the students into a more collaborative learning environment where together we focused on the learning goals and making plans for times when the learning was challenging or when success was demonstrated.

As students shared their voices on our edited questions, an additional key question emerged:

5. How do we want, or what do we want to do, to learn it?

I found that while planning our classes collaboratively, the students often posed this question: “Can we decide what we get to do?” referring to the activity or task. This was evidence to me that the students were exercising their power and believed that they could make decisions that would make a difference in their learning. I was witnessing them taking greater responsibility for their learning. A shift was happening. There was movement from the students seeing me as making the decisions of what they would do in

the classroom and the students not having a clear idea of why to the students' making decisions that focused on their learning. As I listened to their voices, I learned that having them be able to decide what activity they got to do to promote their Math learning was an essential ingredient in our classroom. One classroom moment illustrating this shift emerged incidentally as the students were settling into class and about to write a quiz.

### **A Shift in Roles: From Teacher-Driven to Collaboratively Driven**

“Can you quiz me, B?” Haley had just come into class. Our usual practice was to do our 1-minute quiz at the beginning of class. I held off on distributing the quiz papers after hearing Haley's question to B (a student who had not consented to be part of the research project). Her question was out of the ordinary in the 6 months we had been in class together. I wanted to see where her question would lead. “What ones are your hardest ones?” B asked, and so began an impromptu quizzing session, a student-initiated review session, before our actual quiz. Ella was the third person seated in the triad of desks with Haley and B. After observing the exchange between Haley and B, she looked at me and said: “I think I'm going to write some questions out. That helps me remember them.” Ella picked up her pencil and a scrap piece of paper and began writing out a selection of equations.

These exchanges reminded me of the importance of listening to students. Sometimes, in the busyness of making sure items are accomplished in class, I have forged ahead and outlined the work to be done. That day, I was reminded that a teacher can be most effective by providing the space in a classroom for students to fill with an activity of their choosing and listening respectfully to the range of learners' decisions. I was

reminded of the importance of trusting that students can direct their learning when given the space to do so.

The day following the quiz we discussed if it would be helpful for the students to have a block of time before their quiz each day to choose an activity that they felt would help them achieve their best on the quiz. Eight of the students said that it would be. And so, for the remainder of classes that we had together the first minutes of class were spent with students making decisions for themselves on what they could do to prepare to perform their best on the 1-minute quiz. That day I wrote in my reflective journal that choice is a key element in student voice and looking back I think it is key to student engagement. I noted that I also had to be prepared to facilitate their choices for some of the students, such as by providing suggested options or having conversations to encourage students to think about what activities support their learning.

Not every student immediately gravitated to an activity. Some struggled with deciding for themselves in the beginning. I wrote in my journal that week that I wondered if this happened because often students are told what to think and what to do. As the days progressed, what started as a triad of students deciding how to prepare for their quiz blossomed into larger numbers and generated conversations amongst our group about how we learn and the tasks that are most helpful to retaining information and demonstrating skills. I wrote in my journal that I believe that these conversations helped students further develop insight into learning that could transfer to other subject areas and life situations. Here are possible skills and dispositions that learners might carry forward: (a) collaborating in the support of each other's learning, (b) seeking out support, (c) making personal decisions about the best way to practise, (d) reflecting metacognitively

about suitable learning strategies, and (e) establishing and maintaining respectful relationships while learning from and with each other.

I noted in my reflective journal to be mindful of observations. Sometimes it is not only the words that come out of a student's mouth that provide guidance. There are other ways to listen to student voice and sometimes it is in the observing that I might hear them best. My observations with Ella, B, and Haley that day initiated a conversation about learning and afforded the opportunity to honour the students' voices. Additionally, the observations were a glimpse into the bonds that were developing amidst our classroom community.

### **A Shift in Community**

One of those bonds came from what I would classify as an unexpected source. On that day, Haley reached out to B to ask for support for her learning. When Haley spoke of her description of herself in Math class, she said, "Cranky, yeah, I'm always cranky in the morning." On those mornings when she had the space to choose how she would learn, she had a say in what she was doing, and whom she was doing it with, and noted that it allowed her to "warm up." Haley had a safe place to land, a transitional space that supported her learning needs. B's response showcased a willingness to support Haley. This connection was one that I had not witnessed previously. That day, and for many more after it, they were united in a task of their choosing. Prior to this, my description of their relationship would have been that they were co-existing more than collaborating in the interest of furthering learning. To this day, as I reflect on our classroom community, I marvel at how this bond presented itself, as Haley and B demonstrated commitment to improvement and to supporting one another in their learning. This was one example of

the diverse relationships that are possible in a classroom community. Interestingly, the third member of their table grouping highlighted the aspect of resiliency.

Equally memorable to the interaction between Haley and B that day was Ella's response to work on her own. It highlighted her ability to make a different decision to enhance her learning. While Haley and B worked together, the "pressure" of having another student quiz her was not a welcomed opportunity for Ella. In our interview, the word she used to describe her feelings associated with Math class was *worried*. She is a learner who is able to develop her Math abilities and can also become quite anxious with new learning particularly if she perceives others as demonstrating their learning more quickly or easily than she is able to do. As you may recall from the reporting on the students' journal entries, Ella was the student that added the #NoConfidence to a journal entry noting her feelings about Math class. Ella and I had several conversations to work through this mindset as it was an area of stress for both of us.

On that day, she appeared to consider how to proceed, eliminating the idea of following what Haley and her partner were doing because it would have added to her anxiety caused by trying to perform quickly under the observation of another student. I was proud for her that day. She acknowledged, named, and engaged in the task that was going to be most helpful to her and I was pleased that our classroom had given her the space to do so. One size never fits all. Observing how Haley and Ella made choices for themselves was a reminder of how honouring students' voices in making decisions in class is key to developing their ownership of their learning styles and preferences and cultivating a confidence in their capacity to learn while enacting their motivation to

achieve. It also exemplified growth of our classroom as a community that supports these choices.

**Figure 10**

*Practising Multiplication and Division Facts to Prepare for a Quiz*



As classes progressed, the question of whether the students got to decide what to do became less frequent as it became the way we went about our days. At times we would generate a list of possibilities so that students could refer to it if they needed support to decide for themselves. This list was not static and evolved as the days went on and the learning goals changed. We operated with the understanding that any list was a draft that could be added to if an item was mutually agreed upon by a student and myself. A primary role for me was as a facilitator in finding options for students to consider as they made decisions about how to accomplish their learning goals. My facilitator role

extended into the realm of test-taking as well as I experimented with relinquishing control over the area of formative testing.

### **A Bit More on the Shift in Roles**

I was inspired by Smith's (2009) article in which she shared her experiences with alternate forms to traditional assessments. These alternative forms included having students construct tests. I wondered what might happen if the test-taking component of Math might be led by the students. On one January morning as we talked about the results of the 1-minute quizzes, I asked the students if they would like to take a turn to make up the quiz. The question was met with resounding silence. The students looked at me with what I wrote later in my journal as "various versions of bewilderment." I had thrown them with this question. The silence gave way to students beginning to look at one another in what I interpreted as questioning if they had heard me correctly.

Eventually, this was the exchange:

Charlotte: Do you mean we would get to choose the questions for the next quiz?

Me: Yes.

Charlotte: But what if we chose all the easiest ones?

Several students started to laugh and say things such as: "Yeah, like all the 1x table."

"No, the 0x table!" More laughing.

Me: Well, would that help you get better at solving the equations to 9x9?

Charlotte jumped back into the conversation and said: "I think we should put some easy questions on it so that we build up our confidence and put a few harder ones on it, so we get better at that." The conversation took off with students discussing which equations were harder than others and how they could fairly decide on who would choose

which questions (12 different students, they decided, each would get to choose one question for each quiz). The “hum in the classroom was energetic” (journal entry) as a list of 12 questions for their first quiz was generated.

Over a period of 3 weeks the students chose the questions on the daily quiz, and I observed as their engagement and resilience, along with their accuracy, with this task flourished. By the time of what became their final 1-minute in-class quiz we had 10/15 students achieve 11 or 12/12 on the quiz. We also had three more students who were almost there, achieving 9 or 10/12. And two students were continuing to work on being able to achieve this goal.

### **A Unique Voice**

While there was so much to celebrate as students’ voices emerged in class and they took increased ownership of planning for their learning, there was also a voice that expressed a different perspective that continues to linger within me. It was a voice that I hoped could have been impacted differently. I am referring to Khaled’s message.

What is unique to this one student Khaled and what he shared on his assessment (see above in Figure 9 written on Feb. 25<sup>th</sup>, 2020) was that he had been away for an extended time on an enriching trip with his family. He had experiences that many can only dream of while on the trip. I share this statement because I believe that anyone thinking about his learning would highlight this trip and I would not want the statements about what occurred in Math class to diminish the importance of his family trip. However, his trip also meant that he had missed being part of the opportunity of our co-constructed manner of doing quizzes, rich conversations about identifying easy and more difficult facts, and the supportive ways the students were engaging in number talks while

playing games. It will forever be one of those classroom moments that I regret, not because he missed the time from class, but that due to school closure around COVID concern in the weeks following February 25<sup>th</sup> we never got the in-class opportunity to help him get to the point that he felt he could meet the achievement standard. There was a roadblock in his Math identity that he could not see himself moving beyond. How much did the timed test aspect play a part in this?

I find myself speculating on how achievement (academic, positive involvement, and resiliency) might have improved for Khaled had we not been at home for the remainder of the school year. I believe that with just a bit more time we would have reached the point where he would have seen himself as part of the sea of green on our data table and he too might have experienced the euphoria that another student, Ella, spoke of on February 18<sup>th</sup>, when the majority of the class achieved the goal of getting 11 or 12/12 answers correct on their 1-minute quizzes. It is one of my regrets that I was not able to help facilitate this within the emerging conditions we found ourselves in during the spring of 2020. As I write this section of my dissertation, we are more than 2 years passed the March 2020 closure. I am now able to see different ways to facilitate effective learning in a virtual forum, which during the spring of 2020 was an unfamiliar context for both me and the students. Adding further complications to this time were the isolation and worry that came with the onset of the pandemic. Moving from a classroom learning community to a virtual classroom learning community was a new endeavour for us. It is an area that I will address further in Chapter 5.

## Figure 11

### *Focusing on One of the Assessments for Data Collection*



Regrets aside, the achievement data displayed in Tables 5 and 6 showcase many items to celebrate. Our initial data achievement in which there were 100/225 correct responses to the assessment questions to 159/225 correct responses by the end of our 23 in-class contact days, represented overall growth of 26.3%. While we had 6 weeks together, this was impacted by items such as snow days, two school assembly days, and a school activity day. This 26.3% of overall growth was noticeably impacted by the impressive development of automaticity with multiplication and division facts where there was 60% growth in academic achievement on the 1-minute quizzes. According to the New Brunswick Department of Education's (2009) Mathematics curriculum document:

the goal for Grade 5 is automaticity, which means that students are able to recall ... facts with little or no effort. The fact recall should be automatic as a result of thinking about the relationship between the facts and extensive use of strategies. (p. 22)

While the data were impacted by the shortened term of this research project due to COVID-19, it does show a promising positive trajectory.

### **Classroom Relationships**

Within the theme of fun, I noted the aspects of incorporating or recognizing the fun in Math learning. This included the enjoyment of an activity, the satisfaction that came with improving learning and the social interaction of enjoying an activity with a peer, a feeling that the learner had someone in their learning community that could be trusted to help them.

I move on now from Research Question #1 to Research Question #2: How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision makers of their learning?

Returning to the final interview question with students where they were asked to reflect on the relationships within our classroom and choose descriptors for these, the words that students used were *kindness*, *helpful*, and *respectful*. As I thought about the shifts in roles and overall community in our classroom I was, and continue to be, struck by how closely aligned the student's descriptors were with my observations and the accounts in my reflective journal. The account about Haley, B, and Ella is one example of all these attributes. As the relationships evolved, three topics in relation to these became evident: fun factor, greater insight into purpose, and a collective voice in decision-making. Having fun in Math class, having a broader understanding of the purpose of mastering a Math skill or a process such as assessment to support or track the development of a skill, and having a voice in making decisions about Math learning for

oneself and the class as a community were themes that emerged from the analysis of the data from our study and provided insights with this second research question.

### **The Fun Factor**

In our second doctoral seminar course, Dr. Pam Whitty suggested that when analyzing research data, it is wise to be mindful of what surprises you. The most dominant topic coming out of interviews with the students was an unanticipated one and the following certainly fell into the surprising category for me. As outlined earlier in this chapter, the word *fun* was used repeatedly by the students to describe Math class. Not only was this word spoken by students, other students involved in a group interview also nodded their heads or asserted their agreement to the word when it was used by another student. This happened so consistently that by the third interview I was wondering if this would be the predominant theme to emerge. It was something that perplexed me.

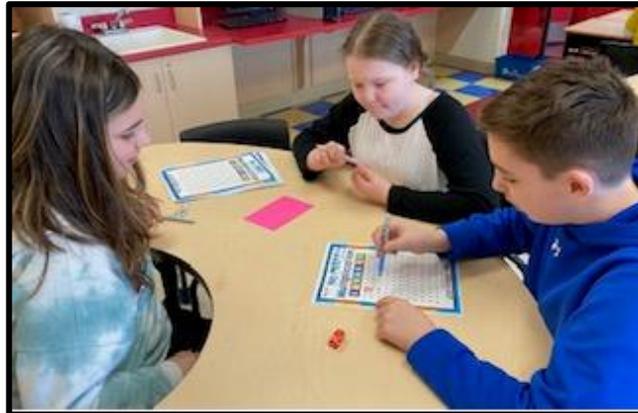
I have reflected on what is so unanticipated about their responses. Had I been asked what I thought the students would say, I would have focused on possible responses such as how the students liked having choices or being involved in the planning of classes. My first descriptor would not have been “fun.” And yet, there was such a resounding focus on fun that I have spent many moments considering the implications of students voicing this.

Tara: I would say it was fun. It would help learn a lot, like, I feel like I have improved a little more since like last year, like maybe a whole lot more though.

The way it is I find it helps with all the games and also makes it fun.

## Figure 12

### *Playing Multiplication Squares*



### *The Fun in Achievement*

Five weeks into our data collection, we had one of the most inspiring moments of the entire research project. On February 18th, 2020, we were looking at the results of our 1-minute multiplication and division facts quizzes. From September to December 2019, we looked at patterns in and strategies for solving multiplication and division equations. One, sometimes two, of the students achieved the goal of 11 or 12 correct answers. On February 18<sup>th</sup>, 10 students achieved this goal, an all-time high for our class. As the students were filling in their charts by colouring the bar graph to show how many answers they got correct on this day's quiz, I shared this piece of data with them. In my reflective journal that day I wrote:

Best moment today! When I shared with the class that today 10 students had reached our goal on the quiz, there was a moment where time appeared to slow down. Charlotte stood in front of the window, at her desk, paused in the recording of her data, looked at me, and said: "Ten people got 11 or 12 today?" "Yup," I responded. She raised both fists in the air, let out a shriek and danced back and

forth from one foot to the other. Euphoria is the word I would use to describe not only her actions but the look of sheer joy and amazement on her face. While she was aware that she had achieved the goal, her reaction was to the class achievement.

In our interview, Charlotte recalled this moment:

Charlotte: I was a little freakin' out.

Me: Tell me more about that.

Charlotte: It felt like my body's last hurrah before it completely shut down.

Her reaction was indicative of the further development of the sense of community in the classroom. It was not only her own personal growth in achievement that she was celebrating. Ten students achieving our goal was a substantive milestone. This was definitely news to freak out about in a hurrah sort of way.

### ***The Fun in Community***

Students often chose to play a game called Multiplication Squares (as described earlier in this chapter) with one or two fellow students in the classroom. While we had other game options in class, this was always the first choice for the students and the one that they consistently referenced in our interviews.

Students could play this game for 45 minutes during Math class and then eagerly return the next day and choose to play it again. Additionally, students would almost always choose to play a game with classmates over any other options available to them. Time with friends and engaging in student-selected games was identified by the students as what contributed to their feelings of fun in class.

Charlotte: Maybe it was because we played more games and we were enjoying ourselves more.

Brandon: [We] played games that taught me math and that was actually fun to use.

Wyatt: The games were fun! Multiplication Squares!

Logan: The games were pretty fun and made it easier cause kids need to learn different ways. It was helpful.

On January 30<sup>th</sup>, 2020, I recorded in my journal:

The students were excited to choose a friend or two to play a game with. This appears to be so, even when I strategically choose players for a game with similar abilities. Getting to play a game and engage in it with classmates outpaces any other Math activity in visible signs of enjoyment ... from choosing their spots in the classroom to play, to the comradery that is exemplified as the students play, to students' comments such as "Oh good, we get to play today!"

It was this observed sense of community that resonated with me as I considered the word *fun* that so often came up in the interviews with students and was noted by four students in their journals. And yet, the gaming aspect to this fun also came with a worry.

### ***A Teacher-Researcher Worry***

As I reflected on the students' preoccupation with Multiplication Squares I wondered why this study had not included a wider variety of games that the students mentioned. The teacher-researcher in me hoped that a finding in this project might have been a practical list of games to share and build upon with students and colleagues, a contribution for us to take forward collectively into other learning situations. There were

moments reflecting on the choices students made in class that I wished they had chosen a variety of games. This was not the case.

As I have analyzed what happened with games in our classroom, I have come to view the students' choice as similar to when children request the same story to be read to them repeatedly. In my mind I have linked the students' game choice to my personal experience of developing my reading fluency through repeated readings of a rhyming Golden Book entitled *The Big Tidy-Up* by Norah Smaridge (1970). With each reading, I advanced further into the book and my reading became more fluid. I can recall enjoying the feeling of accomplishment as my reading with the text progressed through the multiple readings, I engaged in. Through these reflections I have come to honour the students' engagement with Multiplication Squares. The game impacted not only their abilities with multiplication and division tasks, providing opportunities to employ the strategies and patterns for solving equations while improving their recall, speed, and accuracy, but also their engagement with, and satisfaction in, this task as well as their growing relationships with one another. I witnessed it improving their confidence with these skills. All these aspects reflected the positive involvement in Lambert's (1998) "broadly conceived" (p. 23) definition of achievement which inspired this study. And so, my hope of generating a list of games to be shared with others gave way to the positive impact the students' choice of game provided.

Finding the space for students to set their own boundaries and engage in a social learning activity such as this game further taught me to listen to what the students can teach me about what positive involvement might look like for a student in a Grade 5 Math class. A list of games or resources gave way to honouring the space to engage more

deeply with one game. Many students identified this as improving their computation skills, in a manner that they found satisfying, enjoyable, and successful. It taught me to honor their sense of community and how they wished for this to unfold and be present in our classroom.

### **Greater Insight into Purpose**

My understanding of Communities of Practice (CoPs) is based on Lave and Wenger's work in which they focus on the development of identity through the interactions between novices and experts. It is this sort of relationship that I reflected on in the beginning days of our study. I shared with the students the Math curriculum document and the Math Improvement site to enable them to see the purpose of focusing on the outcomes that we were focusing on. Our study was seeking to flatten the hierarchy between myself and the students as I shared these documents to anchor the student's participation in this research project and their learning while cultivating a deeper understanding that educators have responsibilities to documents. These goals fit with Wenger's CoP goals of participation and personal growth where individuals learn from and with each other using each other's experiences as learning resources.

As I shared earlier in this text, the students saw me as the person deciding on what we were learning in class. While I was directing the learning, they did not know that a curriculum document outlined what is to be learned in all Grade 5 Math classes within the province. Taking the opportunity to share this with the students brought them into an aspect of schooling that they had not previously been a part of. I wrote in my journal during the first week of this research that the students' reactions reminded me of the first time I brought a group of students into the staff room. I observed a feeling of importance

that manifested as the students saw this. I wrote about how the class got quieter, the students leaned into viewing the document as we looked at examples of questions, and as students voiced comments such as: “I didn’t know that’s how you decide.” And “Do other kids get to see this?” I wrote that there was “almost a sense of honour” that they were seeing something that was important to their school life, something they had not previously had access to.

Our conversations that first week included how the document was in place so that all Grade 5 Math students in our province were learning the same outcomes. It was these aspects of purpose that resonated with the students: (a) there is a document that directs the learning in Math classes and (b) their Grade 5 Math class is a part of a larger community of New Brunswick Grade 5 Math classes that are all focused on the same learning outcomes.

While our conversations and learning moved on over the weeks of our study to specific outcomes, this information was a large part of the first week of our study and it opened the door to the students developing as co-constructors and co-decision-makers of their learning.

### **A Collective Voice in Decision-Making**

Each day in the lead-up to our study, I would greet the students at the doorway to our Math classroom. Inevitably the question of “What are we doing today?” was a part of those greetings. As the study progressed, I witnessed this question dropping out of our morning greetings to be taken over initially by questions requesting permission to make a self-directed choice such as “Can I play Multiplication Squares today?” or to goal statements such as “I’m going to practise division today.”

Throughout the study, students had the opportunity to make decisions, not only about what activity they would engage in during Math class, but also about which outcomes we would collectively target. These decisions were based on our collaborative analysis of data and in the co-creation of assessments such as the 1-minute multiplication and division facts quizzes. As reported earlier, 9 out of 15 participants noted in our interviews that they liked having a say in the creation of the quizzes. Additionally, I observed the students being more engaged in looking at their achievement data, discussing where the gaps were, and coming to a consensus on which outcomes to target. Students would lean into these times when data were projected on the Smart Board in our classroom. There was a visible focus on these tasks which I wrote about in my reflective journal, and which contributed to my understanding that students having a collective voice in decision-making was positively contributing to their achievement.

Over the days of our study, I witnessed an increase in engagement with Math learning along with an increase in positive involvement by the students. Once they were involved in creating them there was a greater interest in Math quizzes by the students. Prior to the commencement of our study the distribution of quizzes would be met with a few groans and sighs as students settled into class to complete this task. Once we began to co-create the quizzes, I observed the students entering the class rushing to spend a few moments preparing for the quiz with a classmate or reviewing multiplication facts on their own, which indicated involvement in this aspect of Math that was more positive in nature than before our study. There was a feeling in our classroom that their voices mattered in determining how we were learning and what we were focused on. My sense of reading these aspects of our Math classroom life was that the students felt an increased

sense of ownership in their learning, which I believe contributed to their engagement with the learning and, in turn, their achievement scores.

Six students wrote in their journals about the shared decision-making in our classroom being a welcomed opportunity. Wyatt's comments in particular showcased not only his feelings about getting to share in the decision-making but also how these opportunities impacted his Mathematical mindset or identity, his practice at home, and achievement:

From Wyatt's journal (January 23<sup>rd</sup>, 2020): I was surprised when she let us pick the number sentences. Last night I practiced for two hours! I think I remember most of them. Today I hope I get the rest of them done because yesterday I only got nine right. But if I don't get them all right today, I'll always have tomorrow.

Wyatt's surprise reflects the non-traditional construction of a quiz as a collaborative activity. How often do students contribute to assessment construction? His response also showcases an increased connection to his engagement in preparing for the quiz. What I particularly appreciated about his response was his comment that if he didn't get them correct, he would have another chance the next day, demonstrating his belief in his own capacity to impact his learning, a powerful statement of student efficacy. This resiliency and determination are what I would wish for every student in all aspects of their learning. It is these learning dispositions that are not solely aspects of individual achievement but also impact and are impacted by the collective levels of achievement in the community.

In summary, the responses to Research Question 2 highlighted these three things with respect to relationships: the fun factor, a greater insight into purpose, and a collective voice in decision-making.

### **Impact of Shifts on Student Achievement**

Research Question #3: How do these shifts impact student achievement? There were some interesting findings about achievement: the measurable outcomes, students working collaboratively, and students having choice in their learning. Tables 5 and 6 showcase the achievement data from this study. Together these tables outline the data on the outcomes that students improved in and those that continued to require further attention. As I have reflected on what the students shared about their feelings in Math class, I have contemplated how these have influenced the other two aspects of Lambert's (1998) broadly conceived definition of achievement: positive involvement and resiliency.

Whether responding to our adapted (from DuFour et al.'s PLC questions) learning community questions of "What will we do when we have difficulty?" or "What will we do when we are successful?" the students' overwhelming responses were to do something (a game, a tutorial, a practice quiz) with one or more friends in the classroom. On a rare occasion, students might choose, for example, to study or practise writing out multiplication equations on their own. This was the exception rather than the rule. The students' positive involvement with Math was in almost all instances impacted by their ability to engage with their classmates rather than engage on their own.

Having the opportunity to direct their learning and make choices for their learning had a positive impact on their resiliency with Math. As Wyatt's journal comment noted, he was ready to come back and try again if he did not meet the achievement standard on the quiz. His resiliency with the task was indicative of what I was noticing and writing about in my journal. Throughout the study, the students remained engaged with discussions on what they were learning, how they were going to learn, recording

data to track their progress, and constructing quizzes to provide formative data for themselves.

And, just as Jo Vance's (2016) New Year's blog post, cited earlier, had encouraged me to be present throughout the research process, I witnessed the students being more present and being more involved in both their own and each other's learning.

## **CHAPTER 5: FINDINGS SUMMARY, DISCUSSION, IMPLICATIONS, CONCLUSIONS**

This study was guided by the three research questions:

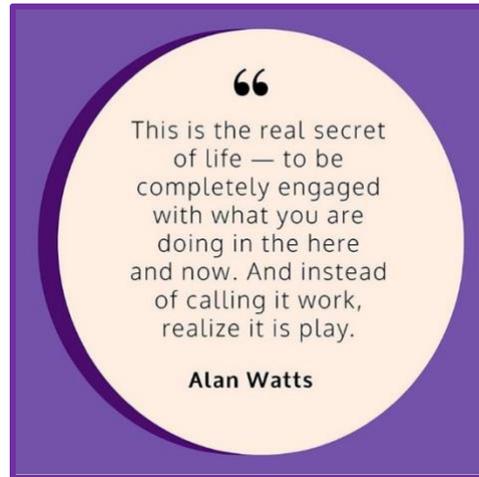
1. What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices?
2. How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision makers of their learning?
3. How do these shifts impact student achievement?

This chapter begins with a summary of the findings followed by a discussion of the findings of the study. These findings are shared considering the literature reviewed in Chapter 2. Additionally, the findings will be shared considering literature that became meaningfully linked to the research project while I was reflecting on the project's findings. Thoughts about the implications of the study including implications for pedagogy, future studies, and concluding statements as well as further questions will also be shared here.

## Summary of Findings

**Figure 13**

*Alan Watts Quotation*



(Huff, 2020)

Watts' quote resonated with the finding of how important the word *fun* turned out to be. Many students focused on the shift from work to fun in their learning during the interviews at the end of this project. If I were to replace the word *life* with *learning*, his words captured what the students had told me. "The real secret of [learning] ---- to be completely engaged with what you are doing in the here and now. So that instead of calling it work, realize it is play." Yoon and Templeton (2019) reminded us that "children's stories have their own unique trajectories that lead us outside of our typical gaze" (p. 60). The students showed me that fun was integral to their learning. To have the opportunity to *play* with numbers through games rather than *work* with numbers on questions from a textbook, or elsewhere, held much more appeal for the students. This, in turn, showcased their greater intellectual engagement with such tasks. As I reflected on the theme of fun, I realized it was fun for the students to be engaged in a game with

friends and that the satisfaction they achieved by honing their computational Math skills through such an activity was also what contributed to their feeling of fun.

The students' statements during their interviews in the COVID period indicated they were missing the fun and play from Math class. These sentiments were echoed in Gavin's (2021) study where "the children repeatedly expressed how they missed seeing, talking, and playing with peers" (p. 11). As well as expressing this in their interviews, the students were observed to enjoy, request, and plan opportunities when they were playing a game with a classmate. Almost all the students, almost all the time, preferred to learn with others. I have wondered if this is perhaps why COVID was so extremely challenging for many students. They were isolated for a 4-month block of time at home away from classmates and had limited interactions with people other than their immediate family members. Their engagement was impacted by worry and loneliness resulting from pandemic restrictions. They missed interacting with the people they had previously connected with during their school day. This interest in socializing and playing with classmates was a predominant theme within our study.

Dr. Lillian Katz (2016) referred to interest as "losing yourself in something outside of yourself, getting absorbed, absorbed enough to stay with it, even when it is not really going right" (07:21). I observed moments of absorption amongst class members as they constructed plans outside of playing games. This absorption was highlighted when we would co-analyze the data from practice assessments. My procedure was to use the Smart Board to share the data using tables such as Tables 5 and 6. Together we would discuss where improvements had been made since the last practice assessment. We then would discuss where improvements were still required and decide which items we would

target next. Moments of absorption were also observed when the students were analyzing their own 1-minute quiz results. Students compared their new results to their previous results and recorded the new results on their 1-minute quiz tracking sheet (see Figure 8). During this time the students would share successes and challenges with one another. At times, they would share hints. One of these times was when a student expressed that he felt that the 4x table was difficult for him. A fellow student suggested: “Did you try doing a double double?”, referring to first getting the answer to the 2x table and then doubling that to get the answer to the 4x table item. This indicates the student’s conceptual understanding of the relationship between the 2x table and the 4x table.

The students were surprised by the opportunity to share in decisions such as co-creating assessments. Many expressed enjoying this opportunity to share in decision-making. Moreover, I observed the students sticking with these activities even when achievement with them was not immediately noticeable. This change in procedure reflected a shift in the community in our Math classroom, a shift that provided opportunities to engage with assessment data and use it to co-create plans about which outcomes to address, when to address them, and how to address them. Throughout this shift in how our Math classroom learning community operated, there were relational shifts as well.

The deeper sense of community was evidenced in Charlotte’s excitement over the class achievement on the 1-minute quiz on February 18<sup>th</sup>, Haley and B’s newly formed alliance in preparing for quizzes, and the group’s focus on co-creating plans and assessments. This deeper sense of community was also evidenced through the supporting of one another in improving achievement and in the celebrations around gains in

achievement made by the entire class and not solely an individual's achievement. The sense of community also manifested itself in the following comment by Khaled. When he wrote that he would never achieve the goal of 11 or 12 correct answers on a 1-minute quiz because he was "terrible at 1-minute quizzes" (see Figure 9), it was emotionally difficult to read this. I did not want him to feel badly about himself or his abilities with Math. It was also good to read this as it signified that we had a Math community in which he felt free to express a challenge.

Khaled's message about his feelings toward achievement with the timed quiz was one that has resonated with me. While it was not a common theme expressed by several, it was a pedagogical moment that further developed my thoughts on and research with Math learning that I felt was important to share. It has provoked research about timed assessments in Math exploration which have broadened my understandings and instilled questions about this practice. I will discuss this finding later in this chapter. For now I will share my belief that the interaction that Khaled initiated was an indicator of the sense of community he felt within our classroom. He knew that he could voice his feelings. While it was difficult to read his message and consider how the practice of timed tests was impacting him, it was and is an important consideration to add to the body of research in this area and to honour Khaled's voice.

### **Discussion**

Let us turn now to a discussion of the findings related to the literature review presented in Chapter 2 and further pieces of literature that informed the analysis of our research data.

## **Student Voice**

Tuck (2022) stated: “People who don’t do youth participatory research or collaborative research with young people might think of it as methods that are modified to be kid friendly like Greek yogurt with Fruit Loops sprinkled on top” (21:29). She went on to state that “there are many ways to shift from doing research on to doing research with ... To do research with someone is to ask them questions about their life or experiences” (Tuck, 2022, 25:10). Her words connected to this study and the literature reviewed in Chapter 2 on Article 12 from the UNCRC (1989).

Lansdown (2004), Tangen (2008), Schiller and Einarsdottir (2009), Hayward (2013), and Horgan (2017), have written about the UNCRC’s significant statement of children’s rights to have their voices heard on matters involving them. To this end, Fullan’s (1991) question: “What would happen if we treated the student as someone whose opinion mattered?” (p. 170) encourages us to listen to students’ voices. Tangen (2008) referenced the “new sociology of childhood” (p. 157) and the concept of “the competent child” (p. 158), which has become part of the Western worldview. Researchers such as Holloway and Valentine (2000), Lansdown (2004), and Tangen (2008) have discussed the notion of children being increasingly viewed as “beings” (Tangen, 2008, p. 157) and not as “becomings” (Tangen, 2008, p. 157). These researchers have added to the importance in this study of asking students questions and listening to their voices to inform and impact our Math classroom learning environment. Our study adds another component to research such as Coleman and Davies’ (2018) New Zealand study with 7- and 8-year-old students engaged in Mathematical learning within a dramatic framework of a co-created dramatic theme.

At the beginning of this project, I was focused on listening to students' voices. My understanding of this practice is now broader than I originally conceived it to be. It has been influenced by experiences such as witnessing and watching Haley and B forge a new component of their classroom relationship as they prepared for their 1-minute quiz. Rinaldi's (2001) "Pedagogy of Listening" in which many meanings of listening were outlined has also been an influence. Particularly influential was Rinaldi's statement that "listening should be open and sensitive to the need to listen *and* be listened to, and the need to listen with *all* our senses, not just with our ears (p. 3). Rinaldi (2001) wrote of listening to children in our search for meaning and that "we have to listen to children not only because we can help them but also because they can help us" (p. 1).

Inevitably when an individual learns of my candidacy for a Ph.D. I am asked: "What are you researching?" Searching for the right sound bite to articulate my studies has been an evolving process. As I near the end of this project, the answer has become clearer. At its core this research endeavour is about listening to students. Using listening to support students in their learning and also to gain wisdom that only the students can provide of what it is to be a student learning. My purpose is to use this research project as a contribution to the field of honouring student voice. My goal is that this research will be a springboard to further encourage myself and others to consistently use our platforms to deepen and strengthen learning experiences for the children we learn with. My hope is that this research will further contribute to the field of teaching practice encouraging educators to be receptive to hearing what students have to say about the classroom learning communities they inhabit. That through this listening, educators and students

will personalize and optimize their classrooms to be responsive places of learning for those who reside in them.

Reflecting on my observations of Haley and B's pre-quiz procedures, I wrote in my journal about how the change in their procedures exemplified the component of positive involvement included in Linda Lambert's (1998) "broadly conceived" (p. 23) definition of achievement. This definition encompassed "academic achievement, positive involvement and resiliency" (p. 23). Haley and B were not only involved in demonstrating their achievements with multiplication and division facts, they were also directing their learning. Additionally, the tone of their interactions was distinctly more positive than their interactions in the months prior to this.

My goal for this research has always been to communicate a story of learning, one that took place in a Grade 5 Mathematics classroom. Much of the planning for the telling of this story took place in the months and years leading up to the data collection, including the caution to maintain a learning stance of being present and remaining open to observe the unexpected or surprising.

As I reflected on Khaled's voice about the 1-minute quizzes, I was provoked to consider Mathematics researcher and educator, Jo Boaler, who in her TED (2017) talk about giving a timed test of multiplication facts noted that it is one of the "terrible things going on in schools all the time imposed by governments" (0:28). In 2015, Boaler et al. stated:

Unfortunately, many classrooms focus on math facts in unproductive ways, giving students the impression that math facts are the essence of mathematics, and, even worse that the fast recall of math facts is what it means to be a strong mathematics

student. Both of these ideas are wrong, and it is critical that we remove them from classrooms, as they play a large role in the production of math anxious and disaffected students. (p. 1)

While my initial wonderings around Khaled's message were focused on how we might have altered his view on the 1-minute quiz practice by having more time to prepare him to achieve the goal of 11 or 12 correct answers, I am now questioning the practice of timed tests. While our classroom practices included learning conceptually about patterns in and strategies with multiplication and division Math facts, I viewed my teaching role also to include preparing the students for the timed tests that were part of the district assessment. I now view the 1-minute quiz practice as damaging to students' math identities, understanding that it is contributing to giving the false impression that being able to do a timed test successfully is a measure of their Mathematical abilities. I view Khaled's voice and my thinking about it as an example of Berger's (2015) research regarding the potential in narrating pedagogical moments:

I wish to illuminate the potentiality of the practice of pedagogical narration to orient educators toward complexity and thinking that is triggered by encounters with unexpected pedagogical situations. Such encounters have the potential to initiate educational judgment that is inspired by events and not by following known rules and standards. (p. 130)

The encounter with Khaled's message opened me to an unexpected pedagogical situation which caused me to question a practice. This questioning led me to share the experience with a district colleague who, when hearing of this, stated that he did not like timed tests. This questioning then led to a search for research to inform my educational

judgment. While reading Khaled's message during this research project inspired me to question the district practice of a timed test to assess the recall of Math facts, I wondered why had I unquestioningly followed the assessment practice of a timed test set by our district? Were other districts doing this? Where was the PLC to bring research on such a practice forward? Where were the conversations to consider this research, our practices, and the impact each had on a fair measure of Khaled's Math abilities? I see my complicity in this. I had not suggested that such a PLC focus be considered. Why? I am questioning how the dominant discourses of schooling operated through me and the practice of timed testing went unquestioned by me.

Viewing and reading Boaler's work in 2021 as I write this dissertation and reflect on Khaled's voice in his note has me questioning our practices and how we might proceed in the future. Are we able to hear individual voice within a learning community? Are we responsive to those voices that interrupt and question our habitual pedagogies or communal celebrations of success with such practices? His voice haunts me. I have reflected on it over a period of months. Along with my questioning about how spaces might open to embrace the roles of teacher-researchers searching more fully for and considering current research. Another learning is about the critical importance for me to listen to students' descriptions of how they see themselves as Math learners.

As I reflect on the note from Khaled in Figure 9, I am critically assessing my responses to him where I state that he has not met the goal "yet" and that he "will get there". With my responses, meant to encourage him and relaying my assumption that he would achieve the goal, had I diminished my capacity to listen to him? How might I have used my teacher voice differently to broaden the conversation with him? How could I

honour him expressing his belief, acknowledge his feelings, and open the possibilities of assessment for him?

Equally important to the acquisition of Math skills is a Math growth mindset, an appreciation that mistakes and struggles are not failures, but rather necessary steps to be valued along a continuum of learning. Mistakes do not reflect their identities. Mistakes are worthwhile to investigate together. For Khaled, what if he had not been timed? What might his results have been? How might our district's process in assessing outcome N3 be modified to exclude a timed component? How might this modification impact teachers in their lesson planning knowing that the students would not be assessed based on a timed test? If pivoting away from timed tests is not an option, how might there be room created for Khaled to determine when he was ready to be timed? During the editing process of this research, Dr. Ray Williams asked if it would be possible to do two assessments – one timed and one not timed. The comparison of results for these two options would be interesting data to analyze. For me, the disservice that I was complicit around timed tests in our classroom was a mistake. I would now be prepared to engage in conversation drawing from the Mathematical research on timed tests. Khaled helped me see these things and instilled in me the conviction to include these conversations with future Math students and educators.

### **Professional Learning Communities: A Shift in Questions**

Hairon et al. (2017) have argued “that a PLC is a multi-dimensional construct comprising three inter-dependent dimensions of ‘community,’ ‘learning,’ and ‘professional’” (p. 72). This research moved outside the construct of a Professional Learning Community (PLC) because students participated in a manner similar to how

professionals engage in PLCs. This difference is reflected in the adjusting the name of PLC to a Classroom Learning Community (CLC). As such, the narrative of this research adds to the body of literature on learning communities in examining what Watson (2014) described as including “wider participation” (p. 20) to examine the “implications of this” (p. 20) on the construct of a PLC. To discuss how this transpired I have framed this around the noticed shifts within the classroom.

**Figure 14**

*Comparison of PLC and CLC Questions*

<b>Four PLC Questions</b> DuFour et al. (2008)	<b>Four Adapted CLC Questions</b> <b>+ 1 Original Question</b>
What do we want each student to learn?	What do we need to learn?
How will we know when each student has learned it?	How will we know when we have learned it?
How will we respond when a student has difficulty in learning?	What will we do when we have difficulty learning?
How will we respond when a student has learned it?	What will we do when we have learned it?
	How do we want, or what do we want to do, to learn it?

As noted in Chapter 2, the four questions of DuFour et al. (2008) associated with PLCs were posed to seek educators’ thoughts on what needs to be learned, how they will know when the learning has been accomplished, and how they will respond when the

learning is accomplished or when it requires added attention. Following Dr. Sherry Rose's suggestion to consider the possibilities around rewording these questions when moving forward with a study which at its heart was about include student voices to impact their Math learning environment, these questions shifted. The reworded choices facilitated a more collegial discourse among the students and me and while this was met in the beginning with questions and uncertainty the conversations in our classroom evolved to demonstrate greater facility among the students with generating ideas and answers.

In the early days of our study when the questions were introduced to the students reflected, Ella's journal reflected her uncertainty with her responses and how we might proceed. As a reminder, this was her writing:

*What do we want to learn?*

Whatever we're supposed to learn I guess.

*How will we know when we have learned it?*

It will come easier?

*What will we do to learn it?*

Practice?

*What do we do when we have learned it?*

I guess I'll find out.

As our study progressed, I observed Ella became more adept and confident in her answers to these questions. She was able to verbalize the outcomes she was learning as well as make decisions for herself about what she would do to learn (e.g., play a game, ask for my support or the support of a peer, or engage in practice to name just a few

choices). Once an outcome was achieved, she would decide on what to learn with next. She developed greater agency with her Math learning and contributed to answering these questions for the class community as well. She was not alone. Although she was the only student whose uncertainty with answering the questions was recorded, my reflective journal noted that as we proceeded through our study, more students engaged in and exhibited more confidence with conversations to answer our CLC questions.

As Burns (2016) noted: “Over the years of working with students in Math classes, I’ve learned that giving students options of what to work on is wonderful for making them feel empowered and in control of their learning” (p. 44). The addition of the fifth question to our CLC questions: “How do we want, or what do we want to do, to learn it?” opened space for the students to use their voices and power to direct their learning, make decisions, and dialogue about their learning.

It is these shifts to PLCs to create our CLC that contribute to the literature for consideration by others with their practices in other classrooms. They are further informed by the literature on CoPs and how this developed in our classroom.

### **Communities of Practice: A Shift in Roles**

When writing Chapter 2, I was considering the influence of the theoretical construct of a CoP in relation to the classroom. I now view the link as how the inclusion of the students in the practices of a PLC might be considered a CoP. As stated in Table 2 of this dissertation, Smith et al. (2017) noted: “For a group of people to constitute a CoP, its members must come together around ideas or topics of interest (the domain) and interact with each other to learn together” (p. 211). It was in the blending of the students’ voices and the teacher voice in our CLC questions about learning where we came

together around the domain of Math. It is how we interacted with each other in a manner similar to a PLC, to learn together about Math that linked to the concept of a CoP. The distinction is clearer. Was our classroom environment a CoP or did our CLC activities represent a CoP? I believe it is the latter.

Lave and Wenger (1991) described a process of legitimate peripheral participation (LPP), when newcomers to a community move towards greater participation and membership by assuming factors such as the practices, tools, and language of the community (p. 40). In our research I witnessed the students moving toward greater participation in factors associated with educators' community. Within our classroom, we engaged in conversations focusing on our five CLC questions. We used these questions to analyze our achievement data and make plans. Tools such as spreadsheets of achievement data and the use of language such as *outcomes* became integral to how our classroom operated. The conversations on CLC questions and through the practice of analyzing data using tools such as spreadsheets and educator language such as the use of the word *outcomes* the students exhibited the process of legitimate peripheral participation.

Wenger (1998) defined a CoP as a construct in which members engage in a collective learning that is sustained by the pursuit of common goals and social interactions. The students and I pursued the common goal of improving our achievement data and engaged in learning conversations – whole group, small group, and individual – in the pursuit of improvement. As we engaged in this pursuit there was collective learning. For example, I learned the students' perspectives about the learning activities they preferred and felt best met their needs. Reciprocally, I shared learning activity ideas for the students to consider.

Through these experiences, our classroom became a more reflective one. Together the students and I reflected on questions, achievement data, and Math activities to work together to improve learning for each of us. Gellert (2013) noted that “social situations in which participants talk together, work together, generate ideas, build on others’ ideas, reason, explore, and discover together are reflective learning environments” (p. 114). Our classroom social situation exhibited shifts in how we talked and learned together. I turn now to write about these shifts.

### ***A Shift in Roles: From Teacher-Driven to Collaboratively Driven***

As Yoon and Templeton (2019) noted, children’s reflections and interpretations “often go unheard, specifically in contexts where tangible products such as test scores (Au, 2016) and compliant dispositions (e.g., being quiet) construct the veneer of success and progress” (p. 56). It was a shift for the students and me to place greater importance on and take the time for the conversations that emerged around our CLC questions. We were breaking down boundaries, encouraging the sharing of ideas and thoughts in a way that was more atypical than typical of how Math learning had previously taken place for us. This fostering of intellectual inquiry and engagement with their achievement through analyzing data and constructing plans to move forward opened a new space for us to hear perspectives, preferences, planning ideas. We collaborated to analyze our achievement data, engage with the provincial outcomes, consider preferences and options of how to learn, and plan for learning activities. This created space for the students’ reflections and interpretations to be heard.

The students exhibited their power in the classroom in agentic ways. As shared in Chapter 4, their conversation shifted as they entered the classroom. They began our class

by outlining their plans for some of our time together. This is an example of their agency as learners. Their shifts in language indicated a switch from passive to active learning and demonstrated a shift in their agency as learners as they noted their plan(s) to play Multiplication Squares with others. As evidenced by my observations of the engagement amongst students when playing such a game and the students' interview comments about the fun and importance of doing so, I am leaving this study with a heightened understanding of the significance of fun in the classroom.

### ***The Factor of Fun***

Another shift within our CoP was the recognition, by both the students and me, of the inclusion of fun in Math learning. Tamburri et al. (2019) noted in their study that teacher participants “planned work to clearly link concrete, representational and abstract, focused on critical thinking skills, ... valued mistakes, provided open-ended tasks, choice and student ownership, and tried to keep it fun” (pp. 694-695). They incorporated fun into Mathematics to positively impact the affective factors of anxiety, confidence, and engagement in students' attitudes with Math. Kolacinski (2003) found that a students' anxiety with Math was a determining factor on their success. And so, as I have learned through my research data collection, I have come to the *stance* that while I did not anticipate the importance of fun in Math class nor did I fully consider how it has an impact on achievement, these are two shifts in my learning that will greatly affect how I approach future teaching opportunities. Supporting students' learning by consciously seeking to determine how we construct fun in learning processes has become a focus to further inform my professional practice. Consciously making evident the fun in practising, for example, Math computational skills and the achievement that is acquired

by doing so is a part of a classroom learning environment that values and includes fun as a contributing factor to academic success. The students' voices about fun have taught me to listen to students as they share what makes a subject fun for them. I need to incorporate explicit planning for this, looking for opportunities to mesh curricular outcomes (a primary teacher focus) with fun. Honouring fun as a component of learning; mathematical learning and all learning has been heightened as an important consideration for my teaching practice.

I have come to see the simple three-letter word *fun* as so much deeper than I originally did. It's a little word that had a big impact, a word that warrants consideration far beyond its most straightforward meaning. I would likely have defined fun as the enjoyment, entertainment, or amusement associated with engaging in an activity that one finds pleasurable. If probed, I believe I may even have associated fun with school and learning but must admit that it is not the first descriptor that might have come to my mind to associate with a Math class. As Shareski (2017) noted about his school years: "In some cases, fun was seen as the antithesis to real learning" (p. 1). As he reflected on this, he "realized [and helped me realize] that learning and joy are inseparable. Real learning always includes joy. Sometimes joy needs to be sought out and experienced if learning is to take place" (p. 1). And so, I cannot write about my findings without sharing how the students helped shift my thinking about the importance of fun or joy in numeracy and how this affected their positive involvement, resiliency, and achievement with the subject area. Additionally, as I have reflected on the findings of this study, I have worked to pull out other aspects of our project that resonated with the students and which might impact future endeavours. This has sometimes proven challenging, and when thinking or writing

about this I have wondered if perhaps it is that students are not often asked to share their thoughts on learning.

### **Our Unanticipated Participant: COVID**

The most unexpected and surprising element of this project was the emergence of COVID. This unanticipated element gathered significance at the end of the data collection period and during the writing of the story of this research. The significance of COVID was such that I have come to name it as an unanticipated research participant. And, while the pandemic disrupted so many aspects of life, including this research project, it has been through this disruption that re-imaginings have emerged.

Hodges et al. (2020) identified emergency remote learning as a “temporary shift of instructional delivery” (para. 13) as a response to a situation of crisis. The COVID-19 pandemic with mandated social distancing saw the New Brunswick school system, and many others, adapting and pivoting to remote online learning. Throughout the interviews conducted for this research there was a wistful quality to the responses offered by the students. They expressed how they missed being together and how it would be so nice to go back to our Math classroom for even one day to be at school with their classmates to play a game.

Through these lost experiences I sensed a heightened appreciation for what had been a regular, perhaps taken for granted, aspect of their learning identities. For both the students and me, these experiences were missed and longed for. In addition to the loss of in-classroom learning, I have reflected on the losses within this research.

As I have reviewed, coded, and questioned the data from this project I have struggled with the unexpected elements with it. These elements included the shortened

research period, the inability to interview students in person in our Math classroom, the lost opportunities for reflection within the students' and my own reflective journals ....

As I conclude writing my dissertation, sometimes during lockdowns, I have come to reframe this deficit lens to focus on the more positive moments and learnings that were revealed within the project. As Gavin (2021) reported: "Children turned to each other for support, prioritizing relationships and producing social lives in new ways through digital technologies and spaces" (p. 11). Daniel, with the support of his father, set up weekly Zoom calls for his classmates to connect. It was through their initiative with Zoom that I was able to hold the first of the interviews. Just as Gavin (2021) noted:

While conversations around education in pandemic times continue to focus on learning loss, these innovations and the learning that took place both in the curating of these spaces and within the spaces themselves needs to be recognized and valued. The children were learning and growing, perhaps not in ways documented by standardized measures. (p. 11)

The concluding statements from Gavin's (2021) study spoke to the importance of listening to the voices of children growing and learning through the pandemic.

In these pandemic times with schooling in flux and fear of student learning loss prevalent, researchers have the opportunity to stand in solidarity with children as they advocate for their needs. The children in this study were innovators, finding novel ways forward during a time of crisis. Children need to be included in discussions and decisions about their learning, with educators and researchers taking seriously their ideas and creative solutions. (p. 12)

There was also a gap that was visible with the student/family initiated Zoom call. Families had varying access and facility with technology. Taking a critical look at how this impacted learning is an area that I will speak to as a possible area for further research in an upcoming section of this chapter.

From 2000-2003, I had the good fortune to be the vice-principal who worked with a dedicated, beloved principal. Throughout those years I learned a great deal from her, and it was over the course of this time together that I often heard her speak of “the students we serve” as she led our school. It is perhaps why Cook-Sather’s (2002) words about the missing component in considering the restructuring of a system without consulting with those it seeks to serve struck me as so important in any action research project I was to embark on. Article 12 of the UNCRC, (1989) asserts the right for children to be able to “express [their] views freely in all matters affecting [them].” This points to the need for educators to consider the views of children in learning. It was my desire to consult with the Grade 5 Math students I sought to support and develop their learning. I wanted to engage in research in a manner which honoured students’ perspectives and preferences while also honouring the prescribed New Brunswick Grade 5 Math curriculum and holding high standards for achievement in Math learning. As the story of this project was revealed and captured in this document, there were findings that surprised me (e.g., the conversations about fun.), findings that continue to engage my thoughts with further questions and wonderings (e.g., student voices in classroom learning communities), and findings that confirmed or validated my thoughts and perspectives (e.g., increased student engagement increases academic achievement).

## **The Fun Factor**

Earlier, I cited this comment from Tara: “We played more games, and we were enjoying ourselves more because we found it was a little more easier for using our stuff [learning].” What resonates with me are the two characteristics of fun that she identified. First, her recognition of the improvements she made contributed to her idea that Math was fun. Second, the games she played in class with her classmates, building Math skills, brought the fun factor into what she was doing. These characteristics spoke to the nuances to what fun meant in Math class. Thinking about what the children meant when they expressed joy or described Math as fun, other components were identified, including a collective pride in class achievement, social participation, and practice. These findings were confirmed as I sought out research on the role of fun in learning. Kamii (2003) has researched and written about games and their ability to provide children with meaningful contexts in which to think about number. Her writings validate how motivating active and critical game spaces can be for children to compute, check answers, explain their thinking, and confront errors together.

As I struggled with this tension between allowing students to make their choice and me imposing another game option on them, a study by Dumas and Nelson (2016) provided some guidance for me:

In so many ways, adults determine the boundaries of children’s social worlds. ... Recognizing children as social beings should lead us to shift our scholarly analysis, our politics, and our practice in ways that respond to children’s rights and interests and to listen to what children can teach us about being a child in the world. (p. 33)

As I practised listening authentically to the students' voices and respecting their right to choose activities as we co-planned our class time. I relinquished my control over setting up assigned games. I learned from the students as I offered choices, introduced new games, and then took a step to the side.

### **Implications for Practice**

In the year that followed the research data gathering, I went on to teach, in person, under the veil of the possibility of a return to home learning. And in preparation for this, I developed new ways to consider on how to proceed in a Grade 5 Math learning environment where we might be separated by not only space but also by technological supports (e.g., access to computers and internet service) we may or may not have in place. COVID highlighted these discrepancies to availability amongst our school families and how the gap of understanding about these availabilities by school, district, and provincial departments resulted in a steep learning curve as these bodies searched for ways in which to provide technology to families. It is these aspects, or a reimagined Math program, that I wonder about and hope that further research might delve into the vast array of questions around virtual learning with elementary students. Along with this, it is my wondering and hope that the voices of the students involved in any reimagined ways for learning are sought out, heard, and acted upon to impact the learning environments that they and others inhabit in the future.

Making sure that students have the opportunity to play or have fun with others during Math class was the number one finding that emerged through this project. I see these opportunities as directly linked to Lambert's (1998) definition of achievement which included positive involvement. Providing the space for students' learning which

values positive involvement or engagement will contribute to success. Boaler et al. (2015, 2017) have written a series of books organized around the principle of active student engagement. Boaler et al.'s books offer a range of activities or tasks, including games, which feature a "low floor and high ceiling" (p. 2) quality so that students of varying needs may be challenged. In our conversations around Math learning, the students' voices encouraged me to focus on further acknowledging and practising incorporating the fun into Math learning. Recognizing that conversations around the idea that persevering with a learning outcome and achieving success with it is fun. Playing a game can be fun and so can the satisfaction of learning.

The authoritative voice within a classroom is often that of the teacher. Opening to the possibilities of diverse dynamic conversations that disrupt this tradition offers the opportunity for students to be heard regarding their preferences when learning. It fosters greater engagement with the curricula, perseverance with tasks, and higher academic achievement. I learned that through sharing access to the curriculum and engaging in discussions with students about how they prefer to learn and what activities they personally find most supportive to their learning can create space for learning to flourish.

This research project helped me to re-think my role in the classroom. I am a teacher researcher who is sharing ideas, strategies, and results with the students. A successful teacher helps students make decisions about their learning, decisions that are rich with possibilities. A further goal is to validate the students' choices. In the instance of Multiplication Squares and its popularity, I found it was important to encourage the students to learn with their chosen game. I did so by circulating among the students and engaging them in conversations about the strategies they were using. At times, I would sit

down and play a game with them in order to learn about their Mathematical thinking and to make visible strategies to support their learning.

As the teacher and the principal of the school where this research took place, I was in a privileged position. I did not have an administrator walking into the classroom questioning what I was doing. While I would have welcomed this opportunity as a teacher, I acknowledge that incorporating a shift such as the one I did could bring with it some hesitancy. Acknowledging this, it is important that teachers who will choose to engage in this type of classroom routine with their students must have a strong understanding of how it can improve learning. Principals would need to be open to exploring this mode of classroom operation to support the students and the teacher in such a classroom. Dialogue about the goals, methods, strategies, questions, and findings will be key to building a strong learning-focused classroom which listens to students' perspectives and incorporates them into the classroom environment.

Khaled's voice and current research on timed tests evokes the questioning of this practice and pedagogic wonderings such as these: Where is the space for questioning such practices in educational systems? Where are the conversations involving continuous reflections around current research for students and educators? How do we ensure that these conversations are happening with classroom teachers, school, and district administrators, and beyond – perhaps even in partnership with university education faculties? The learning with Khaled around the anxiety that came with the 1-minute quizzes had me wondering if perhaps learners need the opportunity to decide when they are ready to participate in timed assessments. What if classroom teachers provided the space for students to use their voices to make this decision for themselves? What if

classroom teachers continued or renewed their focus on the conceptual understanding of multiplication and division facts? What if classroom teachers, principals, and district supervisors and superintendents recognized that timed tests may do more damage than good when students are not ready for or comfortable with them? Educators could use their voices to mitigate the damage timed tests cause by allowing students to make the decision as to when they are ready to participate in this kind of assessment. For some, or all, students they might choose another way for them to demonstrate their conceptual understanding of, and automaticity with, multiplication and division.

### **Implications for Theory**

I was first introduced to the concept of *stirring in* through a journal article by Cooke et al. (2020). Stirring in is a perspective of learning linked to the theory of practice architectures in which the learner is stirred into new practices. This concept connected to what I observed and reflected upon during this research project.

The students were stirred into the process of assessment, an approach provided the space for them to gain a deeper understanding of why and how we assess and what we do with the assessment data. Through their participation in building assessment tools, tracking the data from assessments, and planning for learning, they were stirred into practices that are often completed exclusively by the teacher. Students commonly view assessment as processes that are done to them, rather than with them. Through the stirring in of students with assessment practices, the students' power was exerted in a manner that invited their contributions and created conditions to support meaningful assessments not only of but for students.

I too was stirred in. As the teacher in the classroom during this research project, I was stirred into observing and learning with and from the students through a series of practices that had not previously been part of our routine. This stirring in provided the opportunity for me to gain greater insight into what worked best for the students' learning from their perspective.

Another result of this stirring in was the development of the students' Math identities. As Grootenboer and Edwards-Grove (2019) argued:

... one with a *mathematical identity* is someone who is stirred into both substantive mathematics practices (what is being learned) and learning practices of mathematics (how it is being learned). Thus, the purpose of mathematics education must be to provide the practice architectures (the conditions and arrangements), which enable learners to participate and engage in substantive mathematical practices, and so foster robust and healthy mathematical identities. (p. 442)

While the observations of the students' Math identities were largely positive, there was one negative observation that stood out. This was Khaled's message to me about having an Math identity with the trait of "being terrible at 1-minute quizzes" (See Figure 9). These observations have led me to be curious about further research into learning identities and how students' voices in learning processes such as assessment might be further explored and responded to.

### **Recommendations for Further Research**

Including students' voices in Mathematics assessment and how doing so may support the building of students' Math identities is a future research focus I am

considering. How might including students in the building of assessments, the analyzing of assessment results, and the planning of Math tasks and activities support the growth of positive Math identities for students across various grade levels? Might focusing on these components strengthen Math identity traits such as resiliency, collaboration, and engagement with conceptual learning? In turn might these components and traits lead to greater Math academic success?

With the unfolding and telling of this research story have come wonderings about how other classroom stories around student voice can continue to shape and enhance our understandings about these learning environments. How might classroom learning environments be enhanced through the perspectives of the individuals learning in them? What would this look like for other subject areas? Other age groups? What story might this tell about a multi-age classroom? My curiosity about learning environments and listening to students' voices within them to make decisions about learning has been influenced by other experiences. These experiences include ones when I was a child and my voice was sought and listened to. As a classroom teacher and administrator some of the most impactful and meaningful moments came when listened to students' voices. When I was learning about world affairs, I became aware that the United Nations Convention on the Rights of the Child (1989) was adopted. These are some of the experiences that have influenced me to engage in learning with young students to date. Further future research regarding student voice interests me and I would appreciate being able to learn from others who may look to investigate this area.

The shortened timeline of this research has provoked my consideration of what a longitudinal study in this area might reveal. What story would it tell to look at the following research questions over one or more school years?

1. What are the shifts in operating a Grade 5 Mathematics classroom as a learning environment which incorporate aspects of PLCs, CoPs, and the greater involvement of students' voices?
2. How do the relationships among all the members of the classroom look and evolve as students are encouraged to act as co-constructors and co-decision makers of their learning?
3. How do these shifts impact student achievement?

How might that story be enhanced through the greater inclusion of students' voices in the writing about this research? How might a story such as this be co-written by students and teacher(s)? In hindsight, I have thought about how fascinating it would be to invite students to have different opportunities, aside from their reflective journal writing, to share about their experiences with research on student voice. What would be produced if students were invited to co-compose alternate pieces of writing or texts (e.g.: videos or blogs) or multi-modal texts to share in the dissemination of this research?

The circumstances around learning during COVID have brought a heightened focus to online learning at the elementary level and has exposed a palpable inequality regarding learners' access to technology, an example which notes the privilege of some students over others. In addition to considering questions such as: How might online learning be structured and practised meeting the needs and interests of young learners? How might students' voices be sought to enhance our understandings of curriculum

delivery via online learning? What stories currently exist that can be shared on how online learning is taking place at the elementary level? How can these stories inform us for future online learning endeavours? It is imperative for educators to critically consider the roles that access to, and facility with, technology play in online learning. Research about the aspects of power and privilege in relation to online learning is perhaps now more than ever a relevant field of study to be considered.

There is an intricate play that happens in a classroom learning environment. The people who inhabit it, the questions that are asked, the activities that are engaged in, the thoughts that are shared, the materials that are utilized, and the voices that impact it are just a few of the components that make learning a dynamic and responsive entity in any environment (virtual or physical). An aspect of a classroom that intrigues me to research further was sparked by Kamii (2003), who stated:

When children become able to play games independently, the best thing for the teacher to do is sit down and play the games with the children. ... We learn the most about children's levels of thinking when we play with them, and this assessment tells us how best to intervene. (p. 26)

In my experience, classroom teachers often engage in conversations to share game ideas or plan for classroom learning environments where a game may be used as an activity for students to engage in while the teacher teaches or reinforces a concept with another group of students. Educators may attend a Make and Take professional learning opportunity to create games for their classroom. I find it interesting that I have not often been part of learning conversations that focus on the learning that can come from sitting down and playing a game with children, particularly at the upper elementary level. And yet, these

have been some of the most insightful learning opportunities that I have experienced with students in my research.

Through playing a game with children I was able to learn about strategies they were using and mentor the development of other strategies. I reflected on why I had not been part of more collegial conversations about learning conversations about the learning opportunities that involve sitting down and playing a game with students. My thinking is linked to the inclusion of students' voices in learning environments. We need to have more conversations about the dialogic and reciprocal aspects of a classroom environment. I think that there are more stories to be told about richer engagement in classrooms as places where there is more conversation about all inhabitants being learners. These stories can focus what we think about being engaged in learning together. And dare I say, how we can all have more engagement, fun, and perseverance with learning. Perhaps further research in this area is warranted.

Studies which focus on the materials used to develop Mathematical learning, such as games, intrigue me. Looking deeply and questioning how classroom practices are decided upon, used, and experienced in a learning community interest me. How might such studies deconstruct decisions such as the purchase of materials in the classroom? I propose that such a study might include a focus on materials in relation to the culture of the classroom environment and the achievement of those learners within it. In particular, how might teachers, who are innovative with materials in their pedagogical practices share their stories? How might these teachers be further supported by other educational stakeholders such as administrators or university professors?

Where is the research on PLCs in which educators at the school and district level engage in reflective thought and address innovative practices for learning Math? Research on how engagement of practicing teachers, administrators, and district employees may be supported by that of university professors is a further area of interest for me. In my opinion and experience the missing links that need to be considered arise when few voices are invited and multiple levels of conversation are rare, especially with regard to classroom pedagogy. Outside of personal initiative or educators taking university courses to learn and increase their certification, where is the practice of engaging with current research within the day-to-day occupation of educators? I would suggest that research in this area is not simply needed, it is crucial. How might a PLC be effected across the entire scope of educators and include the most important – student voices that focus on the development of students’ Math identities?

### **Conclusions**

The aims of this study were to explore learning in a Grade 5 Math classroom where there was a focus on student voice and the understandings of Professional Learning Communities and Communities of Practice. In the paragraphs that follow I list some important conclusions from this study.

### **Learning Conversations**

Words and conversations matter. The wording of the PLC questions that guided our learning became more inclusive, which I believe supported the overall positive trajectory of our Math classroom. While I learned with the students in this manner, I want to acknowledge that DuFour et al.’s (2008) original PLC questions and the rewording of these in our Math classroom are not, in my thoughts, exclusive of one another. These two

types of conversation are, in my experiences, not an either-or situation with one being privileged over the other. They are a both/and situation supporting educators and children in multiple ways. As professionals, teachers are constantly searching for ways to bring the curriculum to life in a classroom. The sharing of ideas in PLC conversations supports teachers in many ways, such as in the sharing of resources or through collegial conversations around overcoming identified challenges with learning a concept. In our classroom that winter, one of the primary games that supported the students' mastery of the Math skills of multiplication and division came from a colleague. I may not have learned of it on my own. Thank you, Miss Brittany! Additionally, learning and learning environment were enriched through conversations with the students that sought their perspective. The students voices were listened to as we co-analyzed achievement data, co-planned our Math classes and co-created assessments, As I have reflected on this research project, I have taken the stance that a rich learning environment is created and supported through multiple conversations and voices—the colleagues one learns with, the individuals in the classroom who are learning together, the researchers one reads, the various texts one engages with, educators outside one's home school such as university professors, family, and friends. The voices that have the potential to impact a learning environment are numerous and varied if one is open to listening.

### **Analyzing and Tracking Achievement**

Throughout the course of our 6-week study, two types of achievement tracking took place. For most of the outcomes we were targeting, I completed a colour-coded table such as the ones reported in Chapter 4. I would show the students these tables and we would look at what they noticed and make plans on how to proceed from there. The

second achievement tracking was done by the students themselves. Once their 1-minute quizzes had been corrected, the students would record on their graph the number of correct answers they had achieved. As I have reflected on this, I have come to wonder if the greatest improvement in an outcome was impacted by the students analyzing and tracking their own data and thereby enhancing the responsibility they took for their results.

### **Math Identities**

Over the course of this study, I witnessed students become increasingly engaged in and focused on their Math learning. It felt like there was a subtle but meaningful shift in how the students viewed themselves as their voices were listened to in relation to their Math learning. Math assessment took on a very different tone as the students analyzed achievement data and co-created plans for their learning. There was a greater sense of self-control for the students: Their decisions impacted their learning, assessments were tools that made their learning visible to them, a grade on an assessment was more than what they got because the mistakes they made could be analyzed, strategically targeted, and improved upon. And through this shift in how they saw themselves as Math learners came increased motivation, resiliency, engagements, and success. In essence, the students' power with Math learning became more visible to them and created an atmosphere of learning that we might all yearn to be a part of as life enriching. This is a powerful conclusion indicative of the powerfully positive impact that was witnessed on not only the students' Math identities but for my teacher Math identity as well.

## **COVID Highlights School Connections**

While COVID-19 was an unwelcomed and unanticipated participant in this study, it had a positive effect on how a group of students and their teacher viewed the opportunity to work together in Math. COVID led the way to further questions and study about how this virus insinuated itself into many aspects of being a student and a teacher. As I share the conclusions drawn from this study, I want to acknowledge that, while unwelcomed, our initial learnings through this pandemic about learning communities have been impactful and continue to generate further questions to be explored.

### **Good to be Seen**

As I conclude my reflections on what I have learned, I am struck by the words of a dear friend whom I saw for the first time in September 2021 after nearly 2 years apart. In response to my greeting of: “It is *so* good to see you!” his response of: “It’s good to be seen!” (D. Creelman, personal communication, September 15<sup>th</sup>, 2021) provoked me to reflect on the questions: Isn’t that what we all hope for with the people we have around us? Don’t we all yearn to be seen? And doesn’t part of that yearning to be seen include being heard and listened to? Isn’t this how we make thoughtful enriching meaning that leads to learning?

These questions, all sparked by a friend’s comment, circulated in my mind as I thought through the final chapter of this dissertation. They invited me to reflect on how, perhaps, the lasting contribution of this research might be an increased resolve to engage with those with whom I share a learning community. I am reflecting on commitment to do so. A commitment to engage with the learning community in a way that advocates for members to express themselves. A commitment to listen to the thoughts and ideas shared

by the members. A commitment to use these thoughts and ideas to think critically about power relations within the community. A commitment to enact, as appropriate, these ideas to shape the classroom learning community in a manner where students' voices about how they experience Math learning shapes the way the classroom community operates. To enact these commitments to contribute to learners' agency with their Math learning and the development of positive Math identities for them.

### **Final Words from Charlotte**

Through this research, I am inspired to continue to strengthen my ability to listen to the students with whom I learn. I now hold a deeper belief in, and appreciation for, the abilities and perceptions of students to enrich classroom learning environments. Our research has strengthened this value-laden belief and provided me with increased motivation to advocate for further opening of the space for classroom collaborations that seek the wisdom of student voices. The potential within this space has not been fully realised. It is my hope that future research will share other possibilities and insights into learning from students and teachers in classrooms to demonstrate how learning evolves, is enhanced, and personalized for the learners within it. It is these research stories that grasp my attention. To think that this research story *might* provide others with a window on our experiences as they reflect on their own would be the ultimate compliment.

It is my hope that the voices within this text might provide insight or even inspiration to others to share their stories of how learners' voices might be impactful in the learning they do. When I think of future learning communities, I am reminded of MacNaughton (2004) who encouraged educators and researchers to engage with the question: "How does your research/program honour changeability?" (p. 101). Her writing

has encouraged me to think beyond cause-and-effect relationships in learning to consider how multiple factors affect an outcome. It is in connection to MacNaughton's question that advice, given by Charlotte, resonates with me.

Charlotte answered this interview question: "What things did we do in our Math classroom that were helpful that I should be sure to include when learning with another group of students?"

Charlotte: "Well maybe it wasn't helpful for us but maybe for the other class it will be ... so maybe check in with them and ask them."

Charlotte's voice connects to the reference made in Chapter 1 where Melinda Gates spoke of defining moments when women lifted their eyes and used their voices to impact their situations. Charlotte's visionary voice is a defining moment of lift in this research. Her statement notes the agency in her voice about making decisions that support her learning. Her statement is evidence of her agency to make decisions about her learning and to advocate for other students to have this opportunity.

Charlotte's response also acknowledges the commonalities and the uniqueness of voices as she seeks the assurance that the opportunity of voicing opinions about what each individual might require will be afforded to them. Her words remind me of Braidotti's (2022) phrase: "we-who-are-not-one-and-the-same-but-are-in-*this*-together" (p. 8). Together, Charlotte's and Braidotti's words leave me with two important actions to include in my future interactions. First, listen to each individual's unique voice and second, encourage consistent examination of the benefits to listening to the multiplicity of students' voices in this thing called education that we engage in together.

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## Appendix A

### Summary of Teacher-Led or Child-Run (One-Sided) Instructional Models

(Sewell et al., 2013, p. 50)

Participant Structure	Operational Descriptor
Teacher-run transmission	Teacher as expert transmits information, gives instructions, sets tasks, grants permission, issues reprimands, and makes all decisions. Children as novices passively listen, follow, do set tasks, and try to get inside teacher's mind.
Children-run acquisition	Teacher arranges the resources or open-ended activities, but is passive as children explore these activities individually or in small groups to acquire information.
Child as proxy teacher	Teacher authorizes a power shift to a child, to be in control, to tell, to decide, to reprimand or to validate. Other children are passive, listen, and follow the directives of the proxy-teacher.
Child-initiated one-sided interaction	A child initiates one-sided interaction without the teacher's actual presence by either inviting a more capable child to tell them what to do, to do it for them, or to validate what they are doing.
Contrived joint participation	Teacher manipulates activity so children think they have decision-making power, but in fact these are only choices from teacher ideas. Children can only decide between these teacher-set choices, they are not free to suggest a new idea.

## Appendix B

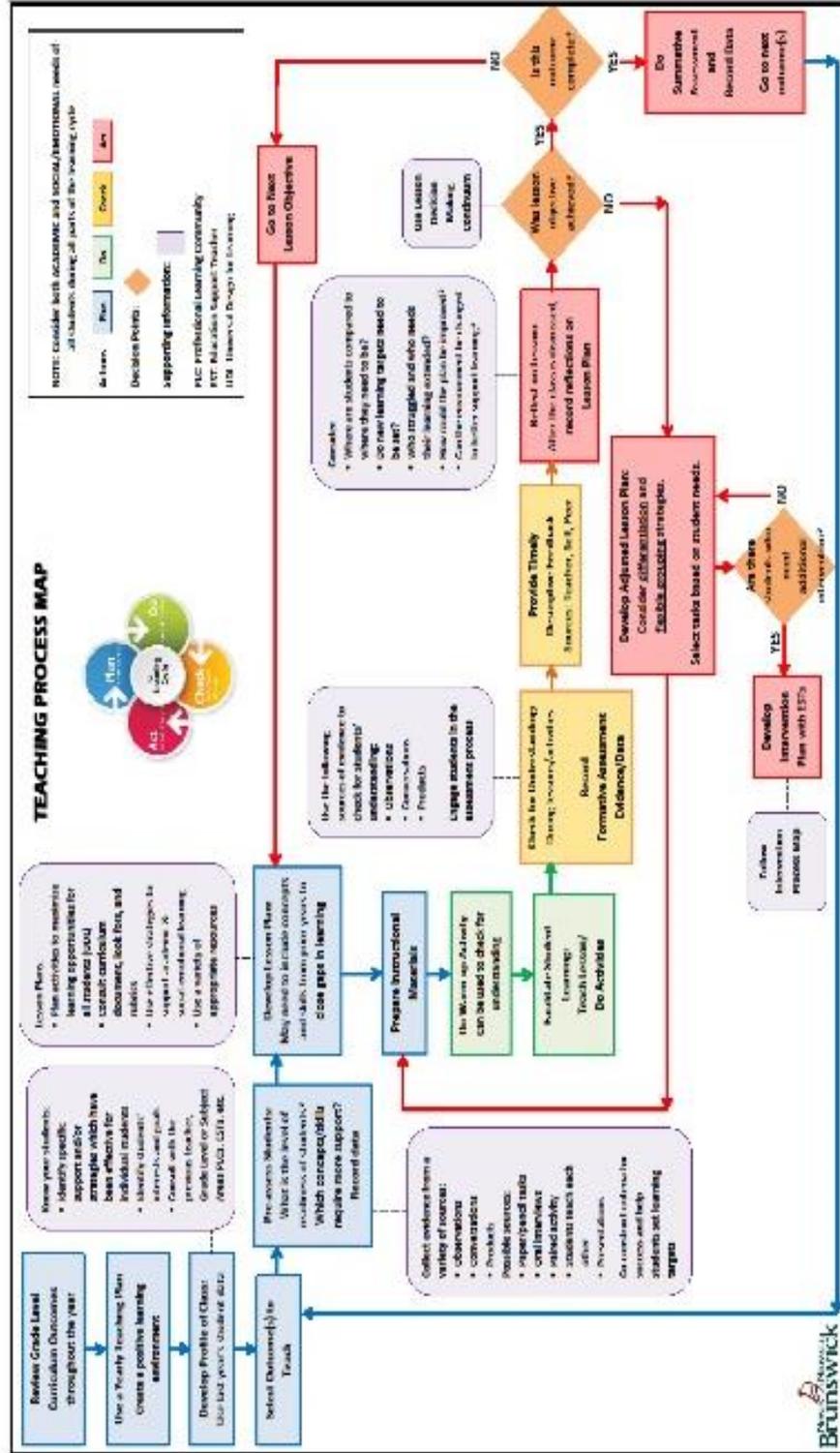
### Summary of Joint Participation Instructional Models

(Sewell et al., 2013, p. 50)

<b>Participant Structure</b>	<b>Operational Descriptors</b>
Teacher and children learning together	Both teacher and children are connected in purposeful activity, listening, and contributing expertise as co-learners, using dialogue to build on earlier contributions to co-construct new meanings. The teacher has created opportunities for collaboration and invites children into a dialogue of learning.
Children learning together	Children are connected with each other in purposeful activity, listening and contributing ideas and expertise. Shared meanings develop and knowledge is co-constructed. The teacher has provided opportunities for collaboration and guided them to develop social and negotiation skills.
Child-initiated joint participation	A child initiates genuine joint participation with other children without the teacher's actual presence.
Non-verbal joint participation	Teacher or children are connected with each other in their focused attention to each other in non-verbal forms of communication (e.g., as eye contact, touch, gestures, postural cues, facial expression).

# Appendix C

## New Brunswick Teaching Process Map



## Appendix D: Student Friendly Newsletter

# Research Newsletter

**Terry Fox Elementary School**  
*Developing the hero in us all!*

155 Basin Street  
Bathurst, NB  
E2A 6N1

Phone: 506-547-2215



### An Invitation to be a Research Participant!

Did you know that your teacher, Mrs. Smith-Ellis, is also a student? She is a Ph.D. student at the University of New Brunswick, Fredericton campus. As part of her studies she will be conducting research which explores the inclusions of student voice in the way the Grade 5 Math classroom operates.

This newsletter outlines information about the research, including the rights of the participants, for the students so that they can be well informed prior to making their decision about being a part of this research project. Thank you for taking the time to consider this request!

**Please know that you may contact Mrs. Smith-Ellis at any time if you have a question about this project.**

### Who is involved in this research?

Your teacher, Mrs. Smith-Ellis and, with your permission and your parent's permission, each of the students in our Grade 5 Math classroom.



### How will the research be done?

Mrs. Smith-Ellis will observe how we work together to learn more about math. She will keep notes in a journal and may take photos of some of the work we do. Each student will have a special journal to record any thoughts they have about how we work together. Mrs. Smith-Ellis will also talk with small groups of students about our work together and these conversations will be audio recorded.



### What will happen to the journals and recordings?

Mrs. Smith-Ellis will read the journals and listen to the recordings. She will think about the ideas and use some of them to write a report about how our math classroom works.



### Will anyone know what I write or talk about?

That will be up to you and your parents. You may choose to have your name included in the final report or you can ask Mrs. Smith-Ellis to use another name for you so that others will not know that she is writing about you but your important thoughts and experiences can be shared.

### What are my rights if I am part of this research?

At any time during the research process you can tell Mrs. Smith-Ellis that you:

- want more information about the research.
- do not want to answer a question.
- want to stop being part of the research.



Students, thank you for reading this newsletter and considering this research project.  
Also, thank you to Dr. Allison Sewell for sharing her work which has informed the creation of this newsletter.

## **Appendix E**

### **Student Permission Letter**

Dear \_\_\_\_\_,

I am writing to you to share a personal research study I will be undertaking as part of the PhD program I am currently enrolled in with the Faculty of Education at the University of New Brunswick. Upon reading of this project, I will be asking you to provide consent for me to collaborate with, observe and interview you.

In the research, I plan to examine the way a Grade 5 mathematics class might learn by including greater use of the students' voices in the way it operates. This will mean that students' will help make decisions and plans about how we learn in our math classroom. I am interested in how including students' perspectives on planning for and doing mathematical learning might help students learn better. I plan to look at how such a classroom works with these changes. The research is being carried out for the participants' direct benefit, in that it seeks to enhance the classroom learning environment they are a part of and may benefit other classrooms in the future. Your input would be appreciated and very valuable in this process.

Your participation in this study is voluntary and in addition to your consent I will be asking your parent or guardian to consent for you to take part in this study. Please see the attached newsletter which outlines various aspects of the proposed research process. Those who agree to share in this experience will be observed over a two-month period and will be invited to share their thoughts on this process through a reflection journal and periodic interviews which will be scheduled as part of our mathematics classroom work or at your convenience.

Please be assured that, if you wish, your responses will be confidential to me. The interview audio recordings will not be used by anyone else. You may choose to have your first name, or a pseudonym, used in any text included in my dissertation. As you make this decision, it is important for you to know that my dissertation will be published online and so your name, or the pseudonym you choose, will be permanent. I will respect whatever decision you and your parents wish to make regarding your anonymity. Within five years of defending my dissertation, all recordings will be destroyed.

You will have an opportunity during the data analysis to check my interpretations of what you have said; again, at a time of your convenience. At any point during this study, you can withdraw from this research project or have any data pertaining to you withdrawn, without penalty. Confidentiality is assured and I do not anticipate any risk to you. The findings of this study will be reported to you in the sharing of the dissertation abstract via email or mail. Should you wish to read the dissertation in full a link will be provided to you to access the document.

Should you choose to participate in this study, your perceptions will assist in developing suggestions for others interested in how math classrooms operate. The findings of this study may

be shared in other academic and professional venues. If you agree to participate under these terms, please sign and return this letter to me.

My supervisor for this project is Dr. Ken Brien. Should you wish to speak to him about this project he may be reached at [kbrien1@unb.ca](mailto:kbrien1@unb.ca) or at (506) 452-6213. If you have any further questions and wish to contact someone not directly affiliated with this research you may contact Dr. Ellen Rose, Associate Dean of Graduate Studies, Faculty of Education at [erose@unb.ca](mailto:erose@unb.ca) or at (506) 452-6125. Thank you for taking the time to consider this request. Should you have any questions or concerns, please do not hesitate to contact me. I look forward to the possibility of working with you on this study. This project has been reviewed by the UNB REB and is on file as #2020-002.

Sincerely

Shari Smith-Ellis

---

I agree to be observed and share my thoughts on this research project between January 7<sup>th</sup>, 2020, to February 28<sup>th</sup>, 2020.

I agree to participate in this research project in the following ways:

- Having my journal entries included as data. Yes\_\_\_\_\_ No\_\_\_\_\_ Actual Name: \_\_\_ Pseudonym: \_\_\_
- Having my photographs included as data. Yes\_\_\_\_\_ No\_\_\_\_\_ Actual Name: \_\_\_ Pseudonym: \_\_\_
- Having my interview comments included as data. Yes\_\_\_\_\_ No\_\_\_\_\_ Actual Name: \_\_\_ Pseudonym: \_\_\_
- Having my achievement data included as data. Yes\_\_\_\_\_ No\_\_\_\_\_ Actual Name: \_\_\_ Pseudonym: \_\_\_

---

(Student's Signature)

---

(Date)

## Appendix F

### Alternate Student Friendly Consent Letter

Dear \_\_\_\_\_,

I am writing to you to share a personal research study I will be undertaking as part of the PhD program I am currently enrolled in with the Faculty of Education at the University of New Brunswick.

As we have discussed in class, with the newsletter outlining this project, I am inviting you to participate in this study. If you agree to participate under these terms, please sign and return this letter to me.

Sincerely,

Shari Smith-Ellis

---

I agree to be observed and share my thoughts on this research project between January 7<sup>th</sup>, 2020, to February 28<sup>th</sup>, 2020.

I agree to participate in this research project in the following ways :

- Having my journal entries included as data.      Yes \_\_\_\_\_      No \_\_\_\_\_  
Actual Name: \_\_\_\_ Pseudonym: \_\_\_\_
- Having my photographs included as data.      Yes \_\_\_\_\_      No \_\_\_\_\_  
Actual Name: \_\_\_\_ Pseudonym : \_\_\_\_
- Having my interview comments included as data.      Yes \_\_\_\_\_      No \_\_\_\_\_  
Actual Name: \_\_\_\_ Pseudonym : \_\_\_\_
- Having my achievement data included as data.      Yes \_\_\_\_\_      No \_\_\_\_\_  
Actual Name: \_\_\_\_ Pseudonym \_\_\_\_

---

(Student's Signature)

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(Date)

## Appendix G

### Parent Consent Letter

Dear \_\_\_\_\_,

I am writing to you to share a personal research study I will be undertaking as part of the PhD program I am currently enrolled in with the Faculty of Education at the University of New Brunswick. This research project is under the supervision of Dr. Ken Brien and he may be reached at [kbrien1@unb.ca](mailto:kbrien1@unb.ca) or at (506) 452-6213 should you have any questions you might feel are best asked of him. Upon reading of this project, you will be asked to provide consent for me to collaborate with, observe, and interview your child.

In the research, I plan to examine the way a Grade 5 mathematics class might learn by including greater use of the students' voices in the way it operates. I am interested in how including the students' perspectives on planning for and implementing mathematical learning might impact student achievement. I plan to examine how such a classroom evolves and operates. The research is being carried out for the participants' direct benefit, in that it seeks to enhance the classroom learning environment they are a part of and may benefit other classrooms in the future. Your child's input would be appreciated and very valuable in this process.

Your child's participation in this study is voluntary and in addition to your consent I will be asking each student to consent to taking part in this study. Please see the attached newsletter which I will also be sharing with your child. It outlines various aspects of the proposed research process. Those who agree to share in this experience will be observed over a two-month period and will be invited to share their thoughts on this process through a reflection journal and periodic interviews which will be scheduled as part of our mathematics classroom work or at the convenience of the interviewee.

Please be assured that, if you wish, your child's responses will be confidential to me. The interview audio recordings will not be used by anyone else and pseudonyms will be used in any text included in my dissertation. Within five years of defending my dissertation, all recordings will be destroyed. As this research is about including students' voices, you and your child may choose to have your child's name used in the final dissertation. I will respect whatever decision you and your child wish to make regarding your child's anonymity.

You and your child will have an opportunity during the data analysis to check my interpretations of what was said, again, at a time of your convenience. Should an image (e.g.: a picture of their work, writing or drawing) of your child's be used in the final dissertation, I will seek both your permission and your child's to include it. At any point during this study the students can withdraw from this research project or have any data pertaining to them withdrawn without penalty. Confidentiality is assured and I do not anticipate any risk for students. The findings of this study will be reported to you in the sharing of the dissertation abstract via email or mail. Should you wish to read the dissertation in full a link will be provided to you to access the document.

Should you choose to allow your child to participate in this study, his/her perceptions will assist in developing suggestions for others interested in how math classrooms operate. The findings of this study may be shared in other academic and professional venues. If you agree to have your child participate under these terms, please sign and return this letter to me. Please know that our math classroom will continue to follow the New Brunswick Curriculum Document as we work on the outcomes for Grade 5.

If you have any further questions and wish to contact someone not directly affiliated with this research you may contact Dr. Ellen Rose, Associate Dean of Graduate Studies, Faculty of Education at [erose@unb.ca](mailto:erose@unb.ca) or at (506) 452-6125. Thank you for taking the time to consider this request. Should you have any questions or concerns, please do not hesitate to contact me. I look forward to the possibility of working with your child on this study. This project has been reviewed by the UNB REB and is on file as #2020-002.

Sincerely,

Shari Smith-Ellis

---

I agree to have my child be observed and share their thoughts on this research project between January 7<sup>th</sup>, 2020, to February 28<sup>th</sup>, 2020.

I agree to my child participating in this research project in the following ways:

- Having my child's journal entries included as data. Yes \_\_\_\_\_ No \_\_\_\_\_

Actual Name: \_\_\_\_\_ Pseudonym: \_\_\_\_\_

- Having my child's photographs included as data. Yes \_\_\_\_\_ No \_\_\_\_\_

Actual Name: \_\_\_\_\_ Pseudonym: \_\_\_\_\_

- Having my child's interview comments included as data. Yes \_\_\_\_\_ No \_\_\_\_\_

Actual Name: \_\_\_\_\_ Pseudonym: \_\_\_\_\_

- Having my child's achievement data included as data. Yes \_\_\_\_\_ No \_\_\_\_\_

Actual Name: \_\_\_\_\_ Pseudonym: \_\_\_\_\_

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(Parent/Guardian's Signature)

(Date)

## Appendix H

### Superintendent Consent Letter

Dear Mr. Donovan,

I am writing to you to share a personal research study I will be undertaking as part of the PhD program I am currently enrolled in with the Faculty of Education at the University of New Brunswick. This research project is under the supervision of Dr. Ken Brien and he may be reached at [kbrien1@unb.ca](mailto:kbrien1@unb.ca) or (506) 452-6213 should you have any questions you might feel are best asked of him. Upon reading of this project, you will be asked to provide consent for me to collaborate with, observe, and interview students in my Grade 5 Mathematics classroom at Terry Fox Elementary.

In the research, I plan to examine the way a Grade 5 mathematics class might learn by including greater use of the students' voices in the way it operates. I am interested in how including the students' perspectives on planning for and implementing mathematical learning might impact student achievement. I plan to examine how such a classroom evolves and operates. The research is being carried out for the participants' direct benefit, in that it seeks to enhance the classroom learning environment they are a part of and may benefit other classrooms in the future. The students' input would be appreciated and very valuable in this process.

The students' participation in this study is voluntary and in addition to your consent I will be asking the students and their parents to consent to the students taking part in this study. Please see the attached newsletter which I will also be sharing with the students. It outlines various aspects of the proposed research process. Those who agree to share in this experience will be observed over a two-month period and will be invited to share their thoughts on this process through a reflection journal and periodic interviews which will be scheduled as part of our mathematics classroom learning or at the convenience of the interviewee.

Please be assured that the students' responses will be confidential to me should that be what the students and their parents wish. The interview recordings will not be used by anyone else and if either the student or his/her parent prefer anonymity, pseudonyms will be used in any text included in my dissertation. Also, within five years of defending my dissertation, all recordings will be destroyed.

The students and their parents will have an opportunity during the data analysis to check my interpretations of what the students said; again, at a time of their convenience. At any point during this study the students can withdraw from this research project or have any data pertaining to them withdrawn without penalty. Confidentiality is assured and I do not anticipate any risk for students. The findings of this study will be reported to you in the sharing of the dissertation abstract via email or mail. Should you wish to read the dissertation in full a link will be provided to you to access the document.

Should you choose to allow the students to participate in this study, his/her perceptions will assist in developing suggestions for others interested in how math classrooms operate. The findings of this study may be shared in other academic and professional venues. If you agree to have the students participate under these terms, please sign and return this letter to me. Please

know that our math classroom will continue to follow the New Brunswick Curriculum Document as we work on the outcomes for Grade 5.

Thank you for taking the time to consider this request. Should you have any questions or concerns, please do not hesitate to contact me. If you have any further questions and wish to contact someone not directly affiliated with this research you may contact Dr. Ellen Rose, Associate Dean of Graduate Studies, Faculty of Education at [erose@unb.ca](mailto:erose@unb.ca) or, at (506) 452-6125. I look forward to the possibility of working with the students on this study. This project has been reviewed by the UNB REB and is on file as #2020-002.

Sincerely,

Shari Smith-Ellis

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I agree to the terms of this research project at Terry Fox Elementary between January 7<sup>th</sup>, 2020, to February 28<sup>th</sup>, 2020.

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(Superintendent's Signature)

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(Date)

## Appendix I

### Interview Protocol

This interview protocol has been developed around the six steps outlined by Creswell and Creswell (2018) in their sample interview protocol (p. 191).

<p><b>Basic information about the interview:</b> Note: Most of this information can be recorded prior to the interview beginning.</p>	<p>Date: _____ Start Time: _____ End Time: _____ Interviewee Names: _____ _____</p>
<p><b>Introduction</b></p>	<p>I am so happy to have this time with you to hear your thoughts about our math classroom. Thank you for agreeing to taking the time to talk with me.</p> <p>As you know, I am going to record our conversation so that I can listen to it again later and write it down to help me think more about the things we talk about.</p> <p>I have six questions for you today and I think we will take between 20 to 30 minutes to have our conversation, but you can certainly speak for longer if you have more that you want to say.</p> <p>One of the questions I have for you is about the relationships in our classroom. By relationships I mean how do we interact with and treat each other. Do you have any questions for me before we start?</p>
<p><b>Opening Question</b></p>	<p>An ice-breaker question such as: How are you doing today? Tell me how you've been spending your time now that school is closed, and you are at home. Is recommended by Creswell and Creswell to help put the interviewees at ease.</p>

<p style="text-align: center;"><b>Content Questions</b></p>	<p>The following questions are the research questions posed in student friendly/age-appropriate language:</p> <ol style="list-style-type: none"> <li>1. Tell me what it was like to be a math student in our classroom.</li> <li>2. How did our math classroom operate either differently than or the same as other math classrooms you have been a part of?</li> <li>3. What did we do that was most helpful to you learning more about math?</li> <li>4. What did we do that was not helpful to you learning more about math?</li> <li>5. What words would you use to describe the relationships between the members of our classroom?</li> </ol>
<p style="text-align: center;"><b>Using Probes</b></p>	<p>Creswell and Creswell (2018) noted that probes “are reminders to the researcher of two types, to ask for more information, or to ask for an explanation of ideas” (p.191). They suggest the following four phrases to be cognizant of during interviews:</p> <ul style="list-style-type: none"> <li>• “Tell me more” (asking for more information)</li> <li>• “I need more details” (asking for more information)</li> <li>• “Explain your response more?” (asking for an explanation)</li> <li>• “What does ‘not much’ mean?” (asking for an explanation) (p.191)</li> </ul> <p>In addition, prior to the end of the interview the authors suggest probing for more details by asking the interviewees: “Is there any further information that you would like to share that we have not covered?” (p. 191)</p>

**Closing Instructions**

Thank you \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ for taking the time to share your thoughts with me. I have learned a lot from you and I will keep our conversation confidential. I may check back in with you when I write down our conversation to check that I have recorded it correctly, Will that be ok with you?  
Do you have any questions for me?  
Should a question arise about how a participant might know of the results of the study I will be prepared to offer to send him or her the abstract of the dissertation.

## Appendix J

### Sample One Minute Quiz

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1.  $5 \times 5 =$  \_\_\_\_\_

2.  $1 \times 7 =$  \_\_\_\_\_

3.  $81 \div 9 =$  \_\_\_\_\_

4.  $12 \div 3 =$  \_\_\_\_\_

5.  $0 \times 6 =$  \_\_\_\_\_

6.  $16 \div 4 =$  \_\_\_\_\_

7.  $2 \times 5 =$  \_\_\_\_\_

8.  $24 \div 6 =$  \_\_\_\_\_

9.  $8 \times 4 =$  \_\_\_\_\_

10.  $7 \times 3 =$  \_\_\_\_\_

11.  $45 \div 5 =$  \_\_\_\_\_

12.  $16 \div 2 =$  \_\_\_\_\_

# CURRICULUM VITAE

SHARI SMITH-ELLIS

## EDUCATION

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<b>Ph.D.</b>	University of New Brunswick	<b>May 2023</b>
<b>Master of Education</b>	University of New Brunswick Curriculum and Instruction Thesis: <i>Critical Literacy: Understandings, Positionings And Questions</i>	<b>October 2000</b>
<b>New Brunswick Principal Certification</b>	Department of Education, New Brunswick	<b>April 2000</b>
<b>New Brunswick Educational Leadership Academy</b>	Department of Education, New Brunswick	<b>Nov. 2012</b>
<b>Bachelor of Education</b>	University of New Brunswick First Division Placement Major: Elementary Education Minors: Early Childhood Education and Psychology	<b>May 1986</b>

## TEACHING EXPERIENCE

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## UNIVERSITY

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<b>Assistant Teaching Professor Present</b>	<b>Jan. 2022 –</b>
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## COURSES TAUGHT

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<b>ED 5104</b> Observation and Pedagogical Documentation (On-line) – 59 students	<b>Winter 2023</b>
<b>ED 3415</b> Developing Numeracy (On-line) – 28 students	<b>Fall 2022</b>
<b>ED 5175</b> Classroom Assessment (On-line) – 32 students	<b>Fall 2022</b>
<b>ED 5355</b> Literacy in the Early Years (On-line) – 33 students	<b>Summer 2022</b>
<b>ED 3415</b> Developing Numeracy – 50 students	<b>Winter 2022</b>

**ED 5104 NEW COURSE DESIGN**Observation and Pedagogical Documentation (On-line) – 26 students **Winter 2022****Contract Academic  
Instructor****Winter/Fall 2021****COURSES TAUGHT****ED 5362** Symbolic Representation in Children’s Play, Pictures,  
and Print (On-line) – Co-Taught – 44 students **Fall 2021****ED 4054 NEW COURSE CO-DESIGN**  
Research in Early Childhood Studies (On-line)– 25 students **Fall 2021****ED 3415 NEW COURSE DESIGN**  
Developing Numeracy (On-line) – 22 students **Winter 2021****Teaching Assistant** ED 6012 Politics and Policy in Ed. Administration **Winter 2017****Teaching Assistant** ED 6014 Secondary School Administration **Fall 2016****NEW BRUNSWICK PUBLIC SCHOOLS****Terry Fox Elementary** **Principal** **2006-2021**

Teaching assignments included: Math (Grades 1-5), English Language Arts (Grades K-5), You and Your World (Grade 2), Methods and Resource (K-5)

**Mary Gosnell Elementary** **Principal** **2003-2005**

Teaching assignments included: Math (Grades 2&amp;3), Methods &amp; Resource (Grades 1-3), You and Your World (Grades 1&amp;2)

**Parkwood Heights Elementary** **Vice Principal** **2000-2003**

Teaching assignments included: English Language Arts (Grades 1-3 &amp; 5), Methods &amp; Resource (Grades K-4)

**Belledune School** **Teacher** **1990-1999**

Teaching Assignments: 1992-1999: Kindergarten-Grade 2 Primary Block Team Teacher; 1991-1992; Grades 1&amp;2, Methods &amp; Resource (Grades 1-5); 1990-1991; Language Arts (Grade 1); Science, Art &amp; Health (Grades 7&amp;8)

**South Bathurst Elem. School** **Teacher** **1989-1990**

Teaching Assignment: Music (Grades 1-6), Language Arts &amp; Math (Grade 6)

<b>Coronation Park Elem. School</b>	<b>Grade One Teacher</b>	<b>1988-1989</b>
<b>Miscou Harbor School</b>	<b>Principal</b>	<b>1986-1988</b>
Teaching assignment: All subjects apart from French (Grades 1-9)		

### AWARDS AND HONOURS

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<b>NBTA Branch 1542 Excellence in Teaching Award</b>	<b>May 2021</b>
<b>President's Doctoral Tuition Award</b>	<b>2016-2019</b>
<b>Microsoft Pathfinder School (Chairperson)</b>	<b>2011-2013</b>
<b>New Brunswick's Lieutenant Governor's Marilyn Trenholme Counsell's Literacy Award (Chapter Officer of IODE's Born to Read Campaign)</b>	<b>Sept. 1998</b>
<b>B.Ed. First Division Placement</b>	<b>May 1986</b>

### RESEARCH

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**Ph.D. Research:** A Classroom Learning Environment: A Co-Mingling of Student and Teacher Voices in a Grade 5 Mathematics Classroom **2016-2023.**

**Microsoft Pathfinder School** **2011-2013**

*I was the lead member of our school team that applied to Microsoft Canada's Pathfinder School Program. This program connected school leaders from around the world in sharing approaches, experiences, and materials in order to develop the critical leadership to support students' achievement. We were selected as one of two Canadian Pathfinder Schools in 2011.*

**Students' Recorded Readings - Motivation and Achievement: An Action Research Project** **2011-2012**

*This research project was conducted with grade 2 students as part of my membership in the New Brunswick Leadership Academy. It focused on students' perceptions of, and reading progression with, doing recorded video readings as part of learning portfolios.*

**New Brunswick Early Years Lab Site** **1992-1996**

*This research was conducted with the Department of Education and Early Childhood and examined curriculum delivery in relation to diverse K-3 configurations*

*within the New Brunswick public school system. Our co-taught K-2 classroom was a research classroom as we investigated how learning in all subject areas might be designed through a multi-age lens. We met regularly with other provincial lab site teachers and Department of Education and Early Childhood personnel to share research, pose questions, and discuss how each of these lab sites was developing early childhood education within their unique configuration.*

## **PUBLICATIONS**

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Smith-Ellis, S. (2023). *Classroom learning environment: A co-mingling of student and teacher voices in a grade 5 mathematics classroom*. Dissertation: anticipated publishing date of Winter, 2023.

Smith-Ellis, S. (2018). Students' voices and professional learning communities: A creative intersection in an elementary classroom. *Antistasis*, 80(1). Retrieved from <https://journals.lib.unb.ca/index.php/antistasis/article/view/25741>

Smith-Ellis, S. (2000). *Critical literacy: Questions, understandings, and positionings*. [Unpublished M.Ed. thesis]. University of New Brunswick.

## **PRESENTATIONS**

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### **PEER REVIEWED PRESENTATIONS**

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Smith-Ellis, S. (Scheduled for: April 15, 2023). *Children's voices in their learning*. AERA, Chicago, Illinois.

Smith-Ellis, S. (June 24, 2017). *Students' voices and professional learning communities: An intersection to enhance student achievement*. Paper presentation at Atlantic Education Graduate Student Conference, University of New Brunswick, Fredericton, NB.

Smith-Ellis, S. (May 28, 2017). *Students' voices and professional learning communities: An intersection to enhance student achievement*. Panel presentation at the Annual Conference of the Canadian Society for the Study of Education, Ryerson University, Toronto, ON.

### **INVITED PRESENTATIONS**

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Smith-Ellis, S. (February 15, 2023). *Including students' voices*. Presentation to ED 5102 Curriculum and Evaluation, University of New Brunswick, online.

Smith-Ellis, S. & Rose, S. (February 14, 2023). *Information session on the B.Ed. in ECE degree program to Introduction to Education students, teacher, and program coordinator*, online.

Smith-Ellis, S. (July 7, 2017). Presentation on classroom assessment experiences with Grade 5 students to ED 6008 Assessment Literacy for School Leaders.

Smith-Ellis, S., Brien, K., & Williams, R. (May 13, 2017). *Giving voice to students within a professional learning community*. Learning to Lead, Leading to Learn: Professional Development joint venture between ASD-W and UNB.

Smith-Ellis, S. (January 2016). *School showcase*. ASD-N Administrators' Meeting. Miramichi, New Brunswick.

Smith-Ellis, S., Boucher, N., Cyr, G., O'Toole, M., & Roy, P. (August 2008). *Professional learning communities*. School District 15 Opening Days Keynote Session.

Smith-Ellis, S. (March 2001) *Critical Literacy and Picture Books*. School District 15 Dinner Learning Series Presentation to K-5 Teachers.

#### **OTHER PRESENTATIONS**

---

Smith-Ellis, S. Rose, S., Stewart, K., Gallagher, C., Tozer, A., & Mountan, S. (November 16, 2022). *Bachelor of Education in Early Childhood Education: Reimagining pedagogies*. Work In Progress (WIPS) Presentation, University of New Brunswick, Fredericton, NB.

#### **UNIVERSITY COMMUNITY SERVICE**

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<b>Ambassador with Dr. Jo Boaler for <a href="http://www.Struggly.com">www.Struggly.com</a></b>	<b>Nov. 2022-</b>
<b>Faculty Representative</b>	<b>2022</b>
B.Ed. in ECE Practicums	
Two 3-Week Practicums (Sept./Oct. 2022)	
One 9-Week Practicum (Oct.-Dec. 2022)	
<b>Assessment Committee, Faculty of Education, UNB</b>	<b>Aug. 2022-</b>
<b>ECE Faculty Learning Community Monthly meetings</b>	<b>2022-</b>
<b>Interview Committee: UNB's B.Ed. in ECE candidates</b>	<b>April 2022</b>
<b>Peer Reviewer Atlantic Education Graduate Student Conference</b>	<b>Dec. 2019</b>

**Session Chairperson** Atlantic Education Graduate Student Conference **June 24, 2017**  
Session Heading: Psycho-Social Influences on Learning

**Session Co-Facilitator** **May 13, 2017**  
*Learning to Lead, Leading to Learn: A Professional Development joint venture between ASD-W and UNB.*

**Proposal Reviewer** **2016**  
Left in the Dark: The Inequities of Privacy Policy in British Columbia's Higher Education Institutions *Canadian Society for the Study of Education*

**Proposal Reviewer** **2016**  
Connecting the Dots: Making Sense of Knowledge Mobilization Efforts  
*Canadian Society for the Study of Education*

### **PUBLIC SCHOOL COMMUNITY SERVICE**

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**Co-Director of Various Musicals** **1996-2021**  
*Throughout my career in the public school system, I have co-directed numerous school musicals. The most recent of these have been Broadway Jr.'s Aladdin (2021 & 2014), Broadway Jr.'s Elf the Musical (2017), Broadway Jr.'s Annie (2015), Broadway Jr.'s Alice in Wonderland (2013), and Broadway Jr.'s Into the Woods (2003).*

**NBTA In-School Administrators Committee** **2018-2021**

**Welcoming Newcomer Students and Families** **2016**

**Microsoft Canada Adjudicator** **2013**

**New Brunswick Education Plan Sub-Committee Member** **2012**

**Terry Fox Elementary School's After School Daycare Program** **2007-2010**  
*In addition to being the principal of this new school, I co-developed, co-established and became the director of an after-school daycare program for families and their children.*

**School District 15 PLC Coaching Team Member** **2007-2014**

**Annual Fundraising Chairperson** **2005-2016**

**School District 15 Math Mapping Committee** **2004-2005**

**School District 15 Math Focus Group** **2003-2005**

<b>District Teaching Mentor</b>	<b>2002-2003</b>
<b>UNB Cooperating Teacher</b>	<b>2000-2001</b>

### **OTHER COMMUNITY SERVICE**

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**IODE: Various Offices including President (4 Years)** **1988-**  
*IODE is a women's charitable organization which focuses on Children, Education and Community Services to improve the quality of life for those in need. Our chapter raises an average of \$6000 annually to support this work.*

**First United Church Community Out-Reach Committee** **2006-2010**  
*Served as chairperson of this committee which focuses on linking the church to the community through initiatives such as support to local schools and volunteer centers.*

**Co-Organizer: Community Benefit Concerts** **2004-2009**  
*Seven concerts featuring local musicians raised a total of more than \$35 000 which was donated to charities including: Shriner's, The Alzheimer's Society of Canada, Canadian Cancer Society, IWK Children's Hospital, VON, The Heart and Stroke Foundation, Gloucester Chapter SPCA, Chaleur Regional Hospital's Palliative Care Unit, and the refurbishing of The Gwendolyn Kent Auditorium at Bathurst High School.*

### **MEMBERSHIPS**

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<b>American Educational Research Association (AERA)</b>	<b>2023-</b>
<b>B.Ed. in ECE Faculty Learning Community Book Study</b>	<b>2022-</b>
<b>Canadian Association for Research in Early Childhood (CAREC)</b>	<b>2022-</b>
<b>Canadian Association for Teacher Education (CATE)</b>	<b>2022-</b>
<b>Canadian Society for the Study of Education (CSSE)</b>	<b>2016-</b>
<b>Canadian Association for the Study of Educational Administration (CASEA)</b>	<b>2016-</b>
<b>IODE</b>	<b>1988-</b>
<b>New Brunswick Teachers Association</b>	<b>1986-2021</b>

## CONFERENCES AND SEMINARS ATTENDED

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Leduc, A. (February 22, 2023). *Author of: Disfigured: On fairy tales, disability, and making space*. The Ann Sherman Early Childhood Learning Series: Literacies Across a Lifetime, on-line.

Dockrill Garrett, M. & Garner, A. (February 22, 2023). *The ‘wicked problem’ of inclusion in New Brunswick: Proposing all-in dynamic inclusive practices as a way forward*. (WIPS).

Adams, J. (February 8, 2023). *Centering creativity in equity-oriented research and learning in education*. Faculty Lecture Series, online.

Wagner, D. (February 8, 2023). *Should it be necessary to address sustainability goals in scholarly publications?* (WIPS).

Hernandez, C. (January 25, 2023). *Author of: The story of us and Scarborough*. The Ann Sherman Early Childhood Learning Series: Literacies Across a Lifetime, on-line.

Alford, K. (January 25, 2023). *What is the best teaching advice I ever received?* CETL online on demand session.

Stewart, K. & Rose, S. (January 25, 2023). *Co-authoring family time online: A social justice research project*. (WIPS).

Judson, G. & Milligan, A. (January 19, 2023). *(Mis)understanding: How do we understand the words “imagination” and “creativity”?* Canadian Network for Imagination and Creativity, online.

Mundee, J. (January 19, 2023). *D2L groups and discussions*, online.

Gerbrandt, J. (December 7, 2022). *A practitioners guide to educational theory: My journey through the weeds*. (WIPS).

Robertson, D. (November 30, 2022). *Author of the recently published: The stone child and The theory of crows*. The Ann Sherman Early Childhood Learning Series: Literacies Across a Lifetime, on-line

The Festival of Literary Diversity Kids Book Fest (November 8-12, 2022), on-line conference.

Fritsch, K. & McGuire, A. (October 26, 2022). *We move together*. The Ann Sherman Early Childhood Learning Series: Literacies Across a Lifetime, on-line.

The AAU Teaching Showcase 2022 (October 15, 2022), on-line conference

Cooper Diallo, H. (September 28, 2022). *#BlackInSchool*. The Ann Sherman Early Childhood Learning Series: Literacies Across a Lifetime, on-line.

Searby, L. (September 13, 2022). *Your mentoring mindset: The power of mentoring*, on-line.

Searby, L. (September 20, 2022). *Discovering your mentoring style*, on-line.

Searby, L. (September 27, 2022). *Strategies and structures to enhance your mentoring part 1*, on-line.

New Professor Research Orientation Session. (August 10, 2022). University of New Brunswick.

Stewart, K. (May 17, 2022). *Exclusions produced through text selections for Twitter book chats*. Canadian Society for the Study of Education (CSSE), on-line.

Ferreira da Silva, D. (May 16, 2022). *Shift in thinking: It all begins with decolonization*. Canadian Society for the Study of Education (CSSE), on-line.

Stewart, K., & Rose, S. (May 15, 2022). *Investigating educational pathways of Early Childhood Educators*. Canadian Society for the Study of Education (CSSE), on-line.

The Festival of Literary Diversity (May 1-7, 2022). *Diversity and the path to deep change*. Online conference.

Tuck, E. (March 9, 2022). *Meaning-making with youth and communities*. Centre for Teaching & Learning, Queen's University.

*Current Research on Reading and Literacies: Response to the Right to Read Inquiry*. (April 28, 2021) Western University.

Conference of the Canadian Society for the Study of Education, (May 27-31, 2017). Ryerson University, Toronto, ON.

Canadian Association for Principals Conference. (May 16-19, 2016). Saint John, NB

Microsoft's Partners in Learning Global Conference. (November 7-10, 2011). Washington, DC, USA

Solution Tree Assessment Institute. (August 25-27, 2009). Saint John, NB

Solution Tree Summit. (February 5-8, 2008). Anaheim, California, USA

New Brunswick PLC Coaching Academy. (May 1-2, 2007). Fredericton, NB