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in education Volume 29, Number 3, 2024 Autumn

Editorial

Kathleen Nolan and Valerie Triggs, *University of Regina*

In this third and final issue of *in education* for the year 2024, we include six articles and one book review. The featured scholarly works range from a topic focus on reading development, health and wellness, number talks, ecological knowledges and practices, and grit in a high school physics class to a methodological focus on collaborative self-study, autoethnography, Indigenous storytelling through poetic orality, and other qualitative research designs. Our authors and their research studies are situated on Canadian lands from coast to coast to coast, from Nova Scotia to British Columbia to Nunavut. In this issue, we are delighted to feature the work of well-established scholars as well as that of new scholars who are navigating the publication of their master's and doctoral level work.

In our first article, *Exploring Inuit Students' Responses to Number Talks*, by **Emily Pope and Jennifer Mitton**, the authors introduce a well-known southern mathematics teaching strategy, number talks, to Inuit students in a northern context. Conducting their research in a Grade 1 classroom in Nunavut, the data for Pope and Mitton's study include participant interviews, classroom observations, and artefacts generated in response to number talk routines. The authors propose an innovative merging of number talks with Nunavut Inuit Qaujimajatuqangit (IQ) principles. Even though they recognize that their approach may not "disrupt Eurocentric teaching methods," they are encouraged by the evidence "that this research helps interrogate a southern strategy in a new, culturally relevant light" (Pope & Mitton, *this issue*).

The second article, *"Self" in Self-Study: Alongside Stories as Indigenously Understood Inquiry*, follows the thread of Indigenous-focused research. Authors **Cher Hill, Awneet Sivia, Vicki Kelly, Paula Rosehart, and Kau'i Keliipio** conduct a collaborative self-study inquiry into the ways in which Indigenous pedagogies and worldviews extend understandings of self within self-study research. As they engaged in their collaborative inquiry, the authors noted a shift in orientation toward ways of being in relation, naming the emerging synergy and relationality as "alongside stories". Drawn to making meaning of the intersections and nuances between forms of self-study research and Indigenous Ways of Knowing, the authors conclude that "the richness of relationality, respect, wholism, resonance, and responsibility embedded in Indigenous worldviews can enhance Western scholarship" (Hill et al., *this issue*).

In *Children as Levels: Early Understandings of Reading Development Conceptualized by Preservice Teachers*, **Andrea Fraser** surveys five preservice teachers (PSTs) on their beliefs about reading instruction and reading development at the onset of an elementary literacy methods course. A thematic analysis of these pre-course surveys revealed that preservice teachers' early understandings of reading development and pedagogy appear to rely on levelling systems. The author reflects on the problematic nature of these understandings and beliefs, which tend to shift attention away from the complex nature of reading acquisition and the skills required to develop proficiency. Fraser concludes her article with recommendations for teacher education, including that literacy methods courses be "designed to facilitate learning experiences for PSTs to unpack and negotiate prior beliefs while engaging in learning opportunities to develop knowledge and application of instruction reflective of current research" (Fraser, *this issue*).

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Our fourth article in this issue, by **Alana Ireland, Laurie Hill, and Sarah Twomey** is titled *Preservice Teachers and School Health and Wellness*. Similar to the previous article in this issue, the research reported on here focuses on understanding preservice teachers' beliefs and attitudes, in this case with respect to health and wellness in teacher education programs and in school settings. A thematic analysis of interviews with 11 preservice teachers identified four themes, all of which point to specific areas of need around health and wellness and prioritizing an evidence-based approach. Specifically, in the area of teacher education programs, the authors suggest that "preparing preservice teachers by providing background knowledge and tools about school health and wellness can foster confidence and support their teaching practice and professional selves" (Ireland et al., *this issue*).

In the fifth article in the issue, titled *A Teacher's Perspective on Grit and Student Success in a High School Physics Classroom,* **Matthew Ngo** shares autoethnographic reflections as a high school physics teacher interested in exploring the concept of grit. Warning the reader that much of the literature on the topic of grit is focused on deficit ideological elements, the author discusses the structural elements which may also be present but often overlooked when studying a student's ability to be 'gritty' and successful in school. Through reflections on narratives of deficit ideologies, grit, and meritocracy, Ngo clarifies: "While I do not suggest that educators abandon addressing effort and hard work, there are concrete justifications as to why educators also need to take structural elements into account" (Ngo, *this issue*).

Finally, our sixth article is by **Peter Cole**, entitled *Punctuating Musical Diacritics of Water in Cross-species Context.* Inviting the reader to shift away from colonial thinking and engage in a different dimension where water is life, this poetic research text calls for inter-cultural cross-species oral performance and recuperative conversations. Cole's narrative score emphasizes how embodied realities of the land, particularly water, might become our baseline being and doing in a realization that nothing is ever fully captured in human knowledge or understanding. Indigenous tricksters Coyote and Raven, joined by others in the performance of this text, ponder such questions as "whatever happened to water just being something you need a drink of when you're thirsty why must it be essentialized with everything else in e-stem thinking   it is alive it is spirit and shapeshifter   molecular is only one of its forms" (Cole, *this issue*).

Our book review in this issue, written by **Hui Xu**, offers an in-depth look at the 2023 book by Lily A. Arasaratnam-Smith and Darla K. Deardorff, *Developing Intercultural Competence in Higher Education: International Students' Stories and Self-Reflection.* As Xu notes, "the book offers an insightful exploration into the development of intercultural competence (IC) in higher education". Based on her critical review, Xu affirms that "the blend of storytelling, self-reflection, and theoretical foundations makes [the book] an invaluable resource for anyone interested in IC and international education" (Xu, *this issue*).

We hope you find these articles as provocative and enjoyable as we have. Many thanks to the contributing authors and the many reviewers who provided their feedback and insight during the review process.

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Exploring Inuit Students' Responses to Number Talks

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Abstract

This paper focuses on how Inuit students responded to a Southern mathematics teaching strategy, known as number talks, in a Nunavut elementary school. Research on the effectiveness of number talks has been conducted in the elementary context (Boaler, 2015; Murata et al., 2017), yet there is little research that focuses on Inuit students' perspectives of number talks as part of mathematics learning. The participants of the study included 10 students and their teacher in a Grade 1 classroom. Data methods included participant interviews, classroom observations, and artefacts generated in response to number talk routines. The results of this affirm what is known about the benefits of number talks and afford new understanding about how to view the teaching strategy through Inuit Qaujimajatuqangit (IQ) principles as outlined by the Nunavut Department of Education (2007).

Keywords: Inuit, number talks, culturally relevant pedagogy, elementary school, Inuit Qaujimajatuqangit (IQ) principles

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Exploring Inuit Students' Responses to Number Talks

Teaching practices from the South are an interwoven part of Nunavut's Education system. Despite the government's efforts to create a more culturally responsive education system (Berger, 2009), a Eurocentric education model constrains schooling in Nunavut. Scholars have noted that the majority of Inuit in Nunavut want to see their culture reflected in the education system, they want Inuktitut to be strengthened, and they have high academic standards for their children (Aylward, 2007, 2009, 2010; Berger, 2009; McCarty & Lee, 2014). Researchers have noted that what has been largely missing in the pedagogy of teachers from the South is the incorporation of culturally responsive teaching strategies (Gay, 2013; Ladson-Billings, 1995; 2014) to support Inuit learners in the Nunavut classroom (Aylward, 2007, 2009, 2010; Berger, 2009; Preston, 2016).

In Nunavut, the Inuit Qaujimajatuqangit (IQ) principles outlined by the Nunavut Department of Education (2007) represent the Inuit societal values that are valued in the Inuit culture. The IQ principles are meant to ground Nunavut education in the Inuit heritage with the aim that students will be successful in modern Nunavut (Consolidation of Education Act, 2020). In Nunavut, educators are expected to incorporate the IQ principles into their daily teaching (Consolidation of Education Act, 2020; Nunavut Department of Education, 2007). Not all teaching practices that are created outside of Nunavut, however, are able to incorporate or align with the IQ principles. In this context, we saw the possibilities of exploring an elementary teaching strategy known as number talks (Parrish, 2014). Number talks are used to encourage students to share and defend their solutions to mathematics problems and the strategies they used, which allows learners to "collectively reason about numbers while building connections to key conceptual ideas in mathematics" (Parrish, 2014, p. 5). The purpose of this study was to explore how Inuit students responded to the use of number talks, and the strategy's alignment with the IQ principles.

The Benefits of Number Talks

Number talks have been found to be successful at teaching both number sense and mathematics facts (Hufferd-Ackles et al., 2004). Integral to the routine of number talks and understanding student learning is number sense. Number sense is the ability to understand the mathematical relationship between numbers and is not simply the memorization of mathematical facts or equations (Boaler, 2015), which is why number sense is used in the mathematics education reform approach "as it typifies the theme of learning mathematics as a sense-making activity" (McIntosh et al., 1992, p. 3). Number sense is an important concept in the teaching and learning of number talks, as it provides windows into the depth of student learning. Being able to understand and show the mathematical relationship between numbers through communication (Boaler, 2015) was critical to this study as we explored Inuit students' responses to number talks.

The success of number talks in some schooling contexts is why Stott and Graven (2015) chose to investigate how number talks could be used in South African schools with the aim of increasing students' mathematical capabilities. Murata et al. (2017) identified that certain teacher talk moves support the development of students' understanding of how to discern the best strategy to use while allowing them to maintain ownership of ideas. For example, asking a student "how did you get to that answer" prompts students to explain their reasoning and reflect upon their approach. Research on the effectiveness of number talks has been conducted in elementary schools (Boaler, 2015; Murata et al., 2017), yet there is little research that focuses on Inuit students' perspectives of number talks as part of mathematics learning in an elementary context. While there

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has been research around mathematics education with Inuit outside of Nunavut (Bergquist, 2020; Poirier, 2007), our study aimed to address the lack of research about mathematics education in Nunavut.

Teacher Pedagogy and Number Talks

A teacher's pedagogy plays an important role in the mathematics classroom when it comes to setting up the conditions for student success. The findings from Murata et al. (2017) highlighted the important role teachers play in the implementation of number talks, as this strategy requires teachers to shift away from traditional teaching methods (Parrish, 2014). For number talks, Parrish (2014) explained that teachers need to assume "the interrelated roles of facilitator, questioner, listener, and learner" (p. 12) to best support student learning. Depending on a teacher's ability to assume those interrelated roles, the nature of a teacher's interactions with students while facilitating number talks suggests a relationship between student learning and the level of mathematical understanding (Murata et al., 2017).

The primary purpose of this study was to explore how Inuit students experienced and responded to learning mathematics using daily number talks. Because of the importance of teacher pedagogy to number talks, a secondary focus included exploration of a teacher's pedagogical practices through classroom observations. The primary research question was: What are Inuit students' perspectives on learning mathematics using daily number talks? While neither author speaks Inuktitut, the primary language spoken in Nunavut, the hope is that this research may resonate with teachers who teach mathematics in elementary classrooms and with students from groups that have been historically marginalized.

Culturally Relevant Curriculum: Possibilities for Nunavut

Berger (2009) found that the Nunavut education system is "[…] based primarily on the knowledge, pedagogy and culture of Euro-Canadians […]" (p. 56) rather than on culturally relevant practices that take into account the Inuit culture (Aylward, 2007; Ladson-Billings, 1995). Lipka (1994) described a similar situation in Alaskan education, stating "this lack of responsiveness by the educational establishment continues to underscore the colonial nature of schooling which too often undermines indigenous language and culture" (p. 14). Berger (2009) maintained that there is still a Eurocentric education model in Nunavut, despite the government's efforts to create a more culturally responsive education system. These efforts included the publishing of *Inuuqatigiit: The Curriculum from the Inuit Perspective* (Northwest Territories Education, Culture and Employment, 1996) and the training and hiring of Inuit educators to teach in Nunavut schools. Berger (2009) argued that "Eurocentrism may act as a roadblock to educational change in Nunavut" (p. 57) because the voices and opinions of non-Inuit are often valued and honoured over Inuit perspectives. In this study, we have attempted to honour the perspectives of Inuit students by maintaining our attention upon their responses to number talks and through interviewing a small sample of students.

The teaching of Inuktitut so that students can be truly bilingual (Aylward, 2009; Indian and Northern Affairs Canada, 2002; McCarty & Lee, 2014) is an important goal in Nunavut. However, Aylward (2009) found upon examining teachers' beliefs around the presence of Inuit languages within Nunavut schools that teachers in Nunavut were disappointed with the lack of a culturally relevant curriculum. Teachers also highlighted that importing curriculum from other provinces and

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territories did not benefit their students (Aylward, 2010). Over time, Aylward (2007, 2009), and others (Berger, 2009; Government, 2021; Preston, 2016), have argued for increased accountability within the Nunavut education system regarding bilingual education and students' abilities to understand Inuktitut and the importance of including families and communities. Parental and community engagement within the school system is an important way of encouraging Inuktitut (Aylward, 2009, 2010) and culturally relevant teaching practices within Indigenous schooling contexts (McCarty & Lee, 2014). Such curricular efforts have shown promise in other Indigenous contexts. For example, Lipka et al. (2005) have shown how a culturally based mathematics curriculum, Math in a Cultural Context (MCC), has been beneficial to their mostly Yup'ik students in Alaska. This is because the curriculum allowed the students to engage in complex mathematics based on practical problems from their village, such as building a fish rack (Lipka et al., 2005). Lipka et al. (2005) found evidence that the MCC curriculum has resulted in improvement in Indigenous Alaskan students' academic performance. Their research has also shown that the MCC curriculum supports a guided inquiry approach which promotes cooperative learning and classroom norms that encourage class discussion (Lipka et al., 2005).

Fostering Mathematical Discourse Through Number Talks

For many scholars, learning mathematics is viewed as a sociocultural process (Esmonde, 2009; Forman et al., 1997). Sfard (2007) described discourse as a communicational activity in which some individuals can participate while others are excluded. Gee (2005) described discourse as how "we continually and actively build and rebuild our worlds not just through language but through language used in tandem with actions, interactions, non-linguistic symbol systems, objects, tools, technologies, and distinctive ways of thinking, valuing, feeling, and believing" (p. 10). Both these descriptions of discourse emphasize that to engage in a communicational activity, individuals need to participate in the building or rebuilding of a perceived reality using a common language, including oral language, gestures and symbols. By participating in mathematical discourse, scholars have argued that students promote their conceptual understanding of mathematics while strengthening their ability to communicate their thinking to peers instead of solely focusing on finding answers (Boaler, 2015; Cavanna et al., 2015; Esmonde, 2009; Forman et al., 1997; Henning et al., 2012; Hufferd-Ackles et al., 2004; Parrish, 2014). Although there is evidence to show the importance of mathematics activities that focus on communication as a way to develop learning, there are multiple approaches to the teaching of mathematics ranging from a traditional approach to a reform approach (Boaler, 2002; Herbel-Eisenmann et al., 2006; Morgan & Sfard, 2016).

In a traditional classroom, one can characterize classroom instruction as the transmission of facts and information from the teacher to the students (Forman et al., 1997). Most often, this is through paper and pencil activities, which has been the predominant way of teaching in Nunavik according to Poirier (2007). In contrast, the reform teacher adopts a constructivist or conceptual approach to teaching mathematics which is based on posing open-ended problems in order to encourage students to develop their own way of solving the problem and to engage them in mathematical discussions with their peers as a way of learning (Boaler, 2002). Instead of rote learning, researchers have argued that students' number sense develops more fully through the use of daily number talks or math talks, as these kinds of approaches help students to develop flexible and accurate computation strategies that are based on key mathematical ideas (Boaler, 2015; Parrish, 2011, 2014).

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The Use of Number Talks in Mathematics

According to Hufferd-Ackles et al. (2004), a math-talk learning community is one in which students and teachers use mathematical discussions to support mathematical understanding. Through participation in the discourse of mathematics, students are able to expand their own thinking as well as the thinking of others (Hufferd-Ackles et al., 2004). Murata et al. (2017) explained that by talking and listening to others talk about mathematical concepts, students think more deeply about the concepts while engaging in mathematical practices that include argumentation and justification.

The Benefits of Implementing Number Talks: An Example. Stott and Graven (2015) worked within the South African Numeracy Chair project looking at mathematics education in South Africa and investigating how number talks could be used in their South African schools. Given the different school and cultural contexts, Stott and Graven (2015) knew that some adaptations to number talks, as outlined by Parrish (2014) and Boaler (2015), were needed to meet the needs of South African students most effectively. For example, in the United States number talks are used with class sizes that are much smaller than in South African schools (Stott & Graven, 2015). Some of the adaptations included allowing the students to work in small groups before discussing the problem as a whole class and getting the teacher to record student responses on the board. Through these adaptations and the creation of teacher resources, teachers found that their students' mathematical conceptual development was strengthened through the use of number talks (Stott & Graven, 2015). While number talks have been used in settings outside of North America with different cultures (Stott & Graven, 2015), there has been little to no research that explores Inuit student perspectives of number talks. In what follows, we discuss the theories that supported our understanding of student responses to number talks.

Theoretical Framework

Given the focus on Inuit students' responses to number talks, the theoretical framework informing this study is comprised of several concepts related to culturally relevant pedagogy (Ladson-Billings, 1995, 2014) as well as sociocultural theory (Vygotsky, 1995), and the IQ principles of the Nunavut Department of Education (2007). Ladson-Billings' (1995) seminal work on culturally relevant pedagogy, and its various evolutions in contributions from scholars such as Paris (2012) and Paris and Alim (2014), focused on ensuring students from all cultures succeed at school while maintaining their home culture. McCarty and Lee's (2014) term of culturally sustaining/revitalizing pedagogy go a step further to focus specifically on Indigenous Peoples. This, in conjunction with Vygotsky's (1978) sociocultural theory and the IQ principles that represent the Inuit societal values (Nunavut Department of Education, 2007), forms the basis of the theoretical framework of this study.

Castagno and Brayboy (2008), Munroe et al. (2013), and Russell and Chernoff (2013) all agreed that when it comes to teaching Indigenous students, their cultures and language need to be incorporated into a teacher's pedagogy in order to make learning accessible, relevant, sustaining, and revitalizing. McCarty and Lee (2014) defined culturally sustaining/revitalizing pedagogy as having three components. These three components include addressing colonization and Eurocentric viewpoints, reclaiming and revitalizing the languages lost through colonization, and ensuring community-based accountability (McCarty & Lee, 2014).

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Vygotsky believed that cognitive development is grounded in its social context and that learning occurs as a part of the internalization of social and cultural values in a given social context (Inan & Yuksel, 2013). Sociocultural theory, according to Vygotsky, incorporates both developmental and sociocultural elements to explain how individuals learn (Inan & Yuksel, 2013). Furthermore, Vygotsky's research supports the idea that oral communication can help facilitate students' development in the mathematics classroom, as he believed that by using language to explain their thinking, children are able to internalize learning (Vygotsky, 1978). It is a child's social interactions with their peers and teachers that allow them to internalize the activity and therefore understand the concept (Stott & Graven, 2015). Learning should be a social activity that develops out of a collaborative and cooperative learning environment (Inan & Yuksel, 2013).

In Nunavut, the IQ principles represent Inuit societal values that are respected in the Inuit culture (Nunavut Department of Education, 2007). The IQ principles, if implemented, would ground Nunavut education in Inuit heritage so students would be successful in modern Nunavut. In Nunavut, educators are expected to incorporate the IQ principles into their daily teaching (Nunavut Department of Education, 2007). The IQ principles enable non-Inuit researchers and educators to more fully understand the societal values of students, their families, and their community as a way to best meet their learning needs. The IQ principles as outlined by the Nunavut Department of Education (2007) highlight the ways in which individuals collectively engage in the act of learning with each other. For example, Inuuqatigiitsiarniq refers to our relationship with others; Tunnganarniq refers to being welcoming and inclusive; Pijitsirniq refers to serving others and the community; Aajiiqatigiinniq refers to making decisions through discussion; Pilimmaksarniq refers to the act of learning through various means such as observation and practice; Piliriqatigiinniq refers to collaboration in order to achieve a common goal; Qanuqtuurniq refers to being resourceful when it comes to problem-solving; and Avatittinnik Kamatsiarniq refers to environmental stewardship.

Connections Across the Frameworks

In this research study, maintaining a focus on student participants and their teacher required a framework that enabled us to consider student interactions with each other and their teacher as they engaged in thinking aloud during number talk engagement in this elementary classroom. As part of the analysis of classroom observations and interviews, we were mindful that many of the IQ principles are reflected in the conduct of number talks, specifically Inuuqatigiitsiarniq, as the act of sharing their thinking with a peer is an integral part of number talks, and Piliriqatigiinniq, or the collaboration that evolves during the whole class discussion. Ideally the act of engaging in number talks is also respectful of the principle, Tunnganarniq, as all students are able to participate and feel some measure of success. Perhaps most aligned with number talks are the IQ principles of Pilimmaksarniq (learning through observation and practice) and Qanuqtuurniq (being resourceful while problem-solving) as number talks encourage students to find ways to solve the problem that works for them. Cultivating an environment in which students feel safe and secure to take academic risks (Mitton & Murray-Orr, 2021; Matney et al., 2020) is also an important part of number talk instruction and engagement and is reflected in the IQ principles of Inuuqatigiitsiarniq and Tunnganarniq, which respectively emphasize relationship with others and being warm and inclusive. Drawing upon Vygotsky's (1978) sociocultural theory in connection with the IQ principles enabled us to better understand the ways in which student participants communicated while engaging in number talks as their communication provided insights into their learning.

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Informed by this framework, attending to field notes on classroom observations and student accounts of their learning during interviews enabled us to identify how students responded to number talks and to see if number talks encouraged them to regularly engage in dialogue as a way to reveal their inner thinking during the learning of mathematics.

Methodology: Essential Qualitative Research

According to Merriam and Tisdell (2016), for an individual to be able to understand a given phenomenon, they must consider their own understanding about the phenomenon within a social context. Earlier conceptualizations of common approaches to qualitative research, Merriam and Tisdell explained, refer to such undertakings as "generic, basic, and interpretative" (p. 23) with an emphasis placed on understanding how people make sense of their lives through revealing and rendering these meanings. Drawing upon Merriam and Tisdell (2016), Lahman (2024) suggests that while the category of basic qualitative research is useful, it "does not capture the careful planning and extensive time and resources that go into conducting essential qualitative research" (p. 101). Instead, Lahman (2024) asserts, that common approaches to qualitative research should be referred to as "essential" as the descriptor "indicates research with the requisite features of qualitative research while not belonging to a specific methodology… [as it] primarily relies on data collected from interviews but may draw on some observation or focus on material data" (p. 101). Given that the focus of this study was upon understanding how Inuit students interpreted their number talk experiences in an elementary mathematics classroom through student interviews and classroom observations, our decision to use an essential qualitative research approach (Lahman, 2021, 2024) was well-suited to the intent of this study. Further informing this study are what Lahman (2024) has defined as the tenets of "culturally responsive research" (p. 18), which she explains include "a commitment to drawing on the cultural knowledge, prior experience frames of reference, and research communication styles of diverse research participants (differentiated by race/ethnicity, sexual orientation, class, disability, gender, age, etc.) to make research encounters more relevant and beneficial for them" (p. 19).

As the strategy of number talks was being implemented in this Nunavut elementary school, we were curious about how Inuit students might make sense of this approach in the learning of mathematics, and if it showed potential to be well aligned with Inuit ways of learning as reflected within many of the IQ principles (Nunavut Department of Education, 2007). We are mindful that while the study was situated within the Inuit territory of Nunavut, the education system continues to feel and reflect colonization (Aylward, 2007, 2009; Preston, 2016; Rasmussen, 2011), with most of its teachers neither Inuit nor from the North (Government of Nunavut, 2021; Preston, 2016). Perhaps, naively, we were hopeful that we would see some potential for number talks to be a culturally responsive teaching tool that might benefit Inuit students and unearth the meaning that students attributed to number talks while learning mathematics. An essential qualitative study, nested within the tenets of culturally responsive research (Lahman, 2024), enabled us to be mindful of the phenomenon under investigation, as students were encouraged to share their perspectives on how they learned mathematics best, while we considered the possibilities of number talks, a teaching and learning strategy imported from the South.

Context of the Study

The study took place in a K-5 elementary school in Iqaluit, the capital of Nunavut, during the 2019-2020 school year. Ten students and one teacher situated in a Grade 1 class participated in the

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study. Most of the Grade 1 students were Inuit, and the others were of other cultural and racial backgrounds. Because we do not want the identities of those who participated compromised, we have chosen to not include detailed descriptions of student backgrounds. The school focused on the incorporation of the IQ principles as part of its regular programming and the medium of instruction was English. For example, Inuit Elders taught students how to sew once a week and engaged them in other Inuit knowledge activities. Monthly assemblies incorporated the IQ principles for both staff and students to learn more about the principles and how they apply to teaching and learning. As part of this focus, land-based activities engaging students and teachers took place throughout the year at the elementary school.

The teacher and students were observed during number talks as part of mathematics instruction, twice a week over a seven-week period, for a total of eight observations. As the focus of this study was on better understanding how students responded to number talks, regular classroom observations enabled us to view student interactions with each other and with their teacher. Additionally, because we were curious about student perceptions of number talks, two Inuit students, Elizabeth and Thomas[1], were interviewed at the start and end of the study. The classroom teacher, Mrs. Piper, agreed to take part in the study as part of classroom observations but was not interviewed. Mrs. Piper, at the time of the study, had been teaching for 11 years with five years of experience at the Grade 1 level. Although Mrs. Piper is not originally from Nunavut (she is of European settler origin) and does not speak Inuktitut, she had chosen to create a life in Nunavut and was committed to the community and her students. As the strategy of number talks was being implemented in the school, Mrs. Piper was interested in taking part in the study. Part of her decision was also based on her participation in a professional learning community that focused on the exploration of number talks. Prior to these experiences, Mrs. Piper had not routinely used number talks as part of her mathematics teaching, introducing the strategy to her students in January 2020.

Oral communication was encouraged in Mrs. Piper's class, even before the formalized introduction of number talks. Students were used to working at centers in peer groups and learning together as a whole class. When student participants were asked about where they engaged in mathematics in the classroom, they indicated that mathematics took place at their tables. When working at their tables, students were able to rotate through the centers which they had completed either independently or with assistance from their peer group. Students were encouraged to ask each other for help during learning activities, a strategy which respects the principle of Piliriqatigiinniq or working together for a common cause.

As a teacher in Nunavut, Mrs. Piper was very familiar with the IQ principles and was encouraged to incorporate those principles into her daily teaching (Nunavut Department of Education, 2007). In this school, over the course of the academic year, the IQ principles are regularly discussed among teachers and students. Students in Mrs. Piper's class were in their second year at the school and most likely had already been introduced to the IQ principles and had engaged in learning activities and conversations about the IQ principles. Thomas and Elizabeth's comments regarding peer group discussions as a part of mathematics learning suggested they were familiar with the incorporation of the IQ principles Aajiiqatigiinniq (decision-making through discussion and consensus) and Pilimmaksarniq (development of skills through mentoring, practice, observation and effort) in their classroom.

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The number talks took place after lunch at the start of a dedicated mathematics period. To structure the number talks, Mrs. Piper used three different questions from Parrish's (2014) book. The questions were visual representations of dots in either a ten frame or loose, were recreated on the computer, and printed on legal-sized paper. While dots are a common way to structure number talks, they do not necessarily hold cultural relevance for students in Nunavut. Out of the eight number talks observed, seven involved dots that were represented in ten frames or loosely on the page while one number talk involved addition sentences. The decision to focus on visual representations of dots was made in consultation with Mrs. Piper, as both the teacher and Emily (first author) felt that starting with something the students were familiar with might allow for more discussion. Mrs. Piper generally asked the students to tell her how many dots there were all together at the start of each question. In other words, the only new aspect of their mathematics classroom would be the number talk routine and not the mathematics involved.

Backgrounds of the Researchers

Emily Pope is a cisgender, able-bodied white female of European heritage born and raised in Canada's south. Before beginning the study, she had lived in Nunavut for 5 years in two different communities as a teacher and had worked in a third community for shorter periods of time throughout her undergraduate degree. Through her role as a teacher in Nunavut, Emily actively participated in school and community cultural events so that she could best incorporate Inuit societal values and IQ principles into her classroom. At her first school, she worked closely with the Ilinniarvimmi Inuusiliriji, or the School Community Counsellor, to better understand her students' cultural backgrounds. At the time of the study, Emily was living in the community and teaching at the school where the research took place. She worked closely with colleagues to create monthly assemblies in which the IQ principles were highlighted to students. Jennifer Mitton (second author) is a professor of secondary literacy and qualitative research methodologies at a university situated in the Canadian Maritimes. Jennifer's teaching and research focuses on culturally relevant pedagogy and the ways teachers foster academic risk-taking while working with culturally and economically diverse groups. The study was undertaken to partially fulfill the requirements of Emily's Master of Education degree, with Jennifer working alongside Emily as her thesis advisor.

Ethical Procedures

Following ethics approval and permission from the St. Francis Xavier University Research Ethics Board, the Nunavut Research Institute, and the Nunavut Department of Education respectively, Emily hosted an information session about the research study at the school for children and families. During this session, the study was presented, and questions were answered about the focus of the study and student involvement. Parents signed a consent form allowing their child to participate and this was followed by a conversation with each child, using appropriate language, to also confirm their assent to participate in the study.

Data Collection and Analysis Methods

The study took place over seven weeks in 2020 prior to the Covid-19 pandemic. Semi-structured interviews, classroom observations, and number talk artifacts (Merriam & Tisdell, 2016) were used as data collection methods. Through eight classroom observations and two interviews with two Grade 1 students, as researchers, we investigated how students responded to the use of number

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talks in a Nunavut school. Mrs. Piper introduced number talks to her students in January 2020 and classroom observation began with this introduction. Number talks typically ranged in length from 10-20 minutes each and took place at the beginning of the mathematics period.

Interviews

The first interview with Elizabeth and Thomas took place before the implementation of number talks and the second interview took place following the final classroom observation. Each interview lasted between 10 and 15 minutes and Emily conducted the interviews. The first interview provided a baseline understanding of how Elizabeth and Thomas viewed learning mathematics while talking and what they thought about sharing their ideas with others. The second interview gave us insights into participants' thoughts about the overall process of number talks and whether their ideas aligned with Emily's observations. During the second interview, Elizabeth and Thomas were asked again about how they felt about learning mathematics during the whole class discussion and if they experienced any benefit from hearing others' solutions to problems.

Classroom Observations and Artifacts

To explore how the ten student participants responded to number talks, eight classroom observations were conducted twice per week between weeks two to five. Fieldnotes were taken during observations which described the pedagogical practices Mrs. Piper used during number talks and documented student responses to number talks, including interactions with each other and the teacher. As Emily was a teacher in the school at the time of the study, this seven-week data collection timeline made it feasible for her to engage in the study while teaching full-time. As part of the observations, photographs of classroom layout, organization, student seating, and chart paper reflecting thinking during number talks were gathered; these artifacts (60 in total) enabled us to better understand how students responded to number talks in the classroom. During classroom observation, Emily documented whether student dialogue encouraged or discouraged additional talk moves. For example, was the purpose of the talk to find an answer or was it to explain their thinking? Identifying whether students engaged in mathematical argumentation, justification, or conceptual explanations during number talks were also documented.

Data Analysis

Data analysis was guided by maintaining a focus on how Grade 1 Inuit students responded to daily number talks in a Nunavut elementary classroom. This analysis process began during data collection while field notes of classroom observations were documented, photographs of number talk artifacts were captured, and interviews were conducted. Engaging in data analysis in ongoing and recursive ways supported our aim to pinpoint common patterns across data sources (Merriam & Tisdell, 2016). What was learned through the analysis of one day's worth of data collection in this study impacted the next day's data collection and analysis. Ongoing analysis began with open codes to identify concepts, keywords, or phrases about the phenomenon that emerged (Merriam & Tisdell, 2016). For example, during this phase we were mindful of the research literature and what is known about student responses to number talks in addition to the theoretical framework; some codes such as opportunities for communication of ideas (Boaler et al., 2015, Cavanna et al., 2015) and the presence of routine (Michaels & O'Connor, 2015; Parrish, 2014) were expected. Other open codes that emerged from the data were quality of discussion, the presence of tabletop activities and manipulatives, permission to fail, and one-to-one conversations.

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As the data analysis progressed, we moved from attending to what was emerging (inductive analysis) to pinpointing if patterns were present across data sources (deductive analysis). At a later phase of analysis, open initial codes were grouped into tentative categories, creating axial codes (Meriam & Tisdell, 2016). These categories were aligned with the IQ principles and the belief that oral communication, drawing upon Vygotsky's (1978) sociocultural theory, is important for developing understanding. This process also included identifying any resonance with culturally relevant pedagogy. Axial codes, also known as analytic codes, "span many individual examples (or bits or units of the data…previously identified) of the category" (Merriam & Tisdell, 2016, p. 206). For example, open codes such as the presence of routine, communication of ideas, and teacher's actions in structuring number talks were grouped into a category we refer to as "student responses to routinizing number talks". The development of categories was an important step in the data analysis process as they revealed the ways in which students responded to number talks.

Findings

Our findings suggest that the students in this study responded positively to number talks based on their willingness to engage in dialogue about their thinking. In our analysis, we noted the importance of a routine, student familiarity with dot patterns, and Mrs. Piper's pedagogy to their engagement in number talks. Each of these components was important to how students made visible their understanding of number sense. Number talks provided culturally relevant learning opportunities for students, offering them chances to verbalize their thinking in how they asked questions, made choices, and assessed their decisions in conversations with others. Such acts, for example, align with the IQ principles of Aajiiqatigiinniq (making decisions through discussion), Pilimmaksarniq (using different means to learn), Piliriqatigiinniq (collaborating to achieve a goal), and Qanuqtuurniq (resourceful problem solving).

Finding 1: Student Responses to Routinizing Number Talks

The use of a routine encouraged students to participate in number talks. Student willingness to engage in dialogue happened over time as they grew more comfortable with the activity. Mrs. Piper worked hard at establishing this routine upon its first introduction in January, affording students the opportunity to practice procedures associated with number talks. One of the first things witnessed by Emily was observing Mrs. Piper raise her hand, followed by raising her thumb, to model for students how they could show that they wanted to share their thinking with the class. Mrs. Piper encouraged students to practice these actions (Classroom Observation 1, January 21, 2020). Following several rounds of modelling these actions, Mrs. Piper asked, "Do we yell [the answer] or keep [the answer] in our head?" (Observation 1, January 21, 2020) to which the students collectively replied that they keep the answer in their head. To practice how she wanted the students to respond instead of shouting out, Mrs. Piper asked them to show her by raising their thumbs (Observation 1, January 21, 2020). Reminders about procedures became a regular part of the number talk routine before Mrs. Piper showed students the first visual dot pattern to be discussed.

Students responded positively to Mrs. Piper's efforts to engage them in understanding how to participate during number talks. When asked during the post-interview how he showed his thinking to others in math, Thomas replied "You can talk to them" (Thomas's Interview 2, February 25, 2020). Like Thomas, Elizabeth also stated that they got to "switch tables" to talk to different students (Elizabeth's Interview 2, February 26, 2020). These examples from two of the

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post-interviews suggest that, for both Elizabeth and Thomas, talking to others to show their thinking was a practice with which they identified.

The number talk routine had practical considerations as well. For example, Mrs. Piper typically taped a visual representation on the whiteboard at the front of the class and then covered it with a clear sheet of plastic. This clear sheet allowed Mrs. Piper to erase the response from the previous student before the next student came up to show their thinking. Given that students were circling their groupings with a marker, there was the potential for confusion amongst the students if they were trying to create their own groupings amongst previous work. This practice also enabled Mrs. Piper to monitor who had participated. Mrs. Piper chose two students to answer each question, taking into consideration who had not shared. Once a question had been answered by two students, Mrs. Piper replaced the paper with a different dot pattern visual (Classroom Observation 1, January 21, 2020). As Mrs. Piper displayed the next question, she praised students collectively for their willingness to participate (Classroom Observation 1, January 21, 2020) or made general comments about the dot pattern visual to be discussed (Classroom Observation 3, January 29, 2020).

Students responded well to Mrs. Piper's efforts to make number talks familiar to them. When asked during an interview about the routine, Thomas explained that "[Mrs. Piper] also says make rows and then some of us get a turn to circle the numbers" (Thomas's Interview 2, February 25, 2020). As Thomas's explanation indicates, he understood that number talks involved sitting in rows on the ground and that some students were called upon to explain their thinking by circling groups of dots using a whiteboard marker. Mrs. Piper's practice of consistent number talk procedures was a pattern regularly observed and it afforded students the opportunity to internalize this routine and normalize the practice of sharing their thinking.

While Mrs. Piper made sure to explicitly review the number talk routines with her class, students created their own number talk behaviours— behaviours that were consistently observed across the observations. For example, Mrs. Piper never stated that students should represent their thinking in different ways for each dot pattern visual. At the same time, she also did not state that students were allowed to share the same mathematical thinking as a previous student. It was consistently observed that students felt their ideas had to be different from what was shared by the previous student. For both Thomas and Elizabeth, it was observed that the solution they presented to the class did not always make the most sense to them and they relied on Mrs. Piper's prompting to assist them in organizing their thinking. Both students indicated in their interviews that they saw their role as sharing their thinking with Mrs. Piper so that she would know how they did and what to do if their thinking did not make sense. Thomas and Elizabeth generally waited for Mrs. Piper to ask them to explain what they had done, as this seemed to be another unofficial classroom norm during number talks.

These data are interconnected examples of how students responded to Mrs. Piper's efforts to make number talks a regular part of their mathematics learning. The infusion of IQ principles was present in each number talk as Mrs. Piper showed ways for students to indicate their desire to share ideas (pilimmaksarniq: using different means to learn), engaged them in discussion about how to participate (Aajiiqatigiinniq: making decisions through discussion), and had the students work together to achieve common understanding about participation and sharing their thinking (Piliriqatigiinniq: collaborating together to achieve a goal). Striking in student responses to Mrs.

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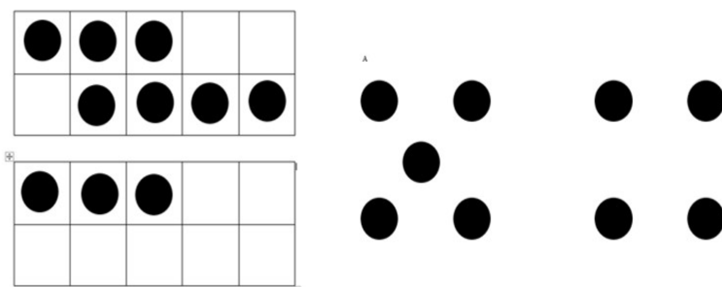
Piper's efforts to routinize number talks was their knowledge of its procedures and their reliance on her, rather than their peers, to provide further prompting if they were uncertain.

Finding 2: Teacher Pedagogy Shaping Student Responses During Number Talks

From the beginning of the observations, the Grade 1 students seemed to be comfortable interacting with dot patterns that were displayed in a ten-frame or loosely on the page. Prior to the introduction of number talks, Mrs. Piper, using her knowledge of the IQ Principle Pilimmaksarniq (using different means to learn), had modelled to students throughout the year different ways to solve dot problems. Figure 1 provides an example of the dot patterns used. Students understood that during a number talk they were to show and talk about, how to put the dots into groups to determine how many dots there were altogether. Mrs. Piper generally asked the students at the start of each question "How many dots are there altogether" (Classroom Observation 2, January 27, 2020).

Figure 1

Example of a Visual Representation Used in Number Talks in Mrs. Piper's Classroom



Students seemed comfortable with the physical act of grouping dots; yet, when it came to articulating their rationale for these groupings, some in the class struggled to explain their thinking and provide the total number of dots present in the dot pattern. In such moments, Mrs. Piper tended to take over the explanation for the student or she asked the whole class to determine the number of dots based on what a student had started (Classroom Observation 5, February 4, 2020). When Mrs. Piper offered prompts, she sometimes spoke directly to the student who was engaged in the number talk and sometimes she directed her question to the whole class. An example of how Mrs. Piper engaged the whole class occurred on February 4, 2020, as the following field note describes:

> Grade 1 student, Marsha, explained that she "…did 3, 2, 2, 2, 3" to solve the problem, referring to the groups of 3 and groups of 2 she had circled on the board. Mrs. Piper prompted the students to skip count by 2s altogether to determine how many dots there were. After Mrs. Piper's direction, the students counted "2, 4, 6," and Mrs. Piper then had them add the 2 groups of 3s. (Classroom Observation 5)

In this fieldnote, it was observed that Mrs. Piper chose to prompt the whole class to consider how to determine the total number of dots rather than working individually with the student, Marsha.

Mrs. Piper also prompted students to explain their thinking, as was evident in the sixth classroom observation on February 6, 2020. One of the students, Carole, had circled parts of the whole to show how she got the answer but did not explain her thinking either verbally or through

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a number sentence (Classroom Observation 6). Mrs. Piper prompted her by asking where she had started, which encouraged Carole to point at the group of 2, then the group of 1, and finally the group of 3. When Mrs. Piper saw that Carole still was not explaining her thinking after prompting, Mrs. Piper took over and wrote the number sentence on the board (Classroom Observation 6, February 6, 2020). Mrs. Piper tended to take over the explanation process when she saw that students were not responding to her prompting, sometimes directing the questions to the whole class. This might be due to her knowledge of specific students and their reluctance to speak in front of the class, or it may have been influenced by the specific situation in which she can see the student is struggling to articulate their thoughts. Viewing Mrs. Piper's pedagogy through the IQ principles brings to light her knowledge about the importance of relationships with others (Inuuqatigiitsiarniq), being welcoming and inclusive (Tunnganarniq), and her efforts to encourage students to make decisions through discussion (Aajiiqatigiinniq) and collaboration (Piliriqatigiinniq).

For Elizabeth and Thomas, Mrs. Piper's practices had some effect on their understanding of number talks. For example, when asked what mathematics looked like in his classroom, Thomas stated "Mrs. Piper puts numbers up and we have to count them and then raise our hand and do away by circling them" (Thomas's Interview 2, February 25, 2020). During the first interview with Elizabeth, her familiarity with dot patterns was evident when asked how she showed her thinking to others in mathematics. She replied "I … show my picture to everybody. It's like 4 red dots and 3 blue dots and then we take away 3" (Elizabeth's Interview 1, January 17, 2020).

Throughout the eight classroom observations, students in the Grade 1 class demonstrated their familiarity with dot patterns as well as their growing familiarity with number talks. Each number talk had the students determine how many dots there were altogether. Prior to the introduction of number talks, students were familiar with seeing dot patterns in their mathematics class. With the introduction of number talks, students learned new practices associated with number talks to engage with the dot patterns. Mrs. Piper, making use of the IQ principle Pilimmaksarniq (using different means to learn), had modelled to students throughout the year how to make use of different practices. Also, prior to the introduction of number talks, she used different ways, or Qanuqtuurniq (resourceful problem solving), to solve dot problems. The students used that mentorship during the implementation of number talks to circle groups of dots to find the total number of dots. By the end of the study, students understood the routines associated with number talks and were able to share, often with assistance from Mrs. Piper, how they grouped the dots in the dot patterns to determine the total number of dots.

Finding 3: Emerging Understanding of Mathematics and Number Sense in Response to Number Talks

When talking with Thomas during the first interview, it was evident that he was developing an understanding of mathematics as a subject. During Thomas's first interview, he explained that in mathematics "you have to try to spell and try to use your sounds" (Thomas's Interview 1, January 21, 2020). When asked again what mathematics looked like in their class, Thomas replied "Mrs. Piper helps us figure out the words. I write about pictures" (Thomas's Interview 1, January 21, 2020). A month later in his second interview, his understanding of mathematics as a discipline had evolved. When asked how he felt about number talks, he replied: "Good. I liked counting numbers and doing math and I like spelling my words" (Thomas's Interview 2,

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February 25, 2020). These conversations with Thomas show his emerging understanding of mathematics, as well as how it was emerging.

Elizabeth's understanding of mathematics as a subject area was more developed at the start of the study. During the first interview with Elizabeth, it was evident that she understood mathematics generally, as demonstrated in the following example. In response to the question, what does mathematics look like in your classroom, Elizabeth picked up Emily's iPod and placed it beside her little finger and offered, "Measuring our pinky and something taller. Which one is taller: the phone or my pinky?" (Elizabeth's Interview 1, January 17, 2020). During Elizabeth's second interview, her explanation of what mathematics looked like in the classroom became more technical and she described its activities as doing "like equals and plus and minus" (Elizabeth's Interview 2, February 26, 2020).

During classroom observations, it was observed that while students' number sense understanding gradually developed, they did not always use the specialized language of mathematics when they explained how they had grouped the dots in the visual. Instead, many of the students said that they "…did 3, 2, 2, 2, 3" to explain their process instead of saying that they added the numbers or that they did 3+2+2+2+3 to find the total number of dots (Classroom Observation 5, February 4, 2020). Most students did not put numbers into addition sentences on the whiteboard to show the final answer to their classmates nor did they explain how they had added groups of dots to determine a total number of dots. Students tended to not use the specialized language of mathematics even though Mrs. Piper modelled it in class. Mrs. Piper would say "What is 2+2+1?" (Classroom Observation 8, February 13, 2020) when assisting students with explaining their thinking, and it was very rare for a student to include the answer in their explanation without requiring prompting from the teacher. One of the few examples was when the Grade 1 student, Mark, explained that "[he] did a 3 and the 8 and then [he] put it together and it makes 10" (Classroom Observation 4, January 30, 2020).

One of the goals of number talks is to help students develop their number sense (Hufferd-Ackles et al., 2004). By introducing students to the routines around number talks, such as sharing their thinking with the class, students are afforded opportunities to learn from each other. Both Thomas and Elizabeth's, as well as the other student participants', general understandings of number sense and mathematics as a discipline seemed to benefit from their participation in number talks. Over the course of the study, their understanding of number sense and mathematics as a subject area, while emerging, was evident for most students, including Elizabeth and Thomas. While some of the students, like Thomas, seemed to be timid and tended to take their lead from Mrs. Piper's prompts for most of the number talks, others, like Elizabeth, were able to explain their thinking to their peers without her assistance. The students in the class adapted well to the number talk routines that were explicitly taught by Mrs. Piper and they also adhered to socially constructed, unofficial, number talk norms that were never directly taught by the classroom teacher. For example, students felt they should show their thinking in a different way than the previous students if they got a turn to share. Some of the students also seemed to think that they needed to wait for Mrs. Piper to ask them to share their thoughts before they could begin. If students had trouble articulating their thinking to the class, Mrs. Piper tended to take over the explanation for them or she enlisted the class to help them determine the total number of dots. Students in this Grade 1 class did not generally use the specialized language of mathematics during the number talks, even though the teacher consistently modelled these terms with the students. Through further exposure

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to daily number talks, it seems plausible that students will become more accustomed to justifying and defending their answers and continue to develop their number sense.

Insights into the Possibilities of Number Talks

Scholars have noted the importance of number talks as a strategy to bolster student willingness to engage in talk about their mathematics learning (Murata et al., 2017; Sun et al., 2018). The implementation of number talks has been found to improve two essential mathematics elements, number sense and procedural fluency (Matney et al., 2020), as students are given time in conversation with each other to practice number concepts (Postlewait et al., 2003). Maintaining a focus on how Inuit students responded to the use of number talks in a Grade 1 classroom in Nunavut required exploring student interactions and perspectives in response to the pedagogical decision-making of their teacher. With the introduction of number talks, students developed the understanding that there are multiple ways to solve a problem. Students were also expected to explain their thinking to the class instead of simply sharing the answer. We have shown how important Mrs. Piper was to students' emerging understanding of the number talk routine in how she worked at establishing its procedures and norms (Parrish, 2014). As Murata et al. (2017) found, the teacher's pedagogical decisions can impact the effectiveness of number talks in the classroom. While Mrs. Piper implemented the routines of number talks and used purposeful problems, other aspects of number talks were less successfully cultivated, such as encouraging discussion amongst the students when multiple answers are presented (Bennett, 2014; Henning et al., 2012).

Investing time to ensure students understand the routine, however, allowed students to anticipate its procedures and Mrs. Piper's expectations while also developing their own "rules" on how to share their thinking in the act of not replicating one another's ideas. By encouraging students to explain their thinking, Mrs. Piper was helping students to develop a better understanding of the concepts being taught (Cavanna et al., 2015). While our findings are reminiscent of other studies (Bennett, 2014; Hufferd-Ackles et al., 2004; Matney et al., 2020; Parrish, 2014), our contribution reveals the positive possibilities of number talks as an important strategy to include in the teaching of elementary mathematics in Nunavut.

The eight IQ principles are used as the foundation of education in Nunavut (Nunavut Department of Education, 2007). Even though the strategy of number talks was not created with these IQ principles in mind, the strategy, arguably, aligns with six of the eight IQ principles in their structure and philosophy. For example, if used effectively, number talks are inclusive of all students and provide various entry points to solve the problem as there is no right way to answer the question (Parrish, 2014; Sun et al., 2018). Students are taught the procedure around number talks which includes being respectful of others' ideas, even when contradictory responses are offered (Bennett, 2014; Hufferd-Ackles et al., 2004; Matney et al., 2020; Parrish, 2014). If there are multiple answers presented by students, the students must justify and defend their responses in a way that allows the class to come to a consensus on justifications for correct answers (Bennett, 2014; Henning et al., 2012; Matney et al., 2020; Parrish, 2011). For those students who are unsure of how to approach the problem, they are provided with the opportunity to learn from their peers as their peers explain their thinking to the class (Bennett, 2014; Hufferd-Ackles et al., 2004; Stott & Graven, 2015). Students are encouraged to be resourceful and to come up with the best way for them to explain their rationale (Bennett, 2014; Matney et al., 2020; Parrish, 2014). While beyond the scope of this study, exploring the question of whether Inuit students (or others from their

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community) see a meaningful connection between the IQ principles and the processes and actions within number talks, and other strategies adopted from the South, is a critical consideration for future research.

When assessing whether a Southern practice is relevant to Inuit student learning, or whether it can be adapted, the IQ principles form a crucial teacher pedagogical framework to enhance the elements of respect and relevance (Kirkness & Barnhardt, 1991). It cannot be assumed, however, that a Southern strategy is culturally relevant simply because it has resonance with some or all the IQ principles. While understanding this relationship is important, it is not the only step that must be taken when ensuring a strategy is culturally relevant. For example, we cannot assume that our, and Mrs. Piper's, interpretation and thinking about the IQ principles is fulsome or, even, always culturally appropriate or respectful. We acknowledge that many Indigenous communities and researchers struggle when non-Indigenous researchers draw conclusions in relation to their cultures when they do not themselves have the Indigenous knowledge[2]. At the same time, we are mindful that it is a common practice for teachers to be recruited to Nunavut from the South due to the present lack of Inuit teachers (Government of Nunavut, 2021; Preston, 2016; Ramussen, 2011). It appears that curricula and teaching practices developed in southern contexts will continue to be offered in Nunavut. In the Nunavut Education Act, it is stated that the IQ principles must be the foundation of all school programs (Consolidation of Education Act, 2020). Perhaps it is an optimistic goal that incorporating IQ principles into the daily teaching of Nunavut educators will disrupt Eurocentric teaching methods (Fredua-Kwarteng, 2016; McGregor & McGregor, 2016). Yet, we suggest that it is encouraging to think that this research helps interrogate a southern strategy in a new, culturally relevant light. We offer what we hope may be viewed as a middle ground in how the IQ principles offer a valuable way to assess the possibilities of a teaching strategy developed in other educational contexts. Such an assessment process, along with professional development opportunities, community involvement, and feedback from Elders and parents, might be included as the next and necessary steps, essential pieces informing a larger puzzle towards accountability, reclamation and revitalization. Our hope is that the findings of this study will resonate with others in this educational context and might resonate with others in similar teaching situations outside of the North.

Notes

[1] The names of the students and the teacher are pseudonyms. In consultation with the students, their pseudonyms are Western in origin (as are their real names) to reflect a common practice of many families in the schooling community.

[2] Our thanks to the reviewer for this insightful point.

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Children as Levels: Early Understandings of Reading Development Conceptualized by Preservice Teachers

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Abstract

This qualitative study surfaced beliefs around reading instruction and reading development at the onset of an elementary literacy methods course. Prior understandings and knowledge around reading instruction and reading acquisition emerge through various experiences and have the potential to contradict notions presented by teacher educators. This inquiry explored prior beliefs held by five preservice teachers (PSTs) about the nature of reading and the teaching of reading, drawing on a thematic analysis (Braun & Clarke, 2006) of a pre-course survey. Results indicated that early understandings of reading development and pedagogy appear to rely on levelling systems for assessing and identifying students' acquisition of reading skills, as well as organizing students into levels for instruction. Beliefs that reading development progresses through a levelled gradient are problematic for both teacher and student, shifting attention away from the complex nature of reading acquisition and the skills required to develop proficiency. While no generalizable statement can be made regarding PSTs' most frequently held beliefs, this pilot study puts forward the idea that understanding PSTs' prior beliefs is a critical part of teacher education. Intentional opportunities to unpack prior beliefs and understandings may offer insight for teacher educators to engage students in discourse and experience cognitive dissonance around inconsistencies, making space for learning and unlearning.

Keywords: preservice teachers, teacher education, levels, reading, reading assessment

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The impact of beliefs and prior assumptions about reading acquisition and development cannot be underestimated. Instructional decisions and designs are often influenced by belief systems held by teachers (Bryan, 2003; Richardson et al., 1991; Skott, 2014), and the relationship between instruction and student achievement is well-researched (Otaiba et al., 2016; Darling-Hammond, 1996, 2000; Guerriero, 2017; International Literacy Association, 2018; Muñoz et al., 2011; Rivkin et al., 2005; Wright et al., 1997). Given that instructional decisions are often grounded in teacher beliefs and that student achievement is directly linked to instructional approach, it is therefore critical to examine how teachers form foundational beliefs regarding all aspects of learning, instruction, and pedagogy.

In a 2000 analysis of state policy surveys and case study data, Darling-Hammond suggests that variables related to teacher quality, such as teacher preparation, certification, and a major in the content area, are more influential in predicting student achievement levels than factors including class size, heterogeneity, poverty, and language status. The focus of teacher education is, therefore, a significant variable in determining teacher efficacy. For example, in reading instruction, Piasta et al. (2009) consider the relationship between teachers' code-related knowledge, explicit decoding instruction, and word reading gains of grade one students. Their findings suggest that teacher knowledge of code-related skills, as demonstrated in the Teacher Knowledge Assessment: Language and Print assessment (Piasta et al., 2009), is positively related to reading gains. Interestingly, despite the use of a highly scripted core curriculum, the students receiving instruction from teachers with lower scores on the Teacher Knowledge Assessment had weaker reading gains. The authors of this study highlight that the use of a core curriculum may provide an instructional base but suggest that specialized knowledge of language and literacy offers teachers the skills to approach instruction flexibly to address the individual needs of students. They suggest that when teachers have specialized knowledge, they are better able to interpret and respond to student errors, engage students in appropriate material for instruction and practice outside the scripted curricula, and adapt the pacing, intensity, and sequence of the curricula to meet the needs of the students. Given the importance of teachers' underlying beliefs about education and content knowledge, teacher educators must be attentive to preservice teachers' learning and unlearning processes. The area of reading is one key area where the need for this dual approach is readily apparent.

Literacy as a Human Right

Approximately 40% of students learn to read with relative ease (Hempenstall, 2016; Lyon, 1998; State Collaborative on Reforming Education, 2020; Young, 2017). However, many find it considerably difficult, and this level of difficulty is compounded by intersectional factors: students navigating poverty, students who identify as racial minorities or as English language learners, and students with disabilities are at increased risk (Fien et al., 2021; Snow et al., 1998). This is not to suggest that students who find learning to read difficult have a disability. Studies demonstrate that most children can learn to read proficiently when provided explicit instruction and targeted intervention, when necessary, of foundational reading skills (Lesaux & Siegel, 2003; Otaiba & Torgesen, 2007; Savage et al., 2018).

Data reported by Saskatchewan's Ministry of Education (2024) demonstrates a persistent gap in reading achievement between Indigenous and non-indigenous students. Reading data

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outlined in the Ministry of Education 2023-24 annual report reflected that in the 2022-23 school year, 70% of Grade 3 students achieved the provincially developed grade-level benchmarks using the approved levelled reading assessments (Saskatchewan Ministry of Education, 2021), while the percentage of self-identified First Nations, Inuit, and Métis students who achieved this level of proficiency was reported at 45.5%. This disparity in reading achievement has been reported consistently from 2014 through 2023 (Saskatchewan Ministry of Education, 2020; Saskatchewan Ministry of Education, 2024). Despite provincial efforts through education sector strategic plans (Government of Saskatchewan, 2014; Ministry of Education, n.d.), literacy rates in Saskatchewan continue to remain below the 80% at or above grade level target set by the province, and Indigenous students continue to perform below their peers, highlighting issues related to equity.

The Ontario Human Rights Commission's (2022) *Right to Read* inquiry report addressed issues related to equity. They suggested that families from historically marginalized backgrounds may not have the access or financial resources to navigate the system or obtain reading support services outside of the school system. The OHRC report calls on faculties of education to promote the goal of equity through the broader topic of culturally responsive instruction, defined by Hammond (2020) as educational practices focused on the cognitive development of under-served students alongside the development of a deeper understanding of scientifically supported pedagogy. It should be noted that culturally responsive pedagogy is not reflected through a distinct routine or program but rather "shaped by the sociocultural characteristics of the settings in which they occur, and the populations for whom they are designed" (Gay, 2013, p. 63) and, while important, are beyond the scope of this article. Rather, this article examines the specific orientation towards reading instruction—balanced literacy—and specific themes related to levelling that should be addressed in literacy methods courses as an act of learning and unlearning.

Literacy is recognized as a human right (Derby & Ranginui, 2018; OHRC, 2022; UNESCO, 2019) and attention to how early reading is taught in schools is influencing state legislature in the United States (Neuman et al., 2023) and has prompted inquiries by provincial human rights commissions in Saskatchewan and Ontario. There is a long history of the debate centred around how reading skills develop and, therefore, how reading should be taught. Known as the "reading wars" (Castles et al., 2018), exchanges centre around instructional approaches favouring a code-based approach—where letter and sound relationships are explicitly and systematically taught (Adams, 1991; Chall, 1967, 1983)—and a meaning-centred approach where students are encouraged to draw on oral language skills to recognize unfamiliar words (Goodman, 1970). The term *balanced literacy* is often used to exemplify an instructional approach that combines skill and meaning (Pressley et al., 2002) and many provincial curricula (see, British Columbia, 2016; Manitoba, 2019; Saskatchewan, 2010) reflect tenets of this approach where skill instruction is to be embedded within meaningful contexts and inquiry learning. Included in this approach is the use of levelled texts for assessment and instruction. Children are ascribed an instructional level based on a combined accuracy and comprehension score with the purpose of matching text difficulty to the reader, then using the levels to create instructional groupings of students (Pratt & Urbanowski, 2015). However, studies have called into question the reliability of commercially produced levelled reading assessments (Parker et al., 2015), the text complexity within and between levels (Burns et al., 2015; Pitcher & Fang, 2007), and the notion of instructional levels (Burns et al., 2015).

The three cueing system is another feature of a balanced approach to literacy instruction and is predicated on the notion that skilled reading draws on three information sources—semantic,

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syntactic, and graphophonic—represented in decreasing order of importance (Hempenstall, 2006). Semantic cues utilize the meaning of the surrounding text to assist with decoding unknown words, and syntactic cues consider the grammatical structure of the sentence wherein unknown words may be guessed based on grammatical rules. Graphophonic cues refer to the correspondence between sounds and symbols, and students may be encouraged to look at the first letter when approaching an unknown word or confirming a word choice (Hempenstall, 2006). In this approach, accurate word reading is not necessary if the meaning of the text is retained (Hempenstall, 2006). Goodman (1970) characterized reading as a "psycholinguistic guessing game" (p. 127) in which readers use graphic, semantic, and syntactic knowledge to guess the meaning of printed words. However, research indicates that accurate word identification based on contextual cues is limited (Gough et al., 1981) and that skilled readers, although attentive to the use of context to derive meaning from unfamiliar words, rely on word structure for decoding (Tunmer & Hoover, 1993). As indicated by the tension between research-informed practices and policies around reading instruction dominant in curricular design, the subject of reading instruction requires thoughtful consideration in teacher education instruction.

The reports from the Ontario Human Rights Commission (2022) and Saskatchewan Human Rights Commission (2023) call for changes in provincial curricula to align with scientific evidence for reading instruction. References to reading levels and three cueing are prevalent in the Saskatchewan English Language Arts (2010) curriculum. For example, a Grade 1 indicator that supports the outcome of reading and comprehending grade-appropriate texts is that students read aloud any text that is familiar and at an independent reading level. For the same outcome, another indicator is that students will use applicable pragmatic, textual, syntactic, semantic/lexical/morphological, graphophonic, and other communication cues and conventions to construct and communicate meaning when reading. Several provinces, such as Ontario, Alberta, and New Brunswick, have made shifts to curricular models that reflect a scientific evidence base, thus signalling a move away from levelled frameworks for reading assessment.

There has been an increase in calls for teacher education programs to prepare teacher candidates better to be teachers of reading. The Ontario Human Rights Commission's (2022) *Right to Read* inquiry report included six recommendations for higher education, drawing attention to the content of required literacy methods courses, the administration and use of valid assessment tools, and supporting students with exceptionalities—including students who struggle with reading and writing. In a recent review of nearly 700 elementary teacher education programs in the United States, the National Council on Teacher Quality (2023) reported that only 25% of programs adequately addressed the essential components for reading instruction (as identified in the National Reading Panel, 2000), and 40% of programs focused on content and instructional methods deemed contrary to the relevant research-base. Recommendations in this report call for critical examinations and revisions to methods courses to align with compelling research and understandings around reading instruction, as well as continued training and professional learning opportunities for the instructors of these courses.

The Role of Preservice Teacher Beliefs

Moats (2014) poses critical questions about the design and content of literacy methods courses that teacher education programs should consider in preparing preservice teachers with the knowledge and skills necessary to address the range of individual aptitudes for reading and includes the importance of surfacing beliefs held by PSTs and challenging those, if necessary, "in ways that engender cognitive shifts" (p. 88). Often overlooked when considering the efficacy of literacy

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methods courses are the beliefs about literacy pedagogy and content that preservice teachers approach coursework and learning with (Ciampa & Gallagher, 2018). Although some studies suggest that new knowledge presented in methods courses is resisted by PSTs when it contradicts personal beliefs (Clift & Brady, 2009; Massey, 2010), there is evidence that supports methods courses as avenues for negotiated understandings (Brodeur & Ortmann, 2018; Duffy & Atkinson, 2001; Leko & Mundy, 2011; Nierstheimer et al., 2000).

Kagan (1992) stressed the central role of pre-existing beliefs held by preservice and beginning teachers and concluded that beginning teachers are strongly influenced by their experiences as learners. Their pre-existing beliefs filtered the content of coursework, remained relatively unchanged, and were translated into classroom practice. Hence, beliefs may act as a barrier to new or conflicting beliefs (Risko et al., 2008) and serve as a filter to either accept or reject knowledge presented in reading methods courses (Vieira, 2019). As such, how do pedagogical decisions rooted in teachers' beliefs influence students' development and proficiency in reading—particularly those with increased risk factors and intersectional factors such as developmental language disorders (Snowling et al., 2021) and poverty (Buckingham et al., 2013)—when those beliefs run counter to research-informed understandings about reading? Taking this broader question into account, this paper explores the early understandings related to levelling systems to consider the narrower question: What particular beliefs, held early in a required literacy methods course, do preservice teachers surface about reading development and reading instruction?

Learning to read is one of the most complex skills students will acquire (Liu et al., 2016) as the act of reading is comprised of many skills and described by Dr. G. Reid Lyon (2003) as "one of the most complex, unnatural cognitive interactions that brain and environment have to coalesce together to produce" (para. 51). Teaching children to read is also complex and requires knowledge and skills across components of word recognition, language comprehension, spelling, and writing (Moats, 2020). However, research suggests that preservice and in-service teachers lack the depth of knowledge required to teach reading effectively, particularly to those children at risk for reading difficulties (Bos et al., 2001; CLLRN, 2009; Cheesman et al., 2010; Cohen et al., 2016; Cunningham et al., 2004; Lyon & Weiser, 2009; McCutchen et al., 2002; Meeks & Kemp, 2017; Meeks et al., 2016; Moats, 1994, 2009; Moats & Foorman, 2003; Moore, 2020; Piasta et al., 2009; Stark et al., 2016). Across Canada, changes in provincial curricula reflect current calls to align content and instruction with compelling scientific research. Literacy methods courses can help PSTs unpack their own histories and beliefs about reading acquisition and help them navigate politically charged discourses around reading by focusing on evidence-based practices while critically examining their own orientations.

Literature Review

Unlike many other professions, PSTs in teacher education programs bring vast classroom experiences, albeit as students. Findings from Debreli (2016), Smagorisnky and Barnes (2014), and Vieira (2019) suggest that instructional choices and learning experiences made by teachers early in their careers are primarily influenced by the experiences they enjoyed or did not enjoy as students. Accumulated and internalized beliefs about reading may also begin with literacy experiences in the home, through parent modelling, encouraged reading habits, and the ease at which an individual learns to read (Vieira, 2019). Findings by Gregoire (2003) and, more recently, Vieira (2019) highlighted the obstinate nature of beliefs whereby prior understandings served to filter the new learning presented in literacy methods courses.

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Bandura (1986) suggests that beliefs may be more prone to modification in early learning experiences. As such, teacher education programs can, in fact, serve as a catalyst for shifting misaligned or outdated beliefs held by PSTs. Contrary to findings that indicated minimal shifts in understandings held by PSTs, several studies demonstrated negotiated beliefs when offered new learning in methods courses (Brodeur & Ortmann, 2018; Duffy & Atkinson, 2001; Leko & Mundy, 2011; Nierstheimer et al., 2000), highlighting the value of surfacing and interrogating beliefs and focusing on meaningful, integrated opportunities for new learning (Yost et al., 2000).

Theoretical Perspective

Through a social constructivist lens, this inquiry investigated the early understandings and beliefs about reading development and instruction, constructed through prior experiences, brought forward by PSTs into their first required literacy course in their teacher education program. Social constructivism is positioned on the belief that knowledge is a social construct fashioned through the interconnectedness between environment, individual, and others (Azzarito & Ennis, 2003; Olson, 1995; Vygotsky, 1978; Young & Collin, 2004). Distinctive of a social constructivist lens is the essential role of groups in constructing knowledge through collaboration, questioning, and discussions among peers with the guidance of a mentor (Yost et al., 2000). New knowledge is socially constructed and filtered through existing knowledge, creating space for revision and reconstruction of existing beliefs (Andrew et al., 2018). This inquiry sought to create space to surface initial beliefs and understandings about reading development and instruction so that they can subsequently be critically engaged. This paper accordingly presents one method through which those initial beliefs can be brought forward.

Purpose of the Study

This study aimed to investigate the early understandings and knowledge of reading development and reading instruction that preservice teachers (n=5) brought with them to a required literacy methods course, guided by the research question: What particular beliefs, held early in a required literacy methods course, do preservice teachers surface about reading development and reading instruction? This study was a pilot for research completed as part of a doctoral program dissertation (Dunk, 2021). The findings from this study may serve as a catalyst for teacher educators to consider the relevance of and how to create intentional opportunities to unpack and confront prior understandings and beliefs about teaching and learning held by PSTs.

Case Study Design

This study examines the beliefs and understandings about reading shared by participants and interpreted by the researcher. Hence, an interpretive case study design (Merriam, 1988) was suited to this study as data were collected to capture individual perspectives, which were interpreted by the researcher (Lincoln et al., 2018). Case study research has a place in investigating various aspects of teacher education programs as it can shift attention "from a 'macro' level encompassing broad issues of content, standards, and other program components to a 'micro' level for a close, in-depth look at issues that affect learning" (Maloch et al., 2003, p. 434, emphasis in original). This study examined the realities presented by the participants at a moment in time and invites readers to consider participant perspectives alongside their own knowledge, beliefs, and experiences (Merriam, 2009).

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Context of the Study

This study took place at a Canadian university where all students in the College of Education must take a literacy methods course grounded in the principle that every teacher is a teacher of reading. It is offered in students' first semester of their Bachelor of Education program. As such, it is the first literacy methods course that PSTs take in their teacher education program and is therefore well-situated as a space within which PSTs might examine their foundational beliefs prior to instructional intervention. Participants from two sections of this course were invited to participate in this study, which involved completing an online survey.

Methods

Researcher Positionality

I came to this research with my own lived experiences, both personally and professionally, as do all researchers. As a classroom teacher who spent many years teaching children to read, I have lived the shifting landscape of 'trends' and approaches to reading instruction, often influenced by professional learning offered by the system and schools I worked with and the curricular resources provided to me for instructional use. I have had to learn, unlearn, and relearn, question my own practices, and consider how my own knowledge and approaches to instruction may be hindering the reading development of some students and what I need to do to ensure I am supporting all children as they learn to read. Through that process, I humbly come to my work as a teacher educator and researcher with the belief that 'when we know better, we do better' (Angelou, 2012).

Effective teachers are critical in supporting students' reading development, particularly those for whom learning to read is challenging. These teachers know when and how to adjust instruction to respond to the varied needs of students and ensure that instructional decisions are grounded in compelling evidence rather than philosophical beliefs. Teacher education programs play an essential role in developing the knowledge and experiences necessary for PSTs to be highly effective teachers of reading. This work is guided by the foundational view that all teachers, regardless of grade level or subject-area specialty, are teachers of reading (Draper, 2008; Fang, 2012; Shanahan & Shanahan, 2008). This has deeply influenced my own views on reading pedagogy and reading development.

Interpretations of the data shared by participants were constructed through the perspectives I brought forward to the study. Situated within a social constructivist lens, my role as a researcher can be described as a co-constructor of knowledge through interactions with the data. However, the participants remained the centre of the inquiry, and it is through their contributions of individual perspectives that truth emerged from a shared consensus between all constructors. These truths, or subjective human realities, reflect individual understandings of reality through one's perspective (Erlingsson & Brysiewicz, 2013).

Participants

Following REB ethics approval, recruitment for the study took place early in the fall semester of 2020 during the COVID-19 pandemic, and at this time, courses transitioned from in-person to online. Consent was obtained from the instructors of two sections of a literacy methods course. The researcher shared information about the study via a virtual presentation for each section, and instructors were absent during this online recruitment presentation. Students were made aware that instructors would not be privy to who participated in the study. The researcher shared a recruitment poster with the instructors to distribute to the students enrolled in the course. This poster included

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a link to the online survey used to collect data for this study. Five participants across the two courses engaged in the study through this process. Participant consent was embedded in the survey, indicating the conditions of participation and that free and informed consent was implied through survey completion and submission. Participants chose a pseudonym for identification; the researcher did not know their real identities.

Fundamental to social constructivism is the recognition of social and cultural influences on learning (Adams, 2006), and it is understood that beliefs about reading development and pedagogy have accumulated and formed through various lived experiences. Although the participants in this study were enrolled in their first required course focused on literacy, they were asked on the survey if they had experience working with children learning to read (see Appendix, question 30). For context, Table 1 outlines the participants and their relevant experience. Highlighting these experiences is not presented with the intent to suggest causal or correlational connections to the findings in this study. Instead, it is to acknowledge that PSTs bring established beliefs and understandings constructed through lived experiences, some of which may be indicated here, to initial coursework in their teacher education programs.

Table 1

Participants: Experience with Beginning Readers

Participant	Experience
Marie	Special needs worker; EA in general and specialized classrooms; work with ELL students in various grades
Pam	Daughter who struggled with learning to read
Elizabeth Marie	Tutor for a Grade 4 student in English
Rae	Tutor for a student with a learning disability
Candace	Parent, EA, volunteer for a city organization

Data Collection

A PhD candidate conducted this research as part of a more extensive study examining the early and negotiated understandings of reading development and instruction pre- and post- a required literacy methods course. All students enrolled in the required literacy methods course were invited to participate. As this course was offered early in the teacher education program, information provided on the survey was based on the participants' experiences and reading knowledge before engaging in any other required literacy methods courses. Participants were five teacher candidates invited from two sections of the same literacy course who completed a pre-course semi-structured survey (see Appendix for survey questions). The survey was created using SurveyMonkey and hosted on the university platform. Participant access to the survey was included via a link on the recruitment poster, and all surveys were completed within one month of the start of the semester.

Survey Instrument

The pre-course survey utilized in this study was adapted from an original instrument created to track teacher beliefs related to literacy teaching by Gove (1983) and Vacca et al. (1991) and used in subsequent studies by Brenna and Dunk (2018, 2019). This survey was used to collect data on

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participant accounts of reading-related beliefs and knowledge and was administered and collected by the researcher.

Data Analysis

Survey data were coded following the thematic analysis phases outlined by Braun and Clarke (2006), which served as a fitting method to report participants' shared experiences and realities (Braun & Clarke, 2006). Based on the repeated readings of the survey results, ideas resonated under the following headings: assessment and achievement, understanding of reading development, and teaching of reading. Although data were limited in scope, patterned responses around the concept of levels were intriguing and noteworthy.

Findings

Participants in this study (n=5) were required to take the literacy methods course at the onset of their teacher education program. This course was a requirement for all students in the teacher education program, not only those interested in pursuing elementary (Kindergarten to Grade 3) or middle years (Grade 4 to Grade 8) teaching careers. The survey included questions that asked respondents to consider aspects of reading development and pedagogy that would apply specifically to beginning readers and other questions addressed aspects of reading applicable to any grade level.

Respondents were asked to identify their preferred grade level. Based on these responses, three participants identified a preferred interest in elementary teaching (Kindergarten-Grade 3), and two identified a preferred interest in teaching middle years (Grades 4-8). Most questions on the survey were broad in scope; however, four questions asked respondents to consider their preferred grade level when answering. Additionally, one question asked respondents to consider their response through the lens of a Grade 1 teacher and another through the lens of a Grade 8 teacher. Specific questions related to reading development and instruction include but are not limited to:

- What would you consider to be key factors that support the reading development of students?
- How will you know if your students are reaching their full potential as readers?
- What kinds of things do you think are important for teachers to teach directly, in support of children’s reading progress?
- When teaching beginning readers, what type of text would you want to use to support reading development? Why?
    - “A fat rat sat. The cat ran at the rat. Sad rat.”
    - “I like to run. I like to skip. I like to jump. I love to play.”

Levelling Vocabulary as an Emergent Theme

An emergent theme, based on the coding process, reflected the popularity and use in classrooms of various levelling systems (Fountas & Pinnell, 2006) for the assessment of and instruction in reading. Characterized through a balanced literacy approach, levelled texts are often used for instruction during guided reading, shared reading, and independent reading opportunities (Glasswell & Ford, 2010). Noted in the surveys was the broad scope of the understood use of levelled texts and levelling systems, not only as instructional and assessment tools but also as a way to depict reading development and reading proficiency. While the scope of the study sought to investigate early beliefs pertaining to reading development and instruction, aspects related to

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assessment are included in the findings as the theme of levelling inextricably linked the use of a levelled reading assessment system to recognize reading development and to guide instructional decisions.

Assessment and Achievement

Participants who identified a desire to teach elementary grade levels (n=3) appeared to believe that children's reading development is primarily assessed through a levelling system. In response to a question about how one would assess reading development, "Candace," a parent and educational assistant, noted that they would use "standardized reading assessments such as F&P" along with reading in small groups. Specific reference to Fountas and Pinnell (F&P) suggests prior experiences with this assessment system, characterized by a progression through texts that are levelled as a representation of increasing difficulty. Additional responses suggested that reading development might be measured by achieving benchmarks when students demonstrate the use of the three cueing systems (i.e., relying on syntax, semantics, and graphic cues for reading) (Clay, 1993) and the students' ability to respond to comprehension questions based on levelled texts. When asked about key components to look for when assessing reading development, "Candace" listed "looking at the pictures for clues" and "contextual clues" as indicators. In response to a question asking what Grade 1 teachers should do regularly, "Marie," a participant with experience as an educational assistant, emphasized using levelled assessments to identify the reading levels of students "regularly throughout the year."

The two participants interested in teaching middle years (n=2) seemed to consider the assessment of reading development in terms of a demonstrated proficiency in reading-related skills and strategies (e.g., reading fluently, ability to decode, knowledge of vocabulary, summarizing text). However, "Pam," who indicated that she has a child who had difficulty learning to read, added that the assessment of reading development should consider the student's ability to use "level-appropriate vocabulary" and "level-appropriate comprehension."

Reading Development

Questions on the survey asked participants to consider key factors that support students' reading development. Findings demonstrated that several of the participants referenced levelled texts in some capacity. "Marie" addressed the need for students to develop comprehension skills by reading texts "not below or above" but at the appropriate level. Similarly, "Rae," a tutor for a student with a learning disability, indicated that a key factor in developing reading is for students to engage in interesting texts that are "reading level appropriate."

This study identified the use of the three cueing system as an indicator of children's reading development. When asked to identify the more proficient reader based on miscues, several respondents chose the reader who substituted a word with a word of similar meaning (reflective of the three cueing approach), one respondent chose the reader who attempted, unsuccessfully, to read the word phonetically, and one respondent justified both types of readers as being the more proficient reader, as one is attempting to decode the written word and the other considers that replacing the word with a synonym retains the meaning of the text.

Reading Instruction

When considering aspects of reading instruction, survey responses appeared to cover a spectrum ranging from dispositional characteristics (e.g., exemplary reading teachers are patient, ignite passion, empower students, and support success) to emphasis on the direct teaching of skills and

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strategies. However, the data showed the use of levelling systems for instructional purposes. One participant referenced that directing instruction to the identified level is critical to supporting reading acquisition. "Marie" noted that part of their home reading program would be:

> for students to take books from their reading level home to read with their parents. This allows the parents to see where I have assessed their reading level to be and for them to engage with them in a level-appropriate manner around reading development.

Relatedly, participants were asked to identify which type of text they would use to support the reading development of beginning readers. One example reflected decodable text, focusing on regular letter-sound patterns (Bogan, 2012). Words in this text were tightly controlled—including one vowel sound, seven consonants, and one high-frequency word ("the"). The other example reflected a pattern or predictable text. The phrase "I like to" was repeated three times and changed to "I love to" in the last sentence. The last word of each sentence exhibited an action (e.g., run, skip, jump, play) that could be demonstrated in the illustration. A characteristic of many early-level texts for beginning readers is the repetition of words or phrases, often referred to as pattern (or predictable) texts. In these books, illustrations serve to enhance the relationship between pictures and written words, offering support to predict the text (Bogan, 2012). Predictable texts encourage beginning readers to draw on semantic, syntactic, and visual cues (three cueing system) for word reading. When asked to consider the type of text they would use with beginning readers to support reading development, several respondents chose the text that would be considered predictable, or patterned, emphasizing the use of the pictures and context to support word reading. Participants who chose the decodable text reasoned that this type of text focused attention on the letter-sound correspondences.

Discussion

Preservice teachers who participated in this study emphasized levelling systems that permeated through their understandings of reading development and pedagogical approaches. However, identifying children's reading development through the lens of a levelling gradient limits understanding of the complex nature of reading and the depth of knowledge required to support children as they learn to read, especially the high number of those who find learning to read difficult. Results of this study highlight the importance of surfacing the beliefs and prior understandings (or misunderstandings) that PSTs bring with them early in their teacher education programs—primarily the reductive narrative framing of children as 'levels'—and the benefit that required methods courses have as an avenue to address misconceptions.

When teacher educators are aware of the understandings PSTs hold, courses can be shaped to address and provoke shifts in understanding. Hikida et al. (2019) suggest:

> The activities undertaken in classrooms during "reading time" are what students come to believe reading to be. We argue that teacher educators and researchers could benefit from being (re) reminded of this axiom. That is, what preservice teachers do during their literacy preparation is what they believe the teaching of reading to be. (p. 191)

Literacy courses offer the opportunity to revise preservice teachers' beliefs with content and pedagogical approaches that align with an interdisciplinary evidence base.

The prominence of associating levels with reading development requires attention. Responses to the survey by some PSTs suggested that they would know children are developing their reading skills if they achieved identified benchmarks throughout the year. When reading

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development is correlated to advancing through a levelled gradient, studies have shown that children define themselves as readers in terms of a level and ascertain who amongst their peers is a strong reader and who is a weak reader based on those levels (Forbes, 2008; Pierce, 1999). Identifying one's reading development along a levelled gradient may have a negative influence (Forbes, 2008) and has the potential to hinder factors for learning to read, such as motivation, interest, and self-efficacy, all of which Tunmer and Hoover (2019) suggested may indirectly impact reading acquisition.

Levelling systems assign a rank, or level, based on characteristics of the text, which are highly subjective (Moats, 2017). In fact, in an analysis of sample texts from one series of levelled books published in the United States, Picher and Fang (2007) found that the levelling system was not a reliable indicator of text difficulty, and the quality varied substantially between and within levels. The authors cautioned that reliance on text levels could be unfavourable in the reader–text matching process. Research has cast doubt on the notion of “instructional levels” (Jorgenson et al., 1977; Kuhn et al., 2006; Morgan et al., 2000; O'Connor et al., 2010; Stahl & Heubach, 2005); however, this term is widely used in education (Burns et al., 2015). PSTs in this study placed importance on matching text to the readers. “Marie” noted that "reading things that are their reading level" was critical in supporting reading development. “Elizabeth Marie” suggested that exemplary reading teachers "teach to the level that each student requires" and identified her strength as a reading teacher, ensuring each child is at the correct level. As well, “Marie” indicated that levelled texts would be used as part of a home reading program, providing opportunities for the child to practice these texts at home and "for the parents to see where I have assessed their reading level to be." Attention here appeared to focus on assessing the progression and identification of levels instead of assessing and identifying reading-related skills.

Participants in this study did not refer to reading development in terms of the acquisition and development of processes and skills required to move from learning the alphabetic principle to applying that knowledge to written words. Ehri (1995) considers word reading development through a series of qualitatively distinct phases, described as pre-alphabetic, partial alphabetic, full alphabetic, and consolidated alphabetic. Central to the characteristics of each phase are the reader's knowledge of the alphabetic system and mastery of the sound/spelling correspondences in words. Knowledge and understanding of the qualitative characteristics of reading development provide a basis for monitoring progress and differentiating instruction. As PSTs in the current study presented their understandings of reading development and instruction in relation to a levelled gradient and matching texts to readers, it would be necessary for teacher educators to unpack those beliefs and facilitate opportunities to build understandings of reading acquisition and the most effective instruction that is supported by evidence.

Using levelled texts to teach early reading is prevalent in classrooms (Cunningham et al., 2005; Moats, 2017). Early levels often appear as predictable texts characterized by semantically predictable and repeated language patterns and with illustrations that match the print. These sources support the use of the three cueing systems for word recognition. As texts increase along the levelled gradient, predictability declines; however, the instructional emphasis of the earlier texts is to foster the coordinated use of the three cueing systems, which is then applied to texts of increased difficulty. The three cueing model, which focuses on the semantic system, is a foundational component of balanced literacy instruction (Kilpatrick, 2015). Reference to utilizing the three cueing systems model permeated the surveys in responses around supporting word reading and identifying proficient readers, which is reflective of a balanced literacy influence.

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Kilpatrick (2015) further suggested that the three cueing model is problematic as it pertains to word reading and suggests that weak readers, not skilled readers, rely heavily on context for word reading. Rather than the semantic system, the connection between the orthographic and phonological systems supports skilled word reading. Reading materials that promote the application of students' knowledge of sound/symbol relationships facilitate storing familiar letter sequences for later recognition and retrieval. These texts, referred to as decodables, accelerate mastery of phonics skills and increase activity in those areas of the brain wired for skilled reading (Kilpatrick, 2015). However, findings in this study reflect PSTs' privileging of levelled, or predictable texts, over decodable texts for beginning readers and reasoned that the repeated words and phrases supported reading development.

PSTs in this study initially appeared to have a narrow understanding of how reading materials can be used to support reading development. “Rae” suggested that decodable texts allow students to "fully comprehend the sound that the letters make" and “Pam” stated that "it's good to start with soft vowels and similar sounds." PSTs who identified they would use predictable texts for beginning readers justified their choice, sighting that the text's meaning, pattern, and predictability, along with picture cues, best supported reading development. Participant responses demonstrated limited knowledge of how decodable texts should be used to support reading development in the transitory phase as students are learning and applying the code in connected text and that once students reach the consolidated phase, their print lexicons and knowledge of letter patterns enable them to read a variety of text types, including levelled texts. While a deep understanding of reading acquisition is not expected or required at the beginning of a PST’s first literacy methods course, this data suggests that many PSTs do come with deeply entrenched beliefs on reading that must be articulated and, subsequently, engaged within the teacher education instruction that follows.

Data from this study in surfacing the beliefs and understandings of PSTs demonstrated a limited, narrow view of various aspects of reading development and instruction. This is problematic when these beliefs and understandings do not reflect current evidence on reading acquisition and instruction. Methods courses offer the opportunity to examine pre-existing beliefs and begin to develop knowledge of the foundational processes required for skilled reading (Stainthorp, 2004). In response to criticism indicating that teacher education programs do not adequately prepare teacher candidates for early reading instruction (Bos et al., 2001; Carlisle et al., 2009; Cheesman et al., 2010; Joshi et al., 2009; Mathes & Torgesen, 1998; Moats, 1994, 2014; Piasta et al., 2009), instructors in literacy methods courses can create space to surface prior understandings held by PSTs and shape course content to address misconceptions and gaps in understandings.

Conclusion

Surfacing the beliefs and understandings that PSTs bring to literacy methods courses can shape the content and experiences of these courses, providing one avenue for PSTs to examine and refine their understandings related to reading instruction and development. Findings from Massey (2010) support the benefit of deep, concentrated instruction and the necessity to surface prior knowledge and beliefs to provide opportunities to add to or change existing knowledge. Duffy and Atkinson (2001) and Brenna and Dunk (2018) also noted the importance of providing preservice teachers with opportunities to address misunderstandings about reading and reading instruction.

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Although based on a small participant pool, the results of this pilot study are significant as we consider how children are defined as readers by policy and pre-/in-service teachers alike. Current practices, guided by provincial curricula, rely heavily on the use of levelled reading assessments and instructional/independent level texts for instruction, perpetuating the identification of children *as* levels. Teachers emphasize the levelled gradient and the defined benchmarks reflecting reading development throughout each grade. Implications of the prevalence of a levelled gradient are apparent in the reliance on this gradient to measure growth and proficiency, make instructional decisions, and limit text choice. Notable is that PSTs who participated in this study brought these beliefs and understandings around the use of levelling systems to their initial literacy methods course, begging the question: Where are these beliefs stemming from? Literacy methods courses have the capacity to offer PSTs a deep knowledge of the phases of reading acquisition, characteristics within these phases, and pedagogical expertise to support development through these phases, providing a more robust understanding of how children develop as readers. A narrow, limited view of reading development through the lens of a levelled gradient is not the only implication of an over-reliance on these systems. Children also identify themselves as readers with reference to a level, comparing themselves to their peers—both of which have the potential to be detrimental to their confidence and belief about their identity as readers.

Learning to read is a complex process that requires teachers to have a depth of knowledge of content—the skills and strategies required for proficient reading, and of pedagogy—and the instructional approaches that best facilitate the acquisition of those skills and strategies. This depth of knowledge also allows teachers to be flexible in their approaches to adjust instruction to support struggling students skillfully. This is not a trivial undertaking. It is recommended that post-secondary institutions recognize the intricacy that is learning to read and that literacy methods courses are not only required but that the sequence of these courses is designed to facilitate learning experiences for PSTs to unpack and negotiate prior beliefs while engaging in learning opportunities to develop knowledge and application of instruction reflective of current research. "Candace" made a striking statement in a survey response: "I wish that there was a university course that provided more direction in teaching reading." Perhaps it is necessary to evaluate currently required literacy methods courses to ensure they are designed in a way that develops and builds critical knowledge of content and instruction. This study offers findings that have the potential to influence aspects of teacher education programs, including the value of surfacing beliefs and understandings and adjusting course content to address possible misconceptions about reading development and reading pedagogy.

Although the results of this study are limited in scope, the findings offer avenues for further consideration. The emphasis placed on levelling systems to define reading development and focus instructional decisions is fascinating. Future studies could unpack these beliefs and how these understandings are negotiated after completing literacy methods courses. Additionally, it is worthy of further inquiry to examine the understandings PSTs bring with them from their experiences in learning to read and how that may influence their pedagogical decisions.

Limitations

The qualitative approach to this inquiry recognizes that interpretations of the data were constructed through the insights and perspectives that I, as the researcher, carried forward to the study. It is possible that the use of the term "levels" (or variations of this term) by the participants could have held an intention different than that interpreted by the researcher. References to the notion of

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"levels" surfaced over various questions (e.g., in a question relating to assessment or a question relating to a type of instructional text), and all of the participants in the study referred to "levels" at some point in their responses.

As is the nature of qualitative research, this study's findings reflect the participants' shared understandings at a moment in time. These findings are not meant to reflect the PSTs enrolled in the literacy methods course who did not participate in the study nor generalized beyond the scope of this study.

The number of participants in this study reflected a small sample size. This research was conducted during the COVID-19 pandemic, and it was the first semester that instructors and students were forced to learn online. Site recruitment posed a challenge as many instructors were shifting courses to online platforms and felt they were not in a place to offer engagement in a study to their students. The limited participation in this study may reflect the additional factors impacting student learning and engagement during this time. Despite these limitations, examining PSTs' initial beliefs remains a generative avenue of exploration as teacher educators consider how to best prepare PSTs through meaningful teacher education courses that are responsive to PSTs' needs, and, ultimately, the needs of the students they will teach. Initial course surveys, such as the one this article discusses, are a meaningful avenue through which researchers and educators can engage in this exploration toward PST learning and unlearning.

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Appendix

1. Please use an anonymous name that you will provide on the survey. Choose a name that you can remember easily, such as the name of another family member, or a middle name. Please do not choose a non-human name as these pseudonyms will be used in the narrative portions of the study results.

   Pseudonym: ______________________

2. List ways you might assess reading development in your students in grade _____ (fill in your preferred grade here)

Preferred Grade Level

Comment

3. What are some key components you might look for when you assess reading development?
4. How will you know if your students are reaching their full potential as readers?
5. How well do you think you understand how children come to acquire reading skills?
   - Little to no understanding
   - Some understanding
   - Adequate understanding
   - Extensive understanding
6. What recommendations to parents might you have to support the reading development of students?
7. What would you consider to be key factors that support the reading development of students?
8. Finish the following statement: "Exemplary reading teachers…"
9. What will you do when a student is reading orally in a 1:1 reading context with you and reads a word wrong (also called a 'miscue')?
10. Is it good practice to immediately correct a child, in the situation above, as soon as an oral reading error is made? Why or why not?
11. Will you have your students practice unrehearsed oral round-robin reading in your classroom? Why or why not?
12. Is it important to introduce all of the new vocabulary words before students in grade ___ (fill in your preferred grade here) read a selection independently? Why or why not?

Preferred Grade Level

Comment

13. Classrooms support many different kinds of activities in teaching students to read or to be more proficient readers. Which activities do you think should occupy the greatest amount

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of classroom time in your preferred grade as identified in the previous question. Number the following from #1 (greatest amount) to #5 (least amount).

	Greatest amount of Classroom Time: 1- Greatest...5- Least
introduction of vocabulary	
setting purposes for reading	
reading (silently or with a partner)	
response to reading activities	
direct instruction of reading skills and strategies	

14. I think teachers of reading in Grade 1 should regularly:
15. I think teachers of reading in Grade 8 should regularly:
16. What role might parents have in your future classroom and/or at home around reading instruction?
17. What are some of the key routines you would have included in your literacy block?
18. Finish the following statement: 'Good readers…'
19. Look below at the oral reading 'mistakes' ('miscues') of the three readers. The word they have not read correctly is underlined, and what they read instead of that word is written above it. Which of the three readers would you judge as the best or most effective reader based on what you see here? Why?

Reader A

I live near this canal.
Men haul things up and
channel
down the canal in big
boats.

Reader B

2. candle
1. ca
I live near this canal.
Men haul things up and
candle
down the canal in big
boats.

Reader C

2. cannel
1. ca
I live near this canal.
Men haul things up and
cannel
down the canal in big
boats.

20. What kinds of things do you think are important for teachers to teach directly, in support of children's reading progress?
21. When teaching beginning readers, what type of text would you want to use to support reading development? Why?
    - "A fat rat sat. The cat ran at the rat. Sad rat."

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- "I like to run. I like to skip. I like to jump. I love to play."

Why?

22. How well do you think you are prepared to teach children to read at your preferred grade level?
    - Not prepared
    - Somewhat prepared
    - Adequately prepared
    - Well prepared
23. How well do you think you are prepared to teach struggling readers how to read?
    - Not prepared
    - Somewhat prepared
    - Adequately prepared
    - Well prepared
24. What do you feel will be your strengths as a reading teacher? What do you think you will need to learn more about?
25. In a literacy methods course, what do you value as most important learning for you as a future teacher? Why?
    - Content (what to teach)
    - Instruction (how to teach)
    - Both

Why?

26. What is your definition of reading?
27. If you were imagining your future students grown up, remembering how you supported them as a reading teacher, what might you hope for in terms of their recollections? "My teacher assisted me by…"?
28. How might someone describe your future classroom if they were observing the floor-plan and how it related to literacy learning?
29. If this required ELA course were an elective, would you have registered for it? Why or why not?
30. Do you have experiences working with children learning to read (as a parent, in the community, in a school, etc.)? What are some insights from those experiences?
31. Is there any other information about your beliefs and understandings about reading instruction and/or reading development that you would like to share?
32. Age
    - 24 or under

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- 25-30
- 31-40
- 41-50
- 50 or older

33. Do you speak more than one language proficiently?
    - Yes
    - No
34. Were you educated (K-8) anywhere other than Canada for any period of time? If so, where and for which grade levels?
35. Please list any post-secondary degrees or certificates earned:

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“Self” in Self-Study: Alongside Stories as Indigenously Understood Inquiry

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Abstract

As part of our ethical responsibilities as scholar-practitioners and community members living as uninvited guests on Indigenous territories, we engaged in a collaborative inquiry to explore ways in which Indigenous pedagogies and worldviews extend understandings of self within self-study research. Over several years, we engaged in reflective conversations about our respective tensions, challenges, and successes in the effort to decolonize and Indigenize our pedagogies and research. These conversations moved us over time to a particular orientation as we shared our life stories as educators and women. We began by documenting our experiences and reflections at each meeting and shared in meaning making how our orientations shifted to ways of being in relation. The emerging synergies of our relationality led us to name our experiences “alongside stories,” in which we made meaning of the intersections and nuances between forms of self-study research and Indigenous Ways of Knowing. In sharing the alongside stories, we re-presented our collaborative understandings of inquiry as interweavings. These interweavings allowed us to explore how our knowledge and belief systems could be intertwined and disentwined to reveal resonances and particularities. Our exploration led us to reframe inquiry and self-study as Indigenously understood.

Keywords: Indigenous, self-study, research, decolonizing, inquiry; alongside stories

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Introduction

In this paper, we intend to explore ways in which Indigenous pedagogies and worldviews extend understandings of self within self-study. In this way, we engage in self-study as a research methodology that can be informed and transformed by Indigenous ways of knowing, being, and doing. Specifically, we clarify and expand on methodologies related to self-study research, particularly in relation to those methods drawn from Indigenous Inquiry (Cajete, 1994; Kelly, 2010; Wilson, 2008). In our work, we draw upon Indigenous scholars from diverse Nations, including Cajete (1994), Kelly (2021b), Meyer (2008), and Wilson (2008), who share inclusive views of Indigenous inquiry, emphasizing storytelling (Wilson, 2008), (w)holism (Archibald, 2008), enmeshment (Donald, 2021), and reciprocal relationality (Kelly, 2016). We intend to give examples of the exploration of living well at the intersection of these methodologies and worldviews to offer a transsystemic synthesis (Battiste & Henderson, 2009) that invites us into kinship relationality (Donald, 2021; Kelly, 2021b).

The process of collaborating through self-study involved honouring our collective affinities within communities of resonance and acknowledging the role of walking alongside and witnessing one another. In terms of our research, this meant exploring our 'selves' as post-secondary educators and engaging in witnessing one another as we shared stories alongside each other. Our learning stories about our journeys towards understanding Indigenous inquiry, and how this transformed us in practice, were situated within particular places, spaces, and educational landscapes, and were contextualized within relational webs of knowing (Wilson, 2008). The nature of these unique interconnections and how they are expressed through a pedagogy grounded, literally and figuratively, in Indigenous place-based Knowledges, pedagogies and practices are explored deeply in this paper.

A central lens through which we explored the self as Indigenously understood within self-study was ethical relationality (Donald, 2009; Wilson, 2008). As Donald (2009) suggests, Indigenous Métissage promotes ethical relationality "as a curricular and pedagogical standpoint…[with] an ecological understanding of human relationality that does not deny difference, but rather seeks to more deeply understand how our different histories and experiences position us in relation to each other" (Donald, 2009, p. 6). Self-study research centres on exploring researchers' life histories and experiences in order to enact relationships that transform our perspectives, beliefs, and practices. Through the lens of ethical relationality, we [explored] our identities as educators embedded within complex webs of what it means to live on this land in the place, we now call Canada (Donald, 2009).

An important lens to situate ourselves in this work as a collective of scholars from diverse ancestral backgrounds came from the teachings of one of our authors, Vicki. We were invited to recognize our diversity of humanness without othering ourselves or each other. Our identities were not merged, nor juxtaposed, and the authenticity of our experiences was lifted rather than suppressed by our collaborative engagement with each other. This work emerged out of the spaces of learning within and between us, both individually and collectively. The inquiry we began helped us form a kinship, a relationality where we nourished our collective resonance as co-inquirers and family on this journey towards a radical re-animating, re-imagining, and re-storying of our vision of the living pathways of becoming fully human.

As teacher-educators and practitioner-scholars working within the contexts of decolonization (Battiste, 2013; Donald, 2009; McDermott et al., 2022), Indigeneity (Absolon,

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2021; Kelly, 2022; Wilson, 2008), and reconciliation (Kelly et al., 2019; Wilson & Nelson-Moody, 2019; Wilson et al., 2019), we have become increasingly unsettled by western research paradigms. The tension of paradigms that further the colonial project is one we navigate in the spaces of academia. We struggle with the potential that research might have to perpetuate othering, sever relationships, or presume that relationships are superfluous to knowledge-generation processes. Instead, we are drawn to practices of inquiry that centre humanity within (humanize) all aspects of our research, and the self is informed and transformed through engaging in those practices. This perspective aligns closely with elements of Self-Study of Teacher Education Practices also known as S-STEP (Bullock, 2017; Pinnegar & Hamilton, 2009). Here, the focus of research is on the "ontological space between self and other […] where knowledge emerges as teacher educators uncover their knowing in relationship" (Hamilton & Pinnegar, 2014, p. 156). The self-study as a form of research is a hybrid method of inquiry (Fletcher, 2019) that draws from other similar traditions, such as narrative inquiry, auto-ethnography, and auto-biographical research, but is a distinct line of research in and of itself.

For the purposes of this paper, we speak generally to the notion of self-study as a way of knowing in research aligned with S-STEP methods. Although self-study moves us closer to the decolonization of research by shifting the focus of the study from others (including students, colleagues, and/or families) to ourselves as educators in relation to practice, it is largely steeped in Western philosophical assumptions. As part of our ethical responsibilities as Indigenous and non-Indigenous educators and community members, we have a responsibility to understand research differently through an Indigenous lens.

In this inquiry, we collectively sought to better understand the resonances and distinctions between the self-study of teaching practice and Indigenous/ist inquiry. We draw upon Indigenous scholars from diverse Nations, including Cajete (1994), Kelly (2021b), Meyer (2008), and Wilson (2008), who share inclusive views of Indigenous inquiry, emphasizing enmeshment (Donald, 2021), reciprocal relationality (Kelly, 2016). To this end, we engaged in a collaborative inquiry to explore how self-study protocols and practices could be Indigenously understood. How could self-study be 'seen' through Indigenous ways of knowing and being? What language could help to 'lift up' self-study out of the Western paradigm and bring meaning to it through Indigenist language? How would this inquiry shape our research moving forward? These questions formed the basis of our inquiry and enabled us to think and imagine freely, unencumbered by Western methodological constraints.

As teacher educators, all five of us carry with us respective wisdom and lived experiences of Indigenous knowledge systems and/or self-study scholarship to our collective. Bringing our unique perspectives to bear at the intersections of these two overlapping methodological spheres provides important insights to the conversation about 'Indigenizing' research. Like the paddlers in the Hokule canoe (as discussed by Kau'i below), each author has particular capacities and ancestries, and we can rely on each other to get the canoe to where it is going and to keep it safe. And like the push and pull of the canoe on the water, together there is also an ebb and flow of knowledge sharing. If one of us doesn't know something, we can turn to our colleagues to help us understand and we can pull from our own experiences of what is being discussed. Over our four years of inquiry, our understandings have shifted and grown.

Intersectionality predisposes us to acknowledge the contentious and problematic design of education as one rooted in colonization and a historical context of Eurocentric worldviews perpetuated on these lands. Even acknowledging land in our respective institutions becomes a

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process of confronting our complicated relationships with the land and how this implicates our work as teacher educators. Acknowledging that we live on Indigenous lands means we have a responsibility to learn about settler colonialism (Donald, 2009) and its impact on Indigenous peoples. This guides us as educators and scholars toward developing ethical, caring relationships with the land, the community of humans and more than human.

To this end, our commitment to collectively explore self-study research is informed by, and interwoven with, Indigenous ways of knowing, seeing, and being in relationship with the world (Archibald, 2008; Battiste, 2010; Cajete, 1994; Donald, 2009; Kelly, 2010; Meyer, 2008; Wilson, 2008). We draw on Indigenous scholars and resources in our work, adhere to protocols when including Elders and ceremonies, and embed First Peoples Principles of Learning[1] in our teaching. Our research and practice are increasingly dependent on the stories that connect us as settlers and Indigenous people to truths about land and place. We engage in an ongoing, continuous project of learning and growing as Indigenous and non-Indigenous educators.

Against this backdrop, and as university educators who are committed to the disciplined study of our own practice as teachers, we notice important resonances between self-study methodology and Indigenous research methodologies in terms of epistemology and ontology (Pinnegar & Hamilton, 2009), as well as important distinctions. In the colliding of worldviews (Littlebear, 2000), that can be present within scholarship, the fact is that our experiences have been more of a 'weaving together' of Indigenous ways of knowing with self-study. In particular, we are curious about the potential for the field of self-study research to be understood differently through Indigenous worldviews and become enlivened by Indigenous knowing, being, and doing. Given that self-study does not privilege any particular methodology, self-study scholars attempt to remain "unencumbered by the epistemological constraints of a singular research method […] to draw as necessary from varied approaches" (Martin, 2018, p. 265). Exactly what those varied approaches, connections, and synergies are helping us broaden and unbind self-study from its Western roots. Additional questions we consider are: How have our ethical commitments towards Indigeneity, decolonization, and Indigenization, extended into the ways we reframe self-study research? How is self-study informed and transformed by Indigenous scholarship and perspectives? How can this 'learning from' Indigenous ways of knowing and being resist appropriation and remain true to our efforts for ethical relationality? What are the implications for us as teacher educators in terms of practice and inquiry?

To explore these questions and honour the ethical desire "to reread and reframe historical understanding in ways that cause readers to question their own assumptions and prejudices", (Donald, 2009, pp. 5-6), we turn to intimate scholarship (Pinnegar & Hamilton, 2015). Methodologically, this requires us to take a pause and reflect as Greene (1995) reminds us, to see "the particularities and intricacies in the lives of those who are deeply entangled in educational settings" (as cited in Strom et al., 2018, p. 2) and to become sensitive to the relational and wholistic ways of knowing and researching. Currently, limited literature exists that links Indigenous knowledge systems with epistemological and/or methodological foundations of self-study (see Markides, 2018; Martin et al., 2020), yet as scholars who are experienced to varying levels in both areas, we see significant resonances and complementarity. To resist a 'flattening' of the two

[1] First Peoples Principles of Learning were developed by the First Nations Education Steering Committee in 2012. These principles have formed the foundation for Indigenizing the Kindergarten to grade 12 education system and they are referenced in teacher education programs in BC.

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methodologies, we also acknowledge dissonances and distinctions that retexturize both in new ways. This brings us to the central question driving this study: What can we learn from Indigenously informed understandings of self-study?

Context

In 2019, a regional network of Self-study of Teacher Education Practices (S-STEP) scholars was launched as part of a sabbatical project by one of the authors. An outcome of that network was to create opportunities for S-STEP researchers to collaborate on studies of interest. At the network session held at CSSE 2019 in Vancouver, we met as a collective of five teacher educators from different institutions interested in exploring our experiences as Indigenous and non-Indigenous educators engaged in Indigeneity, decolonizing, and Indigenous pedagogies, in our respective programs.

Acknowledging the importance of S-STEP to our scholarship and practice, we recognized an opportunity to delve deeper and critically reflect on our experiences. In our initial meeting and through the early stages of the study, we focused mostly on our practices within programs, sharing particular pedagogical experiences and discussing scholars who had influenced us in our thinking towards transforming teacher education contexts. However, as our conversations meandered, we stepped outside ourselves and "looked large" (Hamilton & Pinnegar, 2014, p. 155) at our work. It was at this juncture that we came to appreciate the richness of our "coming-to-know" (Hamilton & Pinnegar, 2014, p. 159) process through discussions and dialogue about epistemologies, ontologies, and axiology, in our responsibilities as educators, scholars, and people, residing on Indigenous lands. The study moved from a focus on pedagogy to conversations about Indigenous ways of Knowing and Being prompting us to understand self-study research differently.

Lenses of Knowing

Intimate Scholarship

Hamilton and Pinnegar (2014) present intimate scholarship as an approach to self-study research that places value on the particular, acknowledges the relational, uses dialogue as a means for coming-to-know, and respects embodied ways of enacting practice. "Intimate scholarship provides a way to plug into and engage with educational phenomena that often remain hidden or ignored in other forms of research" (Strom et al., 2018, p. 4). This approach promotes individual knowing in context and within social milieus and situated experiences rather than as derived from statistics and pre-determined conceptual frameworks which can serve to mask the particularities of the experience. Hamilton and Pinnegar (2014) remind us that intimate scholarship, ontologically, pushes researchers to 'see large' and understand the whole of and wholistically that which they are studying. In contrast, they argue that teacher educators increasingly see practice as 'small' by privileging epistemology over ontology, consequently narrowing the scope of what is learned. Thus, intimate scholarship engages researchers in knowing 'self in practice' to the self in ethically relational ways. This circularity is crucial in terms of future discussions in this study.

Another lens informing our inquiry is Elder Albert Marshall's (2004) *Etuaptmumk* or Two-Eyed Seeing, described as, "learning to see from one eye with the strengths of, or the best in, the Indigenous Knowledges and ways of knowing, and from the other eye learning to see with the strengths of, and the best in, the western (Mainstream) knowledges and ways of knowing, but most importantly learning to use both these eyes together, for the benefit of all" (Bartlett et al., 2012, p. 331). While Two-Eyed Seeing practices run the risk of amalgamating Indigenous knowledge

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within colonial frameworks (Iwama et al., 202; Reid et al., 2020), we honour knowledge practices that recognize collective affinities and maintain the distinctness of the worldviews. Two-Eyed Seeing establishes the value of seeking interconnections between self-study research (grounded in Western epistemology) and Indigenous research (see Martin et al., 2020). While Indigenous and Western paradigms are not homogeneous by any means, some commonalities often are consistent across diversities. As Blackstock (2019) asserts:

> Indigenous peoples think their ancestors are mostly right; Western thought assumes their ancestors are mostly wrong or underdeveloped. Indigenous peoples believe in unified and interdependent theories; Western theories like to break things down. Indigenous peoples believe in expansive concepts of time and space; Western theories focus on one lifespan. Indigenous peoples believe all relationships matter; Western theories think only human relationships, or subsets of human relationships, matter. (pp. 855-856)

The researcher within closed systems comprehends differently and learns different things; conversely, a researcher who is not bound by the same time and space is allowed to be connected spiritually to the past, present, and future (Blackstock, 2019). Within our work, this approach of seeing from two worldviews allows researchers to gain a greater vantage of the whole. In later sections, we also raise the point made by Marshall (2004) about 'many-eyed seeing' in understanding the pluriverse of worlds within worlds (Escobar, 2020).

A third lens that we use to address our questions is ethical relationality (Donald, 2009; Wilson, 2008). As Donald (2009) suggests, ethical relationality is a "curricular and pedagogical standpoint…[with] an ecological understanding of human relationality that does not deny difference, but rather seeks to more deeply understand how our different histories and experiences position us in relation to each other" (Donald, 2009, p. 6). Given that Indigenous worldviews dispose us to consider the human relationality of our work, the potential exists to inform self-study research that centers on exploring researchers' life histories and experiences. In positioning ourselves, we reposition relationships in research to transform our perspectives, beliefs, practices, and ultimately ourselves.

Methodology

As a starting point, we employed several self-study methods, all of which align with Laboskey's (2004) criteria for self-study research: our inquiry was self-initiated, focused, interactive, and included multiple methods (Laboskey, 2004; Laboskey & Richert, 2015). In addition, the centrality of intimate scholarship in our methodological approach signalled our attention to the spaces of self-study research. Pinnegar and Hamilton (2009) suggest self-study "emerges between what we believe and how we act […] the space between our public and private lives […and] the space between ourselves and the others (present and absent) who are involved in our practice" (p. 14). Furthermore, as Beck et al. (2004) remind us, self-study is "a personal-constructivist-collaborative approach" (p. 1256), because it includes elements of an ongoing inquiry, respects personal experience, and emphasizes the role of knowledge creation in coming to know about our research and practice.

However, throughout our inquiry, we turned self-study on itself (Pinnegar et al., 2010) as we explored our question: What is Indigenously understood/informed self-study? As a result, many of the self-study methods familiar to us and commonly reflected in the research literature shifted. Through our conversations, our methods became increasingly informed by Indigenous ways of knowing that include wholistic methods of visioning, observing, witnessing, participating,

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creating, storytelling, and sharing (Cajete, 1994; Davidson & Davidson, 2016; Wilson, 2008). By orienting our learning within a wholistic method yet grounding it in the study of 'self-in-practice, we bring together or braid (Sivia et al., 2021) our stories through collaborative conversations about our teaching experiences and our own navigations of Indigeneity, Indigenization, and decolonization. The "polyvocality" (Pitthouse-Morgan & Samaras, 2015) of this collaborative research centres on the diverse voices, reflections, and experiences of each researcher while seeing strength in the "power of the we" (p. 1).

Living our Inquiry

We drew insights from personal stories, written reflections, conversations (recorded and transcribed or otherwise documented), and scholarship. The reflections served to capture moments in the diverse and varied landscapes and amorphous terrain of our conversations, at times surfacing concerns, tensions, questions, and insights about 'doing' research. Through Two-Eyed Seeing, we wove our ways of knowing and being (Edge et al., 2021) together through our diverse stories, understandings, and the scholarship of others. We shared the synergies, points of convergence, and distinctions that emerged in subsequent meetings and took notes in response. In the second year of our study, we looked back at the whole of our work and began tracking our coming-to-know processes (Pinnegar, 2011).

Integral to self-study research is the role of critical friendship (Loughran & Northfield, 1998). Schuck and Russel (2005) describe critical friends as those who provide another perspective beyond our own on our practice, facilitate the co-construction of knowledge, and challenge beliefs, so we can take risks to transform our practice. While we attended to our inner and outer arcs of attention (Marshall, 2001), noticing our own perceptions, and framing as teacher educators, as well as reaching outside of ourselves to explore nuances of difference that augmented our understanding, the practice of 'critical friendship' morphed as it came into contact with Indigenous worldviews. In our work, it manifested as what we refer to as 'alongside' storied experiences, that led to profound acts of witnessing which we explore later in our paper.

In terms of trustworthiness, our process is disciplined, even though our coming to know is itself fluid and organic. When one author shared that self-study has a way of 'tracking' (Kelly, 2013)—getting to know your footprints as you walk the path, — another author connected this to 'knowing the bear means you must be the bear and see the world from those eyes.' 'Tracking' of practice is done from an Indigenous perspective, the pathway for research can change in response and in relation to the environments, events, and contextual elements around us (Kelly, 2010). Thus, our conversations transformed from stories of teaching and researching, to recording meetings where we discussed responses to each other's insights, to our own reflections on the complexities of collaborative study.

In sharing our learning, we again honoured a Two-Eyed Seeing approach (Bartlett et al., 2012), providing both metaphoric imageries conveying meaning that is contextualized within wholistic structures (Cajete, 1995), as well as propositional and analytical writing more consistent with Western scholarship. Within our group, there was a noted difference in our practices of theorizing in this regard. As Simpson (2014) explains, within Indigenous knowledge systems, meaning "is derived not through content or data, or even theory in a Western context, which by nature is decontextualized knowledge, but through a compassionate web of interdependent relationships that are different and valuable because of that difference" (p. 11). We did this through sharing stories and thinking through a storied landscape.

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Although we all carry distinct perspectives, our ideas harmonized around particular themes through asking questions, providing examples, sharing stories, reading quotes, or creating connections. This learning is represented thematically, the sharing occurring over multiple sessions as we engaged in iterative cycles of inquiry. As guided by Vicki, we also tried to preserve the individual contributions as much as possible through 'braiding;' our descriptions were intended to honour and acknowledge the contributions of each person, and resist writing in a unified voice.

Throughout our two-year study, representing our knowledge was a challenge as the rich ideas and experiences that all five members brought to the table shifted our thinking, understandings, and practices as a group, on a regular basis. As our coming-to-know is embedded within our relationships, which were constantly evolving, so was our collective knowledge. One draft would lead to another and yet another, stabilizing our shared understandings, but only temporarily. As a living inquiry (Meyer, 2010), we have experienced that the value of our work is as much in the process of coming to know as the production of knowledge in and of itself. This draft does not reflect an endpoint but a pause in our thinking—an offering forward of what we have come to understand as grounding ideas that are reoccurring in our work.

The *un*-boxing of Self-Study

Based on our experiences, self-study can serve as an organizing force, at times akin to a bounded container or box. In actuality, the 'box' of self-study is permeable. It reminds Kau'i of the Coast Salish cedar baskets she has witnessed being used for steaming shellfish, which have both flexibility and strength allowing a flow that can affect and alter what is held inside[2]. Similarly, self-study methodologies allow for a flow between the inner and outer realms of knowing. This image of the basket required us to understand the constant hermeneutic process of knowledge extending outward and returning to the core of knowing having been transformed. This ultimately reshapes self-study as a research methodology and situates it within a worldview that can be porous to other worldviews, epistemologies, and ontologies. It also means that we see how flow, space, time, place, and energy work on our knowing.

Figure 1

Coast Salish Cedar Basket

Note. Coast Salish Squamish Valley cedar basket, woven by cedar harvester and weaver Joy Joseph-McCollough, 2021. Photo shared by the artist.

[2] Also see https://www.whatcommuseum.org/virtual_exhibit/universal_exhibit/vex19/index.htm

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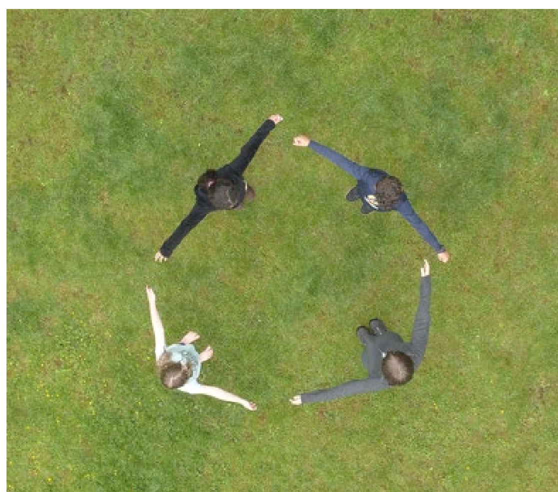
We grew and nurtured our knowledge of research out of this energetic flow and generated learning about self-study that invited Indigenous knowledge systems to flow through our 'basket' of knowing, transforming self-study in interesting and provocative ways. The woven basket also reminded us to organize, explore, and extend our findings, through weaving. Weaving is a traditional practice across all of the authors' ancestral communities, Métis, Anishinaabe, Kanaka Maoli (Hawaiian) Finnish, Scottish, and South Asian. Further, Métis scholarship (Donald, 2012; Kelly, 2021a; Markides, 2018) establishes weaving practices as a way of knowing, doing, and being. We wove together common guiding principles of self-study research (LaBoskey, 2004; Pinnegar & Hamilton, 2009), and common principles of Indigenous/ist research (Blackstock, 2011, 2019; Wilson, 2001, 2007, 2008) as we interlaced our own alongside stories that we had shared as teacher-educators working on Indigenous Lands. Through this work, we generated five interweavings, which contribute to our understanding of an Indigenously-informed/understood self-study.

Interweaving 1: Expanded Notion of Self

Figure 2

Being in Synergistic Relationships



Note. Being in relation radically changes the Western self. Photo of Cher's children and friends shared with permission.

Being in synergistic relationships is where we center our work. We see differently with our eyes, with our hands, with our hearts, with our spirits. This weaving of relationality or being in relation radically changes the understanding of self in relation to S-STEP research. This lifts the lid off self-study and changes it significantly. Within self-study research, the self is seen in relation to practice. Who we are as educators is transformed by the practice we are engaged in since, as Pinnegar and Hamilton (2011) suggest, knowledge lives in the spaces between the researcher and the researched. This view of the self from within the Western paradigm of self-study research, however, is typically understood as relatively stable, bounded, and independent, and it does not fully acknowledge the temporal fluidity, the collective self, or the one being-ness (see below) inherent within Indigenous and other cultures.

Viewed through Indigenous lenses, understandings of the self are far more expansive across time and space than what is typically explored within self-study research, exceeding a single

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embodied individual as well as one lifespan (Blackstock, 2019). Exploring the 'expanded self' or the self within a web of relations can be a much more generative and comprehensive process as informed by Indigenous knowledge systems. As Kau'i shared:

> My interactions are not bounded by self. I have become conscious that I am not doing this by myself and there are others with me. My Indigenous self cannot negate that I am still in relationship with others here, from the past and those who will come after me. Self is informed by everything including the ancestors and the more than human. I am travelling with others. (Kau'i, Meeting Notes)

Here, self is understood across time, involving cherished and sacred knowledge of ancestors and predecessors that flow forward and backward through DNA, as well as through cultural stories, songs, and artifacts. Vicki's scholarship further informs self-study research by describing the sacred and interconnected nature of our becoming in the world. She writes,

> Indigenous epistemologies acknowledge the individual journey of lifelong learning as a pathway, a sacred way of moving toward completeness or fully becoming one's potential. Through our journey toward wholeness, we are gifting our essence to the multitude of unique essences, which make up our world. This profound reciprocal sense that "We are all related, we are All related, we are all Related" is central to Indigenous ways of knowing, being and participating in the world. (Kelly, 2010, p. 83)

Through Vicki's scholarship, we understand our work as self-study researchers as attending to the resonances with and within our relations (Kelly, 2021). Cher, for example, shared a story of witnessing a car accident in which a deer was gravely injured. Informed by what she was learning about Indigenist worldviews, Cher responded differently than she might have done otherwise. She sat with the injured deer singing a song from this Land, comforted the driver, and worked relationally to contact the local Nation to properly honour and harvest the deer, which seemed unlikely to survive. This experience felt sacred and was profoundly pedagogical for Cher. She was aware of herself in relation to and as a part of, place, and others. This awareness determined the responses that followed and how these actions reverberated through the greater whole.

As Vicki explained during our conversations, from an Indigenous perspective, the self is wholistically understood as an extended way of being, the self is a verb rather than a noun. Self-study, in this regard, involves questioning what was your 'self' in that moment and developing a highly evolved presence of being. Interestingly, Awneet shared that in Punjabi, her ancestral language, there is no word for self. Instead, there is a word for community and togetherness (Sangat), a word for one-ness and one beingness (Ek Onkar), and a word for the collective light that is in each of us and the energetic resonances that everyone has with being in the world (Jhot). At this moment, Two-Eyed Seeing gave way to multi-eyed seeing (Kelly, 2022), further expanding our understanding of the practice of self-study. Paula added that the etymology of the word 'study' comes from, 'to strive toward, devote oneself to, to cultivate' (Online Etymology Dictionary, n.d.), which further resonated with our group. We shared with one another sacred moments of 'oneness we had experienced in our teaching and research that were so profound, that we felt them 'in our bones,' and considered how we contribute to pathways that enable such conditions. As Paula mentioned, 'Self-study is who you are, your being, not something you do. It is a becoming of who we are meant to be, living the work, and journeying with others. In finding that alignment, we flourish'.

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Interweaving 2: Alongside Collaborations

Figure 3

Cedar Boughs, S'olh Temexw, Stó:lō Territory, 2020

Note. This image is a reminder of the jagged edges between my identity as an immigrant settler and the Indigenous land on which I journey. The cedar boughs reach out and call me in as I walk alongside others to learn wise ways and ancestral teachings. In this journey, I strive to form relationships that support me to grow. Photo taken by Awneet shared with permission.

Foundational to self-study inquiry is the ability to step outside our unconscious frames of reference and work collaboratively with others who can challenge, disrupt, and extend our perspectives (LaBoskey, 2004). As previously discussed, often this is accomplished through critical friendships. Indigenous scholarship invites us into more wholistic models of collaboration where multiple perspectives can co-exist (Armstrong, 2013; Martin et al., 2020; Wilson, 2008). As Wilson (2008) explains,

> Say you have a fire, and you have people sitting in a circle around the fire. And you ask any person to describe the fire. While they are describing it, and you are looking at the same fire, it's not the same thing. But that doesn't mean they are wrong. They are at a different vantage point altogether. So, we say, if we share this information in the circle, we share this experience, the collective experience; we will get a bigger picture. (Wilson, 2008, p. 112)

Wilson's (2008) story of the fire moves us beyond critical collaborations to wholistic engagement with multiple perspectives, each of which is respected in their own right, to ground our exploration of practice fundamentally within a place of multiplicities of practice. Kau'i made a connection between Wilson's (2008) story and a mo'olelo, story, from her Hawaiian culture about the entity with eight different eyes, reminding people about the different ways of seeing that are embodied into one. As Simpson (2014) explains, individuals carry the responsibility for their own interpretations and qualify them in relation to their own lived experiences within their specific contexts. She states, "This is deliberate, ethical, and profoundly careful, within Nishnaabewin because to do otherwise is considered arrogant and intrusive with the potential to interfere with other beings' life pathways" (Simpson, 2014, p. 11).

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Our practice of sharing what Awneet referred to as "alongside storied experiences" is consistent with these principles. These stories were offered up to the group, not to critique or interrogate, but as lived experiences with their teachings and learnings that created resonance and interweavings as we grew in our understanding of self-study research and Indigenous ways of knowing. These stories were received in all their complexity and understood within a relational context. A key aspect of the sharing of alongside stories is what Vicki 3 refers to as "witnessing" and Simpson (2017) would call "reciprocal recognition." As Vicki explained, we spoke our truth and were received as speaking our truth. In attending to the stories we received with reverence, we lifted each other in the moment, acknowledging the dignity of each one of us, leading to greater awareness and profound insights, about our practice as educators.

Sharing alongside stories, as opposed to critical feedback, felt like a powerful pedagogical as well as methodological practice founded on deep respect and reciprocity. As Kau'i described: "It was the relationships in this circle, as people who knew each other in friendship, that enabled a good way of developing a grounding and sharing an offering. We all were all guiding and supporting and being supported and guided." For Kau'i, a Kanaka Maoli scholar, participating in this process activated understandings about being an Indigenous person and the work that she would need to do on her 'colonized self.' For Awneet, as a woman-of-colour-immigrant-settler, the more she learned about diverse Indigenous worldviews through alongside stories, the better she could understand similar practices in her own culture.

Indigenously understood self-study prompts researchers to consider who is present in our collaborations and who is absent. Wilson (2008), for example, contends that Indigenist research should unfold within the community and be supported by the Elders (see Wilson, 2007). This is consistent with Paula and Vicki's process to envision their graduate diploma program, *Indigenous Education: Education for Reconciliation* (see SFU News, 2017). They worked collaboratively with a curriculum council comprised of representatives from the host Nations, səl̓ilw̓ətaʔɬ and sḵwx̱wú7mesh, and the North Vancouver School District, to co-imagine and co-create a graduate program for practicing teachers that would advance the Truth and Reconciliation Commission's *Calls to Action* and Reconciliation through Indigenous education (Kelly et al., 2021). This program "acknowledged the ongoing invitation from the local Indigenous Communities that we all learn what it means to live on this land and walk with Indigenous people as they journey towards Indigenous Resurgence" (Kelly, 2021, p. 206).

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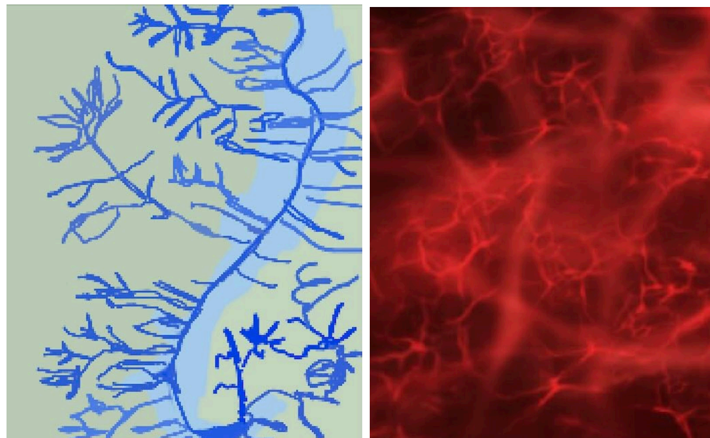
Interweaving 3: Self-study in Service of Community

Figure 4

Web of Water and Life



Note. The streams that run through our watershed and the veins that run through our bodies – we are all connected in the web of water and life. We have a responsibility to care for the Land, for each other and ourselves. As I inquire into my practice as an educator, I think about how learning serves communities and the worlds in which we inhabit, as well as the students. I have moved our learning outside and into neighbourhoods, and a large part of our pedagogy involves caring for our more-than-human teachers and the communities and places that sustain us in this work. Images by Cher's daughter, Mia McTavish.

Inherent within the goals of the self-study research is to deepen and complexify our understanding of ourselves and practice to positively impact student learning (Samaras, 2012). While there is an ethical obligation for self-study researchers to apply their learning to enhance practice (Pinnegar & Hamilton, 2014) and an assumption that they are agents of change (LaBoskey, 2004), these principles are heightened and extended when informed by Indigenous scholarship. As Wilson (2008) asserts, Indigenous research aims to "improve the reality of the people you are working with" (p. 115). During our conversations, Vicki shared how Indigenous research is enacted to be of service to others in the here and now. She stated, "An Indigenous Worldview and axiology are relational and within Indigenous relational accountability; this means we are accountable to All Our Relations" (meeting notes).

Blackstock's (2011) model was educative to us in this regard, clarifying how understandings of human development are restricted by the Western notion of the individuated self. As Blackstock (2011) explains, Maslow's theory borrowed heavily from the Blackfoot people, who understood self-actualization as actually the foundation, rather than the endpoint, of human development. Within this model, self-actualization is the base that supports community actualization, which in turn supports cultural perpetuity and the well-being of All Our Relations in the community. Understanding that S-STEP can be viewed as sacred work that serves our community that extends into the future to touch those who come after us, requires a shift, a morphing of self, from self as being the *object* of self-study research to seeing the intersubjectivities of self with place, pedagogy, and people. As Meyers (2008) asserts "See your work as a taonga (sacred object) for your family, your community, your people – because it is" (p. 219).

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Informed by Indigenous perspectives, self-study research contributes to the flourishing of communities. As Opaskwayak Cree scholar Wilson (2007) suggests, "transformation within every living entity participating in the research will be one of the outcomes of every project" (p. 195). Kau'i shared, "Land is that which feeds us. In the Hawaiian language the word for Land is ʻāina and food is meaʻai. The Land and we as people have an interdependent relationship". In this regard, Cher's focus as an educator has extended beyond the learning of her students to include the well-being of the Salmon and of local communities and of being within a place. When Elders informed her MEd cohort about the dire conditions for Salmon in the Fraser River, the class worked collectively with members of the q̓íc̓əy̓ Nation, environmentalists, educators, and foresters to work towards restoring creeks to care for salmon, as well as community relations (see Hill, et al., 2021; 2023). She continues to embed this powerful participatory pedagogy within her teaching and explores other ways to provide her students with learning experiences that are in service of the community.

Interweaving 4: Self-study as Lifting Up the Learning Spirit

Figure 5

Coast Salish Drum Created in the Indigenous Education Graduate Diploma Program

Note. Education for Reconciliation, GDE. Bucky Baker, a Knowledge Holder from the Skwxwú7mesh (Squamish) Nation gifted the teachers in the cohort with teachings on how to make a drum. Richard Wagamese (2016) teaches us that "when the drum beats it resonates beyond your body. It becomes the heartbeat of Creation as it was meant to be. To sing with it is to offer a blessing to all that is and to receive blessings back (p. 56). Singing and drumming were ceremonial pedagogies that were part of the opening and closing circle in all our Indigenous GDE classes and gatherings; Indigenous, wholistic practices that nurtured relationality, honoured the learning spirit, and attuned us all to our bodies, spirits, minds, and emotions; these practices rippled into the classrooms and served as ways in which flourishing was fostered. Photo taken by Paula and shared with permission.

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Rooted in a moral imperative to ensure just outcomes, the self-study of practice aims to be emancipatory, improving teaching, learning, and schooling (Feldman, 2004). In this era of reconciliation, educators and scholars are called to action, to foster Indigenous wholistic pedagogical pathways that honour Indigenous cultures, perspectives, and practices (Abolson, 2010). Wholistic approaches to being, relating, and educating, honour the learning spirit, nurture relationality, expand aesthetic expression, and acknowledge multiple ways of knowing (Rosehart and Elke, 2022). To re-imagine educational environments that lift the learning spirit of all learners, and indeed to acknowledge the gifts within us as people, educators, and scholars, we need to centre Indigeneity as a re-humanizing and re-spiriting axiology (Battiste, 2010). This requires us, as self-study researchers to do our inner work of "unearthing salient issues about which we care about" (Tanaka, 2015, p. 70). In responding to the call to be of service, we are responsible for using our power and privilege to resist "ingrained patterns of Eurocentric education" (Tanaka, 2015, p. 69) and to foreground Indigenous wisdom that honours all our relations (Wagamese, 2016). As we engage in this re-imagining of self-study as reciprocal relationality, we are embarking upon a journey of finding face (identity), finding heart (passion), and finding foundation (vocation) (Cajete, 1994) both for ourselves and those in our pedagogical care:

> We have to facilitate our children and ourselves in that ancient journey to find our face (to understand and appreciate our true character), to find our heart (to understand and appreciate the passions that move and energize our life), to find a foundation (work that allows us to fully express our potential and our greatest fulfillment), and to become a complete man or woman (to find our Life and appreciate the spirit that moves us). (Cajete, 1994, p. 68)

Within self-study inquiry, there is an implicit assumption that teachers mediate learning and that through advancing our pedagogical practice we can initiate improvements and changes in learning. Extending from this, teacher knowledge and positional power can be centred. This is a colonial view that serves to distance and even marginalize students from the sacred and spirit-driven learning that Battiste (2010) describes:

> What guides our learning (beyond family, community, and Elders) is spirit, our own learning spirits who travel with us and guide us along our earth walk, offering us guidance, inspiration, and quiet unrealized potential to be who we are. (p. 15)

In our thinking, the 'spiriting' of self-study of practice in the service of community, involves a shift from a focus on teaching to a focus on the practice of learning. As Kau'i shared, in her Hawaiian language, there is one word for teaching and learning. Shifting the focus from teaching to learning decentres our role as teachers, and invites others into educative encounters, including the more-than-human and the non-corporeal, a reciprocal relationship. As Awneet wrote in her reflection, "Pedagogy does not belong to a person, it's a way of interacting and relating in the world. People teach us, place teaches us."

Incorporating trauma-informed pedagogies within our teaching, can also serve to re-humanize and re/centre human 'being' and fragility in our practice as educators. We have noticed how such pedagogies are strangely absent in our schools despite provincial and national goals to heal the wounds caused by the residential school system. Teachers in our province have a responsibility to educate students about the ugly history of residential schools (see Milloy, 1999), as well as the ongoing impact of intergenerational trauma (Truth and Reconciliation Commission,

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2015). Knowing that Indigenous (and other students) may carry trauma as a result of colonial violence and oppression, however, requires something more of us as educators.

During our conversations, one of us shared a traumatizing experience for some preservice teachers when they visited a residential school and entered what was a graveyard. Those who entered the graveyard may not have understood the harm of their actions. We are learning how the normalization of colonial genocide on these Lands serves to wrap settler teachers and students in a blanket of privilege which does not prepare them/us to do the "hard soul work" (Wilson & Nelson-Moody, 2019), which is required to create accountable spaces (Ahenkorah, 2020) for all students as learners. This begs the question: How might self-study research, in the ways we are suggesting, be mobilized to re-envision schools as wholistic sites of healing (Absolon, 2010), where all children's learning spirits (Battiste, 2010, 2013; Battiste & Henderson, 2009) are nurtured and communities share responsibility for the hard soul work (Wilson & Nelson-Moody, 2019)?

Interweaving 5: Coming-to-Know

Figure 6

The Hokule'a

Note. Mau Piailug, a Satawal master navigator, trained from age five in the ancient traditional knowledge of wayfinding was asked to navigate the Hokule'a, a deep-sea voyaging canoe on its first voyage from Hawaii to Tahiti in 1976. This was a voyage that had not been done in 600 years on a pathway that Mau had never navigated. As the master navigator Mau relied on the ancient knowledge of wayfinding for which he trained, and he also held the responsibility for the canoe and the crew. He observed and brought together deep knowledge and practical information about the rising and setting of stars, the movement of the sun and clouds, wind and swell, fish, and birds. Mau, as a recognized master navigator, demonstrated rigour through the application of ancient traditional knowledge, and in his responsibility to the canoe and the crew and in turn the community. Photo by Kau'i of the Hokule'a after a worldwide voyage in 2017.

Self-study inquiry contributes to both personal and community knowledge (Samaras, 2012), and yet it is as much an ontological endeavour as an epistemological one. As Pinnegar and Hamilton (2009) assert "The basic question is actually more about *what is* than about claims to

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know" (p. 2). The knowledge that is produced within self-study research is typically understood as specific to particular contexts and inseparable from the knower (Bullock, 2011; Pitthouse-Morgan & Samaras, 2015). Here we feel a strong resonance between self-study and Indigenous methodologies, as compared to other Western research traditions. Within Indigenous methodologies, however, knowledge is situated not only within specific contexts but within webs of relationality (Donald, 2009, 2012; Wilson, 2008), and as Vicki shared, knowledge is distributed across beings. Coming-to-know is a continual process that is constantly shifting as our relational fields change. When we find ourselves in different relationships with each other, with Land, with places and spaces, it changes how we come to know, what we know and calls into question that which we presume to know in the first place. This differs from assumptions that through S-STEP research, practice will "evolve and develop in increasingly sophisticated ways" (Pinnegar & Hamilton, 2009, p. 48).

We have come to an understanding that through self-study inquiry, practice will become more responsive to place and networks of relationships. Indeed, our own coming-to-know within this group unfolded, re-turned, free fell, and snowballed in different ways as our relational context shifted from in-person to online during the pandemic, as seasons changed and our lives cycled, as the bodies of children were and are being found in unmarked graves at the sites of former Residential Schools, and as the effects of colonial roots of climate change, from biospheric and societal stressors to heat domes, fires, and floods, decimate the Land. When we understand self in relation, then place is profoundly impactful to the study or inquiry into self; it is no longer understood as separate from the web of life in which it is embedded.

Through Indigenous knowledge systems our practices of validity or quality as S-STEP researchers are expanded beyond the common criteria of methodological systematicity, significance, impact, transparency, and triangulation (Bullough & Pinnegar, 2001; Feldman, 2004; LaBoskey, 2004). Here, self-study is shifted to a deep and expansive understanding of interrelated systems. As Kau'i explained, from an Indigenous perspective "systematic observation involves an embodied sensibility, a watchfulness, and a breathing into life systems … that enables you to be able to see a lot more than what is in front of you" (meeting notes). She referenced the interdependent connections and respectful relationships between people and the more-than-human and described how changes in one aspect of ecosystems impact other aspects of systems, such as the Salmon that swim through connected watersheds. When we asked Kau'i where "rigour" lives within Indigenous research, her response was, "within responsibility." She shared:

> Pilau was the navigator in charge of the canoe during the first voyage from Hawaii to Tahiti. He held the responsibility for the canoe and all the lives in it. That required rigour in attending to all aspects of nature on his part. His bum was on the bottom of the canoe so he could feel the currents. Rigour is required when you reach that level of responsibility. It comes from the doing and the responsibility for the doing.

As we discussed, our sense of responsibility as researchers is deepened within Indigenous traditions as we must carefully examine what knowledge is worth seeking, what part of reality is worth learning more about, and what our reciprocal responsibility is, to the community moving forward.

Closing: Our 'Alongside' Stories, Relational-Knowing and Multi-Eyed Seeing

As evident through our inquiry, the richness of relationality, respect, wholism, resonance, and responsibility embedded in Indigenous worldviews can enhance Western scholarship. The process

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of collaborating through self-study involves honouring our collective affinities within communities of sharing and acknowledging the role of walking alongside and witnessing one another. We have come to understand that self-study methodologies and how we understand Indigenous inquiry share resonances, and yet, reveal a profoundly different understanding of self. We named these interweavings as expanded notions of self, alongside collaborations, self-study as service of the community, lifting the learning spirit, and coming-to-know. Indeed, Indigenous worldviews evoke an expansion of Western notions of the self that extend to the more than human, the land, and the ancestors (Donald, 2009) through connection to place, community, as well as past, present, and future generations. Indigenously understood self-study methodologies therefore shift our thinking about ethical relationality, in which we come to view our work as a sacred practice that serves our community and extends into the future, to touch those who come after us. This invites a shift from the Western understanding of the self as the *object* of self-study research to seeing the self in relation and *as* relation, intersubjectively, with place, pedagogy, and people. Further, we suggest an inextricable connectedness to place because place forms our orientation and ways of knowing, which correspondingly informs how we teach and how we engage in research.

Our inquiry also contributes to the methodology of self-study research and reminds teacher educators of "Two-Eyed Seeing" (Bartlett et al., 2012) as a knowing that honours Indigenous and Western worldviews and can lead to multi-eyed seeing (Kelly, 2021).

> Seeing with many eyes acknowledges the ways of knowing, the multiple perspectives, and the strengths of Indigenous, Western, Asian, and other cultures. It also acknowledges the need for integrative, transcultural, transdisciplinary, and collaborative work within educational praxis. (Kelly, 2013, p. 23)

Our work serves to expand on discourses and practices regarding multiple ways of knowing, and the cultivation of the relational self, self that is attuned to/with people and place.

On a personal level, this self-study has created a space for us to express and explore our yearnings, including a longing for us as educators, to 'lift up' our students as well as our own learning spirits, and attend to the repairing of colonial harm, to people and Land. Experiencing the transformation of how we understand ourselves and how we stand in relation to our praxis as educators was deeply healing for us as a community of educators. This work grounded us and carried us through the pandemic, health, and family crises, as well as profound loss. Through the sharing of our alongside stories and witnessing those of others, by 'seeing' our work through Indigenous and many 'eyes,' we experienced ourselves-in-relation, as we became part of the community, a family, and part of each other's stories.

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Preservice Teachers and School Health and Wellness

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Abstract

While health and wellness education can positively impact preservice teachers' beliefs and attitudes and the students they teach, barriers exist for preservice teachers in taking on this role, including a lack of formal education. We conducted semi-structured interviews with 11 preservice teachers to determine the perspectives of preservice teachers about health and wellness in school settings and their teacher education program. In our findings, we identified four themes, including (a) teachers are health and wellness role models, (b) preservice teachers need and want more health and wellness preparation, (c) health and wellness ought to be viewed holistically, and (d) responsibility for health and wellness comes from the top down. The themes identified suggest particular areas of need, including more information at the course level in teacher education programs and prioritizing health and wellness at the provincial, divisional, and school levels. We suggest that a systemic perspective that promotes collaboration among teachers, administrators, schools, and teacher education programs is necessary in order to ensure consistent application of evidence-based practice.

Keywords: Preservice teachers, wellness, health, health promotion, schools, teacher education

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Preservice Teachers and School Health and Wellness

There is increasing recognition that addressing wellness in schools enhances student learning and an ongoing emphasis on supporting the whole student, accounting for overall student wellness (Darling-Hammond & Cook-Harvey, 2018; Falkenberg et al., 2021; Lewallen et al., 2015; Slade & Griffith, 2013). Comprehensive School Health (CSH) approaches emphasize the importance of involving all stakeholders, including teachers, in successfully enhancing wellness so that students might "reach their full potential as learners and as productive members of society" (Bassett-Gunter et al., 2016, p. 239). Given the critical position teachers are in to impact student health and wellness (Morse & Allensworth, 2015; Ott et al., 2017), teachers' roles have expanded to include health promotion (Bryne et al., 2018). Mounting evidence that healthy students make better learners (Michael et al., 2015) has contributed to expectations that teachers not only impart curricula but act as role models and health ambassadors in schools (Vander Schee, 2009). Teachers who act as strong role models and health ambassadors who desire to champion healthy ideals within the school community recognize the positive link between health and student learning (Alberta Education, 2015; Alberta Teachers Association [ATA], 2019). This perspective is exemplified by a CSH approach that focuses on whole school health and wellness as achievable through collaborative, holistic efforts in which teachers are important contributors (ATA, 2019; Neely et al., 2020; Storey et al., 2016; Veugelers & Schwartz, 2010). Despite their crucial role, teachers have expressed discomfort with health-related content and a lack of preparation to address health and wellness in schools (Jourdan et al., 2008; Russell-Mayhew et al., 2016). It is important to understand the knowledge and perceptions that preservice teachers have about school health and wellness, given the important role that they will hold in schools as key stakeholders in improving student outcomes through holistic and integrated approaches to school health (Brann et al., 2022; Joint Consortium for School Health [JCSH], 2024).

Theoretical Background

Health and wellness concepts underlie efforts to create a supportive school ethos for student wellbeing. The definition of wellness, adopted for the purposes of this research, is taken from the Alberta Education, Framework for Kindergarten to Grade 12 Wellness Education document (2009) in which student wellness is defined as "a balanced state of emotional, intellectual, physical, social, and spiritual well-being that enables students to reach their full potential in the school community" (p. 3). In this holistic definition, wellness is viewed as a measure of health across varied dimensions.

Children do their best work in learning environments that are predictable, safe, and caring. Yet, across Canada, students grapple with mental health and social-emotional concerns that impact their well-being and school achievement (Brown et al., 2019). Vaillancourt et al. (2021) stressed that a national strategy is required that "emphasizes children's mental well-being" and that the initiative "must include 'school-based mental health' as a first step along a continuum of care pathway" (p. 1630).

While the Government of Alberta proclaimed child health a priority in 2005, "a large body of evidence points to a dramatic rise in cases of anxiety, depression, and self-harm in children (Nielsen & Amundrud, 2023, p. 342). Student health and wellness was also impacted and continues to be impacted by the COVID-19 pandemic (Government of Alberta, 2021a). In response, the government of Alberta published a guideline for schools to help facilitate a safe and caring learning environment. The document outlined a continuum of supports and services for schools

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(Government of Alberta, 2021b); one of these resources is the comprehensive school health framework (CSH), an approach that emphasizes the importance of healthy and supportive school policies that can support school communities (ATA, 2019). Empirically supported, CSH is taken up across Canada as a framework for enhancing health and wellness in schools (ATA, 2019). This approach requires the implementation of policies and practices in relation to four components: (a) teaching and learning, (b) social and physical environments, (c) policy, and (d) partnerships and services (JCSH, 2024). This approach acknowledges that schools are well positioned to influence student health and wellness and that efforts to do so must enlist the support of all stakeholders (e.g., teachers, administrators, students, parents, and community (JCSH, 2024; Storey et al., 2016). Successful CSH efforts require teachers to promote school health behaviours and wellness. An underlying principle of CSH is that healthy students are better learners and that improvement in student wellness contributes to greater student achievement (Bassett-Gunter et al., 2016; JCSH, 2024). A school with an ethos that values health and wellness will induct new teachers into positive attitudes toward the subject and into emulating the good practices that they witness (Byrne et al., 2018).

While school districts in Alberta support their teachers in meeting the goals of a CSH framework through partnerships with organizations like Ever Active Schools (ATA, 2019), teacher education programs also have the responsibility to prepare preservice teachers to meet school expectations in supporting health and wellness initiatives. Indeed, "Preservice teacher programs are ideal venues for engaging future teachers in the critical work of supporting wellbeing" (Squires et al., 2022, p. 3). Yet there remains a gap in terms of what is asked of teachers and the education they are provided in Bachelor of Education (B.Ed.) programs.

Emerging research suggests that health and wellness education for preservice teachers enhances the perceived value of this knowledge for them as they participate in practicum experiences in schools (Bryne et al., 2018; Corcoran & O'Flaherty, 2022), as well as impacts their beliefs and attitudes related to health (Russell-Mayhew et al., 2015). In turn, this knowledge has the potential to impact the health of students, schools (Russell-Mayhew et al., 2017; Brown et al., 2019; Squires et al., 2022), and the classroom environment. A link has been made between the wellness of teachers and their ability to foster caring pedagogical relationships with their students (Lawson et al., 2022). Although results suggest that preservice teachers who receive health and wellness content have more positive attitudes toward health education and their future roles as health promoters (Atkins & Roger, 2016; Bryne et al., 2012; Jourdan et al., 2008), several studies have identified barriers such as school leadership and professional development support to taking on this role (Bryne et al., 2018; Russell-Mayhew et al., 2016; Vamos & Zhou, 2009). In addition, while more teacher education programs in Canada include health and wellness content in required courses, little is known about preservice teachers' knowledge and experiences with health and wellness prior to receiving formal education in this area.

Theoretical Framework: Teacher Professional Identity

Research on professional identity (PI) has emphasized that along with the formal understanding of teaching and learning acquired as a preservice teacher progresses through their education program, PI is also influenced by a teacher's self-image and sense of professional self. A deep understanding of 'identity' development necessarily involves subjective accounts of one's world (Greenfield, 2011, p. 23); in education, a teacher's PI can be framed as the fostering of "self-descriptions" (Winslade, 2002, p. 35). Preservice teachers reconstruct views of their professional selves over

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time in relation to university instructors, classroom teachers, school environments, and the culture of teaching (Sutherland et al., 2010). However, while the creation of a PI is a career-long task, "initial teacher education is one of the periods with the strongest influence on it" (Cuadra-Martinez et al., 2023, p. 6).

Teacher professionalism is strongly influenced by a teacher education program and the program's unique profile (Beauchamp & Thomas, 2009). Program values, the "ontological and epistemological assumptions surrounding what it means to be a teacher" (Cuadra-Martinez et al., 2023, p. 7), and the prescribed program curricula are all factors in shaping preservice teacher professionalism. A PI, informed by preservice teachers' values, beliefs, and formal knowledge, has relevance for the approach that they will bring to their classroom practice. For health and wellness education targeting preservice teachers to be effective, it is critical that the content is responsive to preservice teachers' needs and fit within the existing professional program (Russell-Mayhew et al., 2017). To determine how best to address health and wellness education for preservice teachers at a liberal arts university in Alberta, Canada, this project explored the knowledge and experiences of preservice teachers as they relate to health and wellness in a B.Ed. program.

Methodology

This qualitative study sought to explore the background knowledge and experiences that preservice teachers have in the area of health and wellness through qualitative inquiry.

Qualitative research emphasizes the meaning that people bring to phenomena as a result of the experiences they have (Lincoln & Denzin, 2005). The aim of this research is to establish an understanding of preservice teachers' current views on health and wellness in school settings to determine areas of need for a curricular framework. The findings of this study will serve as a pilot project to provide essential information for future efforts to enhance preservice teachers' capacity and competencies regarding school health and wellness.

Context for the Study

Although we teach in different faculties at a small liberal arts university in Alberta, Canada, our interest in school health and wellness is an area of common concern. The first author is a white female academic in psychology whose research interests include prevention and health promotion in school settings. I (first author) entered the research with a belief in the importance of health and wellness in B.Ed. programs, given teachers' critical role as role models and health promoters within healthy school communities. The second author, a white, female, academic in education, has an interest in preservice teacher program experiences and professional identity development. I (second author) believed that the development of preservice teacher competency would be enhanced through the inclusion of course content around school health and wellness. The third author, a white, female academic administrator in education, is interested in social justice and supporting the development of wellness initiatives across provincial and national teacher education programs. We recognize that instructors in the teacher education program have a responsibility to incorporate current and effective teaching and learning practices, so an intentional emphasis on a school health and wellbeing curriculum would be a timely inclusion to the B.Ed. program.

Preservice teachers at the institution currently receive no explicit course content on understanding school health and wellness or information on how to approach this topic in schools. Two practicum experiences are offered in the first year of the program; preservice teachers

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work with one mentor teacher for both practicum experiences. The mentor teacher supports them in making explicit connections between theory and practice in a classroom setting. The practicum also gives preservice teachers the opportunity to develop a professional identity that will guide their work as a future educator.

Methods

In this research, we utilized thematic analysis (Braun & Clarke, 2006) to discover the meanings and perceptions that preservice teachers have on health and wellness in schools. Specifically, this research focused on establishing an understanding of preservice teachers' current views on health and wellness in school environments through the following research questions:

1. What do preservice teachers believe and understand about health and wellness in educational settings?
2. What are preservice teachers' experiences in relation to health and wellness in educational settings?

Participants were invited to participate in a semi-structured interview to share their current perspectives on health and wellness in schools and classroom contexts as key stakeholders contributing to whole-school health and wellness from a CSH perspective. Ethics approval was obtained from the University Research Ethics Board. Informed written consent was obtained from all participants via Qualtrics.

Participants

Information about the study was shared with 280 preservice teachers enrolled in an after-degree teacher education program. Eleven preservice teachers consented to take part in a semi-structured interview. Participants (n = 3 male, n = 8 female) were in their first year of a two-year B.Ed. program. Eight participants identified their race or ethnicity as White, one as Hispanic, one as Southeast Asian, and one as Biracial. All participants had a prior B.A. or B.Sc. degree with varying majors (2 science, 2 business/economics, 3 psychology/child development, 2 general, 1 health and physical education, and 1 undisclosed).

Data Collection

Author one and author two conducted eleven semi-structured interviews with preservice teachers who were at the end of their first year in the teacher education program. Participants were asked to share their views and perspectives on health and wellness in school contexts. The interviews were conducted virtually and lasted approximately 45 minutes. Questions from the semi-structured interview guide focused on four general areas including (a) their observations of how health and wellness are present in schools, (b) their own beliefs about health and wellness, (c) where ideas about health and wellness are derived from, and (d) how they see themselves engaging with health and wellness in schools as health promoters. Interviews were audio recorded and transcribed.

Data Analysis

Data was analysed using the steps of thematic analysis outlined by Braun and Clarke (2006; 2019). They identified six steps for data analysis, including: 1. Immersion in the data in order to become familiar with it; 2. Generating initial codes; 3. Establishing themes; 4. Reviewing and refining the themes; 5. Defining and naming themes; and 6. Producing a report that tells a story about the data. Additionally, the researchers discussed divergent perspectives concerning

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categorizations and themes to ensure trustworthiness (Elo et al., 2014). NVivo software was used to facilitate a process of inductive data analysis wherein coding is completed without a prescribed framework, and codes were derived from the data rather than pre-existing theoretical assumptions (Nowell et al., 2017).

We utilized "validation strategies" (Creswell, 2013, p. 250) to assess the interpretation of the accounts of the preservice teachers. Creswell employed this term to emphasize the process of carrying out the study rather than as a verification of findings. He identified a number of accepted strategies for researchers "to document the accuracy of their studies" (Creswell, 2013, p. 250) and suggested that researchers "engage in at least two of them in any given study" (Creswell, 2013, p. 251). In our study, we utilized two strategies: we clarified the researchers' background and bias, and we provided detailed, thick descriptions of the research themes and the participants' thoughts through individual notes and then shared discussion. To capture a detailed description of preservice teacher perceptions and understandings, we offer a detailed account of themes derived from across all interviews in order "to find repeated patterns of meaning" (Braun & Clarke, 2006, p. 86) and to make the participants' understanding visible.

Findings

Four themes were discovered through the analysis of our data including (a) teachers are health and wellness role models, (b) preservice teachers need and want more health and wellness preparation, (c) health and wellness ought to be viewed holistically, and (d) responsibility for health and wellness comes from the top down. The following is a description of these four themes.

Teachers are Health and Wellness Role Models

There was strong agreement amongst preservice teachers that they viewed classroom teachers as role models for their students. Participants generally saw their responsibility as teacher role models in a positive light. One preservice teacher noted, "If we can't display a positive mindset amid struggle as well, then how can you really expect the students to do that?" Another preservice teacher commented, "I think it starts with the teachers because they set the example."

Several participants expressed that as classroom teachers, they would aspire to be role models for their students; "I think, as an individual, and as a teacher, if my health outside of school is kept well, then I'm able to bring that into the school". This preservice teacher continued:

> If I'm deregulated, and if I'm not in a good place, how can I expect the students to [not] feel the same? So, I need to make sure that I go into work with a sound body and mind and that I'm ready to take on the unpredictability of the day.

Another participant noted that she would "love the opportunity to make deeper connections with the students and help empower them to take control of their life…help them feel empowered to make their own decisions and get involved in their own life."

One preservice teacher acknowledged that teachers she had observed were not always strong health role models, and she wondered how many opportunities students had to express and apply the health class information they received. A participant observed, "It's not really put into practice, and I think that the kids are getting the information, but they are not getting to use that information [from health class] for themselves." Preservice teachers believe that classroom teachers have an important role to play in modelling healthy behaviours that promote wellness for

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their students. The assumption is that when there is an absence of strong modelling for students by educators, it is often more difficult for them to take up healthy habits themselves.

A lack of role modelling by the school more broadly or adoption of health and wellness was something several preservice teachers commented on. They did not always see a meaningful investment by teachers in teaching about health and wellness. "Health is given a very small amount of time in schools in general." A preservice teacher described the lack of time invested in health and wellness this way, "students...they don't even get health [as a subject] every day...in my opinion, it's [health and wellness] the base of the pyramid–that should be the biggest chunk. They need to be healthy first. "This participant wanted to see teachers devote more time to health and wellness awareness. "I think that it's important that health in general is part of the every-day."

Preservice Teachers Need and Want More Health and Wellness Preparation

Although preservice teachers clearly identified the important role that teachers play in schools as role models, all participants expressed that health and wellness education was largely missing from their teacher education program. Participants expressed interest in more content on health and wellness in B.Ed. courses that would support them in their future classroom practice. One preservice teacher indicated, "We need more health and wellness classes in [the] curriculum." A suggestion for incorporating school health and wellness into the B.Ed. program was offered, "creating [a] module for wellness, and [exploring] how we can implement this [knowledge about] wellness in the classroom." Preservice teachers wanted specific kinds of information, including how to deal with students in crisis; a course that, as one preservice teacher described it, covered "fostering mental health, fostering physical health... and how the words that we use make a difference to the classroom culture." A preservice teacher declared, "I'd love a whole course on wholeness, like Human Wholeness." Another participant commented on the importance of having an understanding of mental health intervention strategies for her students. She described her interest this way; "I'm gonna deal with students who have to deal with grief or loss, depression, or anything really, so just training on how to deal with these students who are in crises. Or even students with disabilities." Participants suggested that while they received small pieces of instruction that related to topics of health and wellness, health and wellness themes were not addressed in a comprehensive manner in their professional program.

While preservice teachers identified a lack of preparation in B.Ed. course offerings, they also acknowledged that they did not readily find opportunities to learn more about health and wellness during their practicum experiences in school settings. A preservice teacher commented that "it's for the benefit of everyone, including the teacher, to maintain that positive, that wellness, that meditative type of environment in the classroom so things can work and move forward." However, several preservice teachers reported that there was a lack of focus on health and wellness topics in their school settings. This observation, "It's just...it's not there. I mean, it's there, and I'm not sure how many hours or minutes she [her mentor teacher] needs to spend on that class, but I kinda don't see it... I've never seen her teach the class," which was indicative of this perspective. Preservice teachers viewed access to information about health and wellness for students as essential support but found that these resources were not always present in school settings. The belief that health and wellness are underrepresented in teacher education programs and in school settings during practicum experiences is related to the next theme, which captures

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the belief that health and wellness needs to not just be included in formal B.Ed. courses but done so in a way that accounts for the broader spectrum of dimensions of wellness.

Health and Wellness Ought to be Viewed Holistically

Participants overwhelmingly shared beliefs that wellness is a "holistic" concept about "the mind, body, and the spirit." When discussing a holistic approach to wellness, one participant stated, "It's not just saying academics is one thing and then everything else comes second; they're saying everything in its entirety represents the student." Embedded in such conversations with participants was an agreement that schools are in a prime position to influence wellness and that it is the responsibility of educators to consider dimensions of wellness beyond academics or intellectual wellness.

Although all participants shared a strong belief in the importance of a multifaceted approach to wellness, several agreed that a fulsome understanding of wellness was lacking. Sharing about the ambiguity and lack of understanding, one preservice teacher stated, "I think that's kind of an underlying theme, but we all think of it, we all touch upon it, but nobody knows kind of what that means in a sense." This highlights the underlying notion that a comprehensive view of wellness is important but that a true grasp of the multiple dimensions of wellness is largely missing.

The lack of understanding was evident in preservice teachers' descriptions of "holistic" or whole-student conceptualizations of wellness. Participants shared views of wellness that were often reduced to one or two of the five dimensions of wellness. Notably, when participants shared what they believed to be encompassing descriptions of wellness, they often focused on physical aspects. As one participant indicated, "physical health and wellness [is] the catalyst for holistic wellbeing," placing physical health in a privileged position. Another participant described wellness in terms of the physical dimension, stating, "I would say to keep active. I think when people move, it plays a huge role... And also, healthy eating means a lot ...So yeah, moving and exercising, and eating healthy." An emphasis on physical aspects of health was also prominent in larger school approaches to wellness, as another preservice teacher noted, schools have "a body-focused health plan. So, I've seen a lot of speak about nutrition, I've seen a lot of talk about activity and being active."

Responsibility for Health and Wellness Comes from the Top Down

The critical role of administrators and those above them in educational hierarchies was identified by a majority of participants. As one preservice teacher indicated:

> When this culture is created from administration and people with more authority who take on more of a leadership role within the school, when these people set the standard and create a healthy workplace culture, then that really helps translate toward students, teachers, and support staff.

Preservice teachers expressed a belief that although the responsibility for wellness may fall on all those involved, including students and teachers, there is a "responsibility and accountability in leadership position[s]," suggesting that administration and government have greater power to impact wellness and thus, have responsibility. Another participant echoed:

> I think a little bit falls on everyone. There's some ownership on the individual who needs that support in recognizing that they do need additional support that they can't provide for

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> themselves. But then you see that it does fall on the admin, the principals, the superintendents, the government, and the higher up to ensure that policies and what is available is matching.

Others expressed beliefs that the ability to influence, and consequently the responsibility for, wellness was also greater for heads of departments who invite collaboration from those within their departments and ensure that the group shares an intended focus.

Discussion

Teachers are key role models for the students in their classes. It is generally accepted in research and practice that the role of teachers includes an expectation that they provide some form of health education (Leahy et al., 2015, p. 2). A provincial government focus on school health and wellness (Alberta Education, 2009, 2015; Alberta Health Services, 2023) signals the importance that this subject area has for student learning and educational outcomes, so provincial curriculum guidelines should prioritize health and wellness for all students. Indeed, Bryne et al. (2018) found that guidance and support from senior leaders was essential in creating a positive culture that supported health and wellness within a school community. When school boards and school districts embed school health and wellness perspectives in school and division-wide goals, procedures, and codes of conduct, a collective and collaborative approach to school health and wellness can emerge. A comprehensive framework can inform not only curricular outcomes for students but also school culture and practices that shape the perspective of everyone in the school community (Darling-Hammond & Cook-Harvey, 2018).

To better prepare preservice teachers to contribute to or address health and wellness in schools, researchers have recognized a need for education regarding teachers' role as health promoters (Bryne et al., 2018; Russell-Mayhew et al., 2012; Squires et al., 2022) and in relation to specific aspects of wellness such as mental (Greif Green et al., 2020), physical (Varea, 2018), and social (Corcoran & O'Flaherty, 2022) dimensions. Consistent with this, preservice teachers in the current study and previous research (Kendrick et al., 2024; Russell-Mayhew et al., 2012; Vamos & Zhou, 2009) expressed a lack of confidence in their ability to address health-related concerns or content and a desire for dedicated coursework in their teacher preparation programs.

Enhanced health and wellness-related preparation is critical to preparing not only preservice teachers who may choose to take on health-promoting roles in their future roles as a professional educator but also any teacher who may influence students as a role model. The potential for teachers to impart their own beliefs or attitudes regarding health and wellness, whether intentionally or unintentionally, is well-established in the literature (Parkinson & Burrows, 2020). Preservice teacher accounts suggested that they attributed responsibility to the classroom teacher to provide a positive model of good health and wellness for their students. In a larger school context, the school ethos "that values health and wellbeing" and "a leadership team that advocates health and wellbeing for all staff and pupils" (Bryne et al., 2018, p. 292) will support new teachers to develop positive attitudes towards these subjects, and so the health and wellness of teachers becomes central to the messaging that students receive about healthy lifestyles.

Finally, participants in the study also expressed a desire to approach health and wellness from a holistic perspective, or one that is inclusive of the various dimensions of wellness. Despite this, the comments shared were predominantly focused on physical (e.g., physical activity and nutrition), mental (e.g., mental health), and social (e.g., healthy relationships) aspects of wellness,

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with a comparable lack of emphasis on other aspects. A parallel seems to exist between the lack of attention preservice teachers placed on other dimensions of wellness and the paucity of research regarding those dimensions (e.g., spirituality in secular schools) in the literature.

Implications for School Health Policy, Practice, and Equity

School staff and administration, together with students and parents, are part of a connected and interactive school community. Each group has an impact on the other, and so the wellness of everyone is important. A teacher's responsibilities include the obligation to positively impact and influence their students' learning, and healthy students make better learners (Faught et al., 2017). For preservice teachers and in-service teachers to embody and promote health and wellness in schools, the larger school community must also make the same commitment. As noted by participants, these goals need to be made clear priorities by the administration and school divisions. Preservice teachers are influenced by the teaching context and school culture in which they carry out their practicum experiences (Oyserman et al., 2015). If a school does not embrace school health and wellness initiatives, preservice teachers will find it difficult to support health and wellness initiatives through their teaching in the practicum classroom and to foster the kind of values that support school health and wellness. Preservice teachers and their PI are shaped by the environment of their practicum experiences, and the values and beliefs they are exposed to in a particular school environment shape their future practice as teachers (Flores & Day, 2006). All teacher education programs should include school health and wellness concepts and resources in course programming that will offer a purposeful and meaningful way to engage with this knowledge.

Preservice teachers in this study identified a need for more information, resources, and practical application from their teacher education program. Their responses to questions about health and wellness in schools indicated that their personal values and previous experiences related to these topics had a greater impact on their approach to classroom instruction than information they had received from courses in their education program. Learning opportunities that allow preservice teachers to become more familiar with and reflect upon their teaching role and the lived experiences they had in classroom settings as they relate to health and wellness are needed. The teacher education program at our institution does not require preservice teachers to take any health and wellness courses during the two-year length of the program. This content gap is significant and leaves preservice teachers unprepared for their future role as teachers. As consistent and reliable information about student health and wellness is a requisite for meaningful student learning, theory and pedagogical strategies on the topic of school health and wellbeing should be part of course offerings in B.Ed. programs. The inclusion of this material would help to support preservice teacher efficacy and preparedness and would give preservice teachers an opportunity to incorporate health and wellness beliefs and values into their professional identity.

An already crowded teacher education program course of study creates challenges for B. Ed. programs trying to incorporate school health and wellness theory and content. While individual programs will need to examine the best way to deliver this knowledge and content for their students, the inclusion of health and wellness content signals to preservice teachers the importance of creating a positive learning environment through health promotion and improving educational outcomes for their students (Bryne et al., 2018). Without teacher education program support, the responsibility for acquiring knowledge about school health and wellness rests with the individual preservice teacher rather than the program and the larger educational community. While preservice

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teachers in this study felt responsible for addressing the role of modelling health and wellness in their practicum school experiences, they did not believe that they had the resources (knowledge and strategies) to carry out this role well. A preservice teacher's desire to understand what it means to be a teacher and part of the teaching profession suggests that the meaning-making process of teachers must be an intentional focus in teacher education programs (Gallchóir et al., 2018).

As future educators, preservice teachers will be working in a particular school culture that will hopefully support a healthy workplace environment for all teachers. However, the demands of teaching do not always allow teachers to prioritize their own health and wellness. In these cases, taking on the role of a health ambassador is not always a viable option. New teachers entering the profession "especially require additional resilience support" (Squires et al., 2022, p. 14) as the emotional work to enter into authentic and caring relationships with students requires much emotional energy. Preparing preservice teachers by providing background knowledge and tools about school health and wellness can foster confidence and support their teaching practice and professional selves.

Within the larger education community, proposed health and wellness-related teacher qualification standards and divisional priorities should reflect coherent and consistent interpretations and practices of health and wellness. School divisions can benefit from researching and adopting evidence-based health and wellness initiatives to guide teachers in taking up these efforts. This is crucial to avoiding unintentionally imparting unhelpful, inaccurate, or potentially harmful messaging or practices gained through personal experience rather than established best practices and the literature.

Limitations

The number of preservice teachers, eleven in total, who took part in the interviews was small and their responses do not represent the full range of perspectives on school health and wellness. Their comments reflect a particular moment in time in their thinking and a particular point in the progression of their study in the B. Ed. program. Notably, interviews were conducted during the COVID-19 pandemic. Although participants were instructed to reflect on the context outside of the pandemic, this may have influenced their responses.

The interview protocol collected demographic information on gender and race/ethnicity categories, however, the CSH framework that provided the foundation for our interview questions did not highlight the collection of potential data from the participants about these themes. The question of how gender and race relate to the prior knowledge and understanding of preservice teachers in the areas of health and wellbeing is a worthwhile area to examine. Additionally, the preservice teachers who responded to the invitation to take part in our study may have had a previous interest in school health and wellness that informed their responses. Further research that captures the perspectives and understanding of beginning teachers would add to the picture of how schools and teachers frame school health and wellness.

Conclusions

The findings from our pilot project identified gaps participants had in their knowledge and understanding of health and wellness in school settings. Participant comments guided the creation of a school health and wellness course syllabus. The adoption of this course will help to incorporate content on health and wellness in our program and contribute to the health and wellness background knowledge of preservice teachers. A deeper knowledge of this content will foster a

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sense of professionalism and efficacy for preservice teachers, and both these aspects will support the teaching approach they bring to their emerging practice.

Health and wellness are considered essential priorities in schools, requiring implementation at all levels of the educational system. Schools, administrators, and school board organizations play a vital role in the promotion of student health and wellness (Vaillancourt et al., 2021). As preservice teachers enter an increasingly challenging profession (Squires et al., 2022), they require program support to help them understand the significance of school health and wellness for their students. In this study, preservice teachers indicated a need for further knowledge and more resources in order to feel confident in their teaching role as a school health and wellness advocate. As such, a commitment from teacher education programs that responds to these program gaps is recommended. This knowledge will support preservice teachers as they develop their practice and will offer an opportunity to develop a confident health and wellness-promoting identity as they begin teaching in a fully professional role. Further, a systemic perspective that invites collaboration amongst and investment from teachers, administrators, schools, and the provincial education authority is necessary (Brown et al., 2019) and consistent with supported CSH approaches (McIsaac et al., 2016). Other stakeholders, such as students, parents, and community organizations, also play crucial roles in the development and implementation of whole-school approaches to health and wellness. Opportunities for further teacher growth and professional development within the broader school district will contribute to an informed teacher practice and a developing teacher identity that recognizes the significance of student health and wellbeing.

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A Teacher's Perspective on Grit and Student Success in a High School Physics Classroom

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Abstract

In a high school classroom, there are many factors that may influence academic achievement. One such factor may be due to the grit of individual learners. While much of the literature related to grit is focused on deficit ideological elements, structural elements, which are often overlooked, may also be present and could impact a student's ability to be 'gritty' and successful in school. Therefore, the purpose of this study is to understand, from a teacher's perspective, whether these structural elements, in addition to deficit elements, also impact student achievement. This autoethnographic study explores the culture of grit and student success in relation to three former students enrolled in Grades 11 and/or 12 Physics as they progress in their coursework. While deficit ideological elements exist within my autoethnographic narratives, structural ideological elements also implicate crucial moments when a student's grit and success either radically improved or declined. Consequently, for those who support learners, the argument put forth in this paper suggests that being mindful of structural circumstances is essential if educators are to use grit to reinforce achievement.

Keywords: grit, student success, high school, physics, deficit ideology, structural ideology

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A Teacher's Perspective on Grit and Student Success in a High School Physics Classroom

As a high school Physics teacher, I have always been fascinated by students who, day in and day out, make incredible strides toward success. I am often left to wonder what elements and circumstances lead to academic achievement in students. Through much contemplation, early investigation and reflection, I discovered a phenomenon called *grit*. In the study informing this paper, I sought to investigate this construct to understand how it may enhance success in learners.

It is important for me to explain why I positioned grit as the focal point of this investigation. As a second-generation Vietnamese-Canadian, growing up was not easy. I was the eldest child in a poor, single-income family. Making friends and blending into society was difficult. Looking back, I believe it was likely due to the significant cultural differences between my at-home Vietnamese culture and that of the broader society. In addition to the differing culture, all the things associated with being poor (e.g., not wearing brand-name clothes or having money to attend social functions) also contributed to this difficulty. Sadly, for much of my childhood, I experienced hardships which negatively influenced my life. This negative influence made me doubt my abilities, self-worth, and my overall confidence. I did not believe I could amount to anything.

Throughout my childhood, education was the most dominant aspect of my life. Every day, my parents pushed me to excel. They believed that if I could sustain a high degree of academic excellence, I could one day escape poverty and have a promising future. While I was initially skeptical of this view, my parents instilled a belief in the importance of taking measured steps toward a larger goal. They believed that if I put in tremendous amounts of effort, I would experience success. Eventually, my dedication, persistence, and effort paid off; I was not only able to graduate high school, but I also maintained the mindset necessary to succeed at more challenging goals, such as graduating with a Bachelor of Science in Physics and Mathematics, completing a master's thesis, and beginning a Doctor of Philosophy in Educational Studies.

In examining the phenomenon known as grit, I note that it is defined as passion and perseverance for long-term goals (Duckworth et al., 2007; Duckworth & Quinn, 2009). These scholars indicate that highly accomplished learners tend to have a high degree of grit. While much of the literature related to grit is connected to deficit ideological elements (Gorski, 2016, 2018; Kohn, 2014; Williams et al., 2020), there are often overlooked structural elements. For example, as a child, I was lucky to have two very involved parents who supported my education. While financial hardships existed, my parents made sacrifices to ensure we had the necessary money to buy notepads, calculators, or computers to be successful. However, not all families have the same privileges that I did, and consequently, this may also impact achievement. Therefore, such structural elements prove to be worthy of investigation when one intentionally utilizes the construct of grit to promote achievement in schools. As these educational scholars have identified, an overemphasis on grit can communicate that mindsets, personality, and attitudes are more important for success than the recognition of structural elements. In considering my own circumstances, if I did not have two involved parents who prioritized schooling, I do not believe I would have been at all successful. These structural elements may play a role for learners. Therefore, while one should not abandon the study of the concept of grit, the purpose of this paper is to understand how such structural elements, in addition to deficit elements, impact achievement.

In the following literature review section, I provide readers with an account of the ideological spectrum related to grit and student success. At one end of this continuum is deficit ideology, which positions itself on attributes such as mindsets, personalities, and motivation as

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factors for achievement. At the other end is structural ideology, which attributes achievement to elements such as social and familial structures, race, and income. While the study discussed in this paper examined these elements, it is conceivable that there are other significant elements at play.

Literature Review

The literature review presented here encompasses an overview related to the phenomenon of grit, which spans three main areas. The first section chronicles the notion of grit and its relationship to mindsets. This includes the exploration of Dweck et al.'s (1995) research related to entity and incremental theory. The second section describes the aspect of personality and motivation being embedded with grit. This includes the exploration of the Big Five factors and how certain personality factors may have relationships with an individual's grit. It also includes the examination of Ryan and Deci's (2000) research related to intrinsic and extrinsic motivation. Finally, the third section illustrates how social and familial elements are related to grit. In addition to understanding the structural and deficit elements related to achievement, this paper reports on research that attempts to understand the phenomenon of grit and its impact on student success within a high school physics classroom.

Understanding Grit

Duckworth was originally a teacher who also wrote the 2016 book *Grit: The Power of Passion and Perseverance*. Duckworth wondered why some students were outperforming others. In trying to understand the reasoning behind this, she compiled the intelligence quotient (IQ) scores of her students and found that some of the top performers did not have the highest IQs; in fact, some of her best performers had lower IQs (Hochanadel & Finamore, 2015). Through further investigation, however, the one quality her highest performers did possess was grit (Duckworth, 2016).

Grit was a term coined by Duckworth et al. (2007) as passion and perseverance for long-term goals. An individual can persist and overcome challenges when faced with significant obstacles and barriers. Since the introduction of the term grit, a great deal of research has been conducted to determine its legitimacy (Datu, 2021). To measure grit, a numeric score is found by using a survey with a Likert scale, as reported by Duckworth et al. (2007) and Duckworth and Quinn (2009). After an individual completes the survey, results are averaged to determine an overall grit score. Since this groundbreaking research on grit, the phenomenon has received significant attention from both researchers and classroom teachers. The question remains, however, whether grit alone can support achievement within today's classrooms.

Fixed and Growth Mindsets

One possible reason why certain individuals possess more grit than others may be due to their mindsets. In examining Duckworth et al. (2007) and Dweck et al. (1995), these scholars argued that it was not a lack of intelligence (lower IQ) that led students to failure but, rather, it was a lack of effort which caused some students to question their belief systems. As Dweck et al. (1995) identify, "people's assumptions about the fixedness or malleability of human attributes predict the way they seek to know their social reality, as well as how that reality is experienced and responded to" (p. 282). It can be said that individuals who believe that they have fixed, non-malleable qualities of intelligence are bound by *entity theory* (i.e., fixed mindset). According to Dweck and colleagues, individuals who lean into entity theory, have a worldview that is relatively stable and predictable. However, for those who believe that intelligence is malleable and can be progressively changed, these individuals follow *incremental theory* (i.e., growth mindset).

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Dweck et al.'s (1995) research illustrates that individuals with fixed mindsets tend to have less grit, less adaptability, and poor coping mechanisms. Such individuals are more likely to blame themselves for not being born more capable of achieving success. As Dweck and colleagues note, "this tendency towards global self-judgments is usually accompanied by a greater vulnerability to other aspects of a helpless reaction, such as negative affect, disrupted performance, or the abandonment of constructive strategies" (p. 275). In contrast, those who subscribe to a growth mindset, these authors believe that such individuals are more likely to attribute negative outcomes to a lack of effort and use strategies to overcome such situations.

Results of Having Grit

Research from Duckworth et al. (2007) and Duckworth and Quinn (2009) identify the success of individuals as being tied to having a high degree of grit. Consequently, individuals with a high degree of grit tend to experience greater achievements. Examples include the prediction of first-year GPA scores (Akos & Kretchmar, 2017), a greater chance of success in graduating from high school (Eskreis-Winkler et al., 2014), higher test score gains in Mathematics and English Language Arts (West et al., 2015), a reduction in absenteeism (West et al., 2015), and excellent productive behaviours from fourth to eighth grades (West et al., 2015).

While these examples provide some indication of the value of grit and its probable implications for academic success, it is worth mentioning that Duckworth et al.'s (2007) and Duckworth and Quinn's (2009) data were largely derived from specific populations. For example, Duckworth et al.'s investigation focused on cumulative grade point averages (GPA) among undergraduate students at an elite university; thus, such findings may not apply to those at non-elite institutions. Ivcevic and Brackett (2014) acknowledge this limitation in the work of Duckworth et al. (2007) and Duckworth and Quinn (2009) noting that participants were largely drawn from private schools and middle-class family backgrounds. Such a sample could obscure how socioeconomic status or systemic barriers may impact grit.

Personality, Motivation, and the Big Five Factors

In the following subsections, I will discuss how grit is tied to the Big Five factors (Rimfeld et al., 2016) which make up an individual's personality. These Big Five factors are important because each factor has a specific relationship to the phenomenon of grit. In the second sub-section, I will illustrate how grit is related to motivation.

Grit, Personality, and the Big Five Factors

In Muenks et al. (2017), the researchers demonstrate the relationship between grit and *personality theory*. There are five main attributes that make up a person's personality. According to Rimfeld et al. (2016), these Big Five factors are, "extraversion, agreeableness, conscientiousness, openness, and neuroticism" (p. 780).

To define the Big Five factors, Caspi et al. (2005) describe those with extraversion to be expressive, energetic, and sociable. Such individuals have strong positive emotions. This can be contrasted with those who are introverted; that is, quiet and reserved individuals, seldom drawn to socialize. Those who have a high degree of agreeableness (the second Big Five factor) have positive traits such as cooperation, empathy, and politeness and are willing to accept other individuals' points of view. This is contrasted with disagreeable individuals who are aggressive, stubborn, and set in their ways. Interestingly, as Caspi et al. (2005) and Poropat (2009) have

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identified, the personality traits related to openness are similar to those of extraversion and agreeableness.

Grit is found to be more closely affiliated with conscientiousness (the third Big Five factor) than the other factors (Duckworth et al., 2007; Poropat, 2009; West et al., 2015). Conscientious individuals are described by Caspi et al. (2005) and Poropat (2009) as being incredibly persistent and determined in their tasks, responsible, independent, and attentive. Other scholars have also identified conscientiousness, agreeableness, and low neuroticism (the fifth Big Five factor) as relevant factors for cultivating success (Noftle & Robins, 2007; Poropat, 2009). Interestingly, in Noftle and Robins' (2007) research, these scholars identified their surprise, finding that openness (the fourth Big Five factor) was weakly related to academic performance for college students. This aligns with Poropat's (2009) research, which found that openness and extraversion (the first Big Five Factor) have only minor effects on academic success.

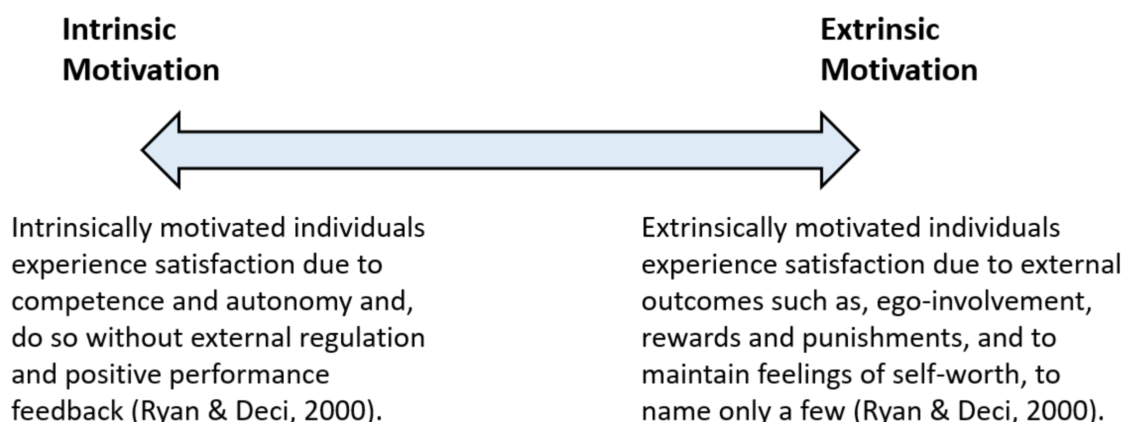
Motivation and Grit

Motivation is related to grit because individuals may be motivated by internal interest or by the desire for an external reward (e.g., social reinforcement or tangible prizes such as tokens or stickers) (Ryan & Deci, 2000; Von Culin et al., 2014). Ryan and Deci's research (2000) outlines a range of factors that impact the motivation of individuals, including resistance, perceived control, disinterest, attitude, resentment, and a lack of acceptance of the value of a task. Individual differences in mindsets are one possible reason why individuals are either motivated or unmotivated (Poropat, 2009; Von Culin et al., 2014).

According to Radl et al. (2017), degrees of motivation vary based on an individual's perceived locus of control, where "locus of control is the belief that life events are causally attributable to one's own actions" (p. 221). Intrinsic motivation is defined as "the doing of an activity for its inherent satisfaction rather than for some separable consequence" (Ryan & Deci, 2000, p. 56). As these researchers describe, intrinsically motivated individuals act not for any instrumental reason but purely for the positive experiences gained from extending themselves further.

Figure 1

The Spectrum of Intrinsic and Extrinsic Motivation (adapted from the work of Ryan and Deci, 2000)



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Individuals with a high degree of intrinsic motivation experience satisfaction through competence and autonomy, and without external regulation or positive performance feedback (Ryan & Deci, 2000). Extrinsically motivated individuals differ because the performance of an activity is used to satisfy external outcomes such as ego involvement or rewards and punishments and to maintain feelings of self-worth, among other factors (Ryan & Deci, 2000).

Intrinsic motivation is related to grit because "intrinsic motivation [is] the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000, p. 70). This quote highlights the theme of grit. In examining Von Culin et al.'s (2014) research, these scholars showed that individuals who were extrinsically motivated were less gritty than their intrinsically motivated peers. While grit is important and has gained significant attention, as indicated in Duckworth et al.'s (2007) and Duckworth and Quinn's (2009) research, it is equally important to consider that an understanding of structural elements, such as social and familial, needs to be considered as well.

Social and Familial Structures

In this section, I provide readers with an understanding of deficit, structural, and grit ideologies and how these ideologies influence educational success. I will also address other social and familial factors which may impact success, including systemic barriers faced by Black, Indigenous, and/or People of Colour (BIPOC) students, as well as income disparity, poverty, and familial structures.

Deficit, Structural, and Grit Ideologies

Despite the advances and good intentions of many educational researchers studying grit, it would be imprudent to overlook the social, racial, and familial structures related to grit and the success of students. In today's schools, students enter classrooms with unequal privileges and opportunities. These unequal power structures are sometimes overlooked or insufficiently examined.

In reviewing Gorski's (2016, 2018) research, the author examines the social structures related to grit ideology. One prominent theme in Gorski's research is the concept of *meritocracy*. Meritocracy is the belief that individuals are rewarded with opportunities based on their hard work, abilities, and talents rather than factors such as social class, family background, or wealth. It is the belief that regardless of one's positionality in society, one could, through their efforts, end up becoming Prime Minister. This idea of meritocracy also extends to the student context, suggesting that students who can demonstrate hard work and considerable effort are able to achieve positive future outcomes (Carter, 2008). Unfortunately, research from critical educational scholars reveals that meritocracy is largely a myth (Apple, 2010; Cummins, 2021; Ladson-Billings, 2021).

According to Gorski (2016, 2018), in a world of diverse educational ideologies, educators, policymakers, and researchers span different ideological spectrums. Gorski (2016, 2018) identifies deficit and structural ideologies as existing at two opposing ends of a broad spectrum, cautioning that they are not to be treated as binary concepts. For those in education who subscribe to a deficit ideology, there is a belief that students can change their success through recognition and change of attitudes, mindsets, and behaviours (Gorski, 2016, 2018), often overlooking or underestimating the significance of structural inequities. In a world marked by inequity and deeply rooted issues, such as unequal power structures, equal opportunity simply does not exist (Gorski, 2016, 2018; McIntosh, 2005). As a result, the term 'equal opportunity' serves only to obscure the existence of systems of dominance (McIntosh, 2005).

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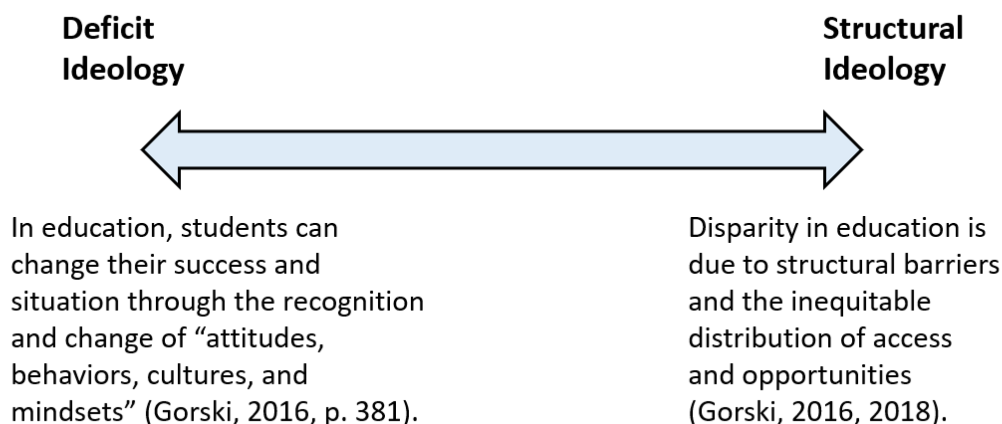
Figure 2

The Spectrum of Deficit and Structural Ideology (adapted from the work of Gorski, 2016, 2018)



As shown in Figure 2, structural ideology is on the opposite end of the spectrum from deficit ideology. Educators who identify more with structural ideology believe that disparity in education is due to structural barriers and the inequitable distribution of access and opportunities (Gorski, 2016, 2018). While there is recognition of structural barriers within Duckworth et al.'s (2007) and Duckworth and Quinn's (2009) research, the questions asked in their grit test exclude aspects of poverty, instability, and structural inequities. With that said, and as Gorski acknowledges, when individuals overemphasize grit, "we tend to attribute a student's underachievement to personality deficits like laziness" (Gorski, 2016, p. 383). Consequently, according to Gorski, grit ideology appears to lean more towards deficit ideology on the spectrum.

Systemic Barriers for Black, Indigenous, and/or People of Colour (BIPOC)

Students who identify as Black, Indigenous and/or People of Colour (BIPOC) are often at a disadvantage due to unequal power structures within a predominately White culture. The racism and other compounding oppression they face at the macro level of society are too often replicated at the micro level of the school. Unfortunately, the prevailing belief from politicians, policymakers, and researchers is that students can succeed and improve in school by focusing on changing mindsets, behaviours, and attitudes, and without significant and meaningful consideration of systemic and structural barriers (Gorski, 2016, 2018).

In examining immigrant and non-immigrant students in German schools, Hannover et al. (2013) showed that immigrant students who did not identify as part of the overall German school culture were not as successful as their native-born counterparts. The researchers describe the barriers to academic success as being deeply rooted in negative peer interactions, stereotypes in the school environment, and a vulnerability to discrimination. However, as evidenced by Hannover et al.'s research, students who can identify themselves within both ethnic and German cultures "outperformed students with purely ethnic school-related selves" (Hannover et al., 2013, p. 175). This may be due to what Carter (2008) identifies as effective cultural straddling. Students in school who are able to maintain and successfully negotiate between primary and secondary cultures while also affirming and reinforcing their cultural, ethnic, and racial identities, are likely to experience higher levels of academic success (Carter, 2008).

That said, the social environment and attitudes of people in schools are crucial for maintaining the success of students. Students who feel connected to their school and their fellow

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peers ultimately experience much more success because their social needs are met (Gore et al., 2016). In reviewing the work of Gore et al., the power of connectedness for all students is abundantly clear. Students who are able to form meaningful connections with other students, teachers, and staff, in addition to being actively involved in schools, have shown significant and positive academic results.

While some researchers have claimed that extroverted students tend to experience positive grade outcomes (Caspi et al., 2005; Noftle & Robins, 2007), new research is rethinking whether introversion is perhaps a more desirable quality (Cain, 2013). In Cain's research, the scholar describes the different mindsets, motivations and personality characteristics between extroverted and introverted individuals. According to Cain (2013), society appears to have linked extroversion to success in different realms; however, introverted individuals are just as likely to be successful.

Income Disparity, Poverty, and Family Structures

Educational performance, grit, and student success appear to be linked to poverty. Although poverty impacts all students from different backgrounds, social class intersects with race and racialized people are more likely to experience poverty. Therefore, this situation reinforces the need to consider how some students come to school with a certain set of privileges while other students come to school with few (or no) privileges. Thus, the concept of grit, without considering structural inequities, may be flawed (Gorski, 2016, 2018).

Family structures are also a major consideration when discussing wealth and poverty in today's homes. Because family resources are finite, having many children in the household often reduces the financial resources available to each child (Radl et al., 2017). It is also common for children to be raised in lone-parent households. Frank and Fisher (2020) report, "children living in lone-parent families experience a much greater likelihood of living in poverty than children living in coupled families" (p. 24). Therefore, success can be seen as closely tied to income disparity, poverty, and family structures.

Theoretical Framework and Methodology

Here, I provide readers with a brief account of qualitative research and why I chose autoethnography as my methodology. I also believe it is crucial for researchers to reveal their positionality because not only do researchers have a direct influence on how they view, interpret, and construct the world (Mason-Bish, 2019) but the researcher's use of language and how they pose questions are also linked to this positionality (Berger, 2015). Finally, I will provide readers with details on how I collected, analyzed, and interpreted the data.

Using Qualitative Research

Prior to conducting research for my master's thesis, my methodological toolbox contained only quantitative approaches. As a physicist, my entire adult life was steeped in positivism. As a physics teacher, I once believed that the positivist tradition, in which quantitative research designs exist, was the gold standard for research (Denzin & Lincoln, 2011). When the COVID-19 pandemic lockdown occurred in March 2020, my research was put on hold. It was only in June of 2020, when I had a lot of time on my hands, that I decided to investigate whether other approaches could work for me. Fortunately, at that time, I was introduced to autoethnography, and I decided to adopt qualitative approaches for my research. That monumental decision opened a whole new world of epistemological ways of thinking. The seismic shift was not an easy one for me; however, over

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time and through deep reflection, I realized that quantitative and qualitative approaches have different merits for answering different research questions.

If researchers are attempting to ascertain statistical trends and patterns, they would lean on hypothesis testing and statistical treatments for data analysis. However, as Denzin and Lincoln (2011) have identified, if a researcher wants to understand how and why questions, qualitative methods shed new light on these questions. Rather than solidifying human experiences into numerical data, qualitative researchers focus on "understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (Merriam, 2009, p. 5). Therefore, instead of doing research that aims to make generalized claims, I chose to use qualitative methods, specifically autoethnography, for my research design.

Why Autoethnography

Autoethnography originated as a merging of autobiography and ethnography (Adams & Ellis, 2012). According to these scholars, when an individual writes an autobiography, they retrospectively select and write past stories, assembling them using a recollection of memories. These researchers describe an ethnographer as someone who enters a defined culture for an extended amount of time. Such ethnographers use their observations and experiences, such as "repeated feelings, stories and happenings" (p. 201), to write a thick and vivid description of a culture (Geertz, 1973). Then, ethnographers often connect their experiences and findings to formalized research. Ultimately, as Adams and Ellis (2012) describe, ethnography aims to describe the cultural practices happening within an insider culture so that it becomes familiar to cultural outsiders. Because autoethnography exists at an intersection between autobiography and ethnography, it provides a medium for a researcher to draw upon their own experience, story, and self-narrative (Savin-Baden & Major, 2013) and to critically reflect on oneself in the context of a culture (Adams et al., 2015).

Regardless of one's practice or genre of research, critical reflection is vital for a greater understanding of future practices and actions (Hamilton et al., 2008). As a teacher, I believe deep reflection is crucial for gaining long-term success. Deep reflection compels me to re-examine past assumptions, actions, and interpretations and whether different choices may have yielded different results. As addressed by Adams et al. (2017), rigorous self-reflection is typically referred to as reflexivity since it allows individuals to identify and interrogate the intersections between oneself and one's social life. To create an environment where all my students have the capacity to be successful, the constant need for my reflexivity is vital. At first glance, autoethnography gave me a positive impression due to its ability to help me sustain this practice. Additionally, as a researcher who shares cultural membership with cultural insiders, I aim to share my findings so that cultural outsiders (e.g., people whose identity is outside the classroom setting) can better understand, from a teacher's perspective, what is happening within a high school physics classroom.

The draw to centre oneself within a defined culture also piqued my interest in autoethnography. This is because autoethnographic stories are stories positioned from an individual's self through a cultural lens (Ellis et al., 2011). As Walford (2021) claims, the careful placement of the researcher at the centre of the research is helpful in arriving at a deep sense of understanding of oneself within a culture with others.

Positionality

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The positionality of a researcher is "where one stands in relation to the other" (Merriam et al., 2001, p. 411). Walford (2021) emphasizes the importance of identifying and clearly articulating one's positionality and background when undertaking and publishing qualitative research. As this scholar asserts, without the identification of a researcher's position and bias, a reader may not be able to critically evaluate a "researcher's emotional, ethical, and personal dilemmas" (p. 34). Consequently, as Mason-Bish (2019) also affirms, not only do researchers have a direct influence on how they view, interpret, and construct the world but it is also linked to what Berger (2015) claims as the researcher's use of language and how they pose questions.

As a second-generation Vietnamese-Canadian teacher, I had to tackle many different life circumstances. I lived a childhood where I had a misunderstood sense of classism, marginalization from a dominant society, social isolation, and other systemic structures that made it incredibly difficult for me to be successful. As noted earlier in this text, my family did not have money growing up, as we lived in a poor, single-income household. Yet, while I did not have much in the way of financial resources, my parents reinforced education as a way of escaping poverty. My success came from my parents' continuous encouragement as they instilled in me a deep sense of determination and hard work.

Additionally, as a seasoned high school teacher, I share the cultural insider membership with the students that I teach. That is, these students attend the school where I teach, they come into my classroom, and they are involved with school functions. In other words, all these students interact with me on a daily basis. Therefore, I take ownership of these forthcoming stories as they are positioned within my classroom, and these stories are written through my lens and viewpoint. Such stories do not happen in isolation from me. It is important to recognize that my positionality has likely influenced my students and my decisions, as well as how I perceived certain events. Therefore, while the upcoming stories are centred on three students, their degrees of success were also influenced by my interventions, choices, and actions.

Data Collection

The purpose of this study was to understand whether the social and familial structural elements, in addition to deficit elements, also impact achievement and grit. Simply stated, I, as the researcher, was the primary participant in data collection (Savin-Baden & Major, 2013). As Adams and Ellis (2012) explain, an autoethnographic researcher retrospectively and selectively writes about their deep and meaningful experiences (i.e., epiphanies) that are made by being part of the culture through possessing a cultural identity (i.e., positionality).

Life experiences can be marked by significant events, and such events can be classified as epiphanic. Denzin (2014) describes an epiphany as a transformative moment of revelations that drastically alter the fundamental meanings of an individual's psyche. These epiphanies are important because they "encourage us to explore aspects of our identities, relationships, and communities that, before the incident, we might not have had the occasion or courage to explore" (Adams et al., 2017, p. 7). Not all life experiences are epiphanic; some experiences may be aesthetic, since, as Bolen (2014) asserts, these insignificant moments may lack transformative power.

To conduct this autoethnographic research, I took the opportunity to deeply reflect upon the hundreds of students I have taught, as well as those with whom I had meaningful stories and experiences. Ultimately, I drew upon past epiphanic moments with three of them (using the pseudonyms of Caleb, Adhira, and Violet), as my experiences with these students not only

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drastically altered my understanding of the culture of grit and student success but also contained detail, the happenings and feelings that occurred at the time, even though some of these experiences happened quite some time ago. Recalling these epiphanic moments led me to share my personal narratives in the form of story, utilizing Denzin's (2014) structure. Denzin depicts autoethnographic stories similar to those of performances. People are depicted as characters within a scene or context where the story is told in chronological order (Denzin, 2014). An epiphany or dynamic tension occurs between characters, which eventually leads to a point or moral of a story that gives meaning to an experience (Denzin, 2014). Consequently, to create these stories, I utilized Geertz's (1973) notion of thick description. Drawing on these two sources was an intentional act on my part, as I wanted to engage readers by creating a sense of "being there in the moment" (Adams & Ellis, 2012, p. 3). Thick descriptions provide a sense of verisimilitude, making it feel 'real' to a reader and, in doing so, promote a deeper understanding of the stories and experiences being told (Adams et al., 2015).

Introducing the Students

In teaching Caleb, I recall that my experiences with him were negative. The two years that I taught Caleb were among the most difficult experiences I faced as a high school teacher. He came from a low socioeconomic, single-parent household. Through the daily behavioural issues and challenges, I often butted heads with him. Every day was a challenge, and often I felt let down because many of my interventions, such as building rapport, providing him with treats and rewards, or enforcing disciplinary consequences, failed. At some point, I gave up on him, and that was a difficult thing for me to do. However, when there is adversity, there is also often opportunity. During the height of the COVID-19 lockdown, he slowly changed his behaviours and, each day, worked very hard to be successful. He made it a point to overcome all odds and adversities in his life and, as a result, significantly turned around and ended up far exceeding his original goal of simply passing. What led him to this turnaround was important to my understanding of success.

In the past decade, I have taught many first/second-generation Canadians. I chose to write here about Adhira because, through our conversations, it seemed her upbringing closely resembled my own. Adhira was a very hard-working and determined student. She gave me every indication that she would be a gritty student. For example, she was always conscientious, ambitious, and self-motivated to succeed. Although she experienced a high degree of success, her success looked as if it was tied to her parents. At some point in Adhira's Grade 12 year, her grades started to decline. She missed several classes, was inattentive in class, and often displayed a lack of focus on certain tasks. I originally believed it was what some Grade 12 students refer to as having 'Senioritis,' a feeling identified by students as having a lack of motivation because they were reaching the end of their high school experience. However, for Adhira, this was not the case. Adhira's role as a translator, advocate, and support person for her parents was something I had not considered. Due to this role, many unknowns appeared to negatively impact Adhira's schooling. For example, on the days she missed classes, I learned that she acted as a translator with doctors when her parents faced significant health concerns. This reality would appear to conflict with my initial assumptions about Adhira's situation and, consequently, led me to consider the structural inequities that may exist behind the scenes. It was this reflection that led me to select Adhira as part of my research autoethnography. It is my view that parental expectations, students' mindsets, and the relationships developed between the student, educator, and school have very profound impacts on student success.

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When Violet first came into my class, she appeared to exhibit many signs opposite to grit. While she tried her best to be successful, she showed signs of agitation, anxiety, and stress when completing assessments, frequently expressing self-doubt and often becoming irritated by not remembering general concepts. It was Violet's self-defeating words and attitudes that sometimes caused her to experience major setbacks in achieving academic success. Although it was likely unintentional for her to hold these self-defeating attitudes, they appeared to be linked to possibly unrealistic parental expectations that contributed to her negative sense of self. In other words, Violet's success was not necessarily related to changing her own mindset and beliefs, but instead changing her mother's mindset and beliefs around the idea of success. It was this change that ultimately led to Violet becoming one of my top Grade 12 Physics students. Overall, a major part of my understanding of grit and student success came from Violet. To this day, her difficult journey and her turnaround bring me great satisfaction. The experience demonstrates to me how her persistence and effort ultimately paid off in the end.

Data Analysis and Interpretations

To initiate the analysis of my stories, I began interpreting each epiphany and aesthetic event by assigning codes to the data. "Codes tend to be based upon themes, topics, ideas, phrases, and keywords" (Savin-Baden & Major, 2013, p. 422). I had a rationale for why I assigned codes to each event: Coding helped me sort clues and connections between each string of text, which would later allow me to compare and contrast during future interpretations and analyses. After I coded the entirety of the stories, I began the process of cutting, which Savin-Baden and Major (2013) refer to as snipping texts into small, meaningful segments. I looked at cues between these stories. Oftentimes, certain keywords stood out; other times, it was the similarities between the events. Based on this strategy, certain themes emerged. These themes included personality, motivation, perseverance, passion, cultural circumstances, familial structures, social structures, and income disparity.

As I continued the process of cutting, I noticed that most of the themes emerging in my data were also explored within the literature and discussed previously in the literature review of this paper. Essentially, as addressed by Adams and Ellis (2012), I connected my experiences from the narratives to the existing research and, in doing so, used the literature review to "interrogate the meaning of [the] experience" (p. 199). Therefore, the literature acted as a filter to support my interpretations; however, "the key [was] to ensure that these frameworks do not force interpretations but [merely] serve as a way to view them" (Savin-Baden & Major, 2013, p. 457). In other words, these authors propose that if interpretations contradict existing research literature, such interpretations are important to state as a possible contribution to new knowledge production. As such, what made autoethnography a powerful choice was the ability to either elaborate and critique or extend knowledge in relation to existing research (Adams et al., 2015). This was particularly valuable to me because, through this research, I could determine whether my "theory supports, elaborates, and/or contradicts personal experience … [and whether it] provides a foundation on which to elaborate or provide a counter narrative to the meanings and implications" (Adams et al., 2015, p. 94) involved.

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Autoethnographic Reflections and Discussion

It is important to clarify that these autoethnographic stories are from my point of view. Because these stories are filtered through my lens and my positionality as a high school Physics teacher, positioning this section as an autoethnographic reflection is appropriate, as the data are not fully supported by external sources (i.e., student input). In this section, I provide readers with my personal interpretations through the lenses of deficit and structural ideologies. In the deficit ideology section, I connect my analysis to grit, mindset, the Big Five factors of personality, and intrinsic and extrinsic motivation. In the structural ideology section, I connect my analysis to the implications of social, income, and familial structures.

Deficit Ideology

Grit, Mindset, and the Big Five Factors of Personality

The three students in my autoethnographic stories achieved varying degrees of success, and while success is not a fixed bar that everyone must reach, it remains a fluid and ever-changing goal. Research suggests that students with higher levels of grit tend to exhibit qualities such as ferocious determination, conscientiousness, self-control, sustained effort, and a strong ability to persevere when challenges arise (Duckworth et al., 2007; Duckworth & Quinn, 2009; Muenks et al., 2017). Although my students Caleb and Violet initially displayed few, if any, of these qualities, over time, both began to exhibit several of these traits. Grit appeared to change daily for these students, depending on the ongoing circumstances each student faced.

Personality also played an important role in influencing grit. When Caleb and Violet first began physics class, both exhibited many fixed-minded traits. They showed signs of poor coping mechanisms, frequently blaming themselves or others, and appeared neither resilient nor adaptable when physics questions were slightly altered from their practice questions or when new topics were built on from previous concepts. Adhira, on the other hand, demonstrated many growth-minded traits, including taking responsibility for successes and failures, a willingness to accept challenges, and the ability to turn areas of weaknesses into areas for growth.

Grit is found to be closely associated with conscientiousness, more so than the other Big Five factors (Duckworth et al., 2007; Poropat, 2009; West et al., 2015), which reflects Adhira's experiences. From the outset, Adhira had the appearance of several conscientiousness traits, as described by Caspi et al. (2005) and Poropat (2009), including being self-motivated to learn, highly inquisitive, and actively taking control of her learning by seeking further enrichment for future growth. Her success was consistent throughout Grades 11 and 12, although her familial difficulties did impact her conscientiousness.

Given that conscientiousness is significantly tied to grit, literature from Noftle and Robins (2007) and Poropat (2009) also indicate that agreeableness and low neuroticism are contributing factors. This aligns with what Caleb and Violet demonstrated in class. I observed that both students were notably vulnerable to anxiety and stress. However, with my interventions and support, both appeared to be coping much better; their stress seemed significantly reduced, and they began to display traits associated with conscientiousness. While the success of all three students might suggest a connection to extraversion, I observed that Violet was successful despite being strongly introverted.

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Implications of Intrinsic and Extrinsic Motivation

At the beginning of the Grade 11 Physics course, I noticed that both Caleb and Violet exhibited a low grit, poor academic performance, and a fixed mindset. I initially thought these attributes would negatively impact their long-term academic success. To address their fixed mindsets, I decided it was important to examine what motivated Caleb and Violet. For Caleb, his journey in Physics seemed particularly challenging. He appeared to be motivated by extrinsic rewards, which encouraged growth, though often temporarily. In contrast, both Adhira and Violet were not extrinsically motivated like Caleb.

I needed to offer frequent positive and meaningful reinforcement to encourage and motivate both Caleb and Violet's self-worth. Through these supportive verbal affirmations, I aimed to strengthen Caleb's and Violet's sense of self-worth, and through this process, I observed that their stress level decreased, they became less agitated, and they showed signs of educational satisfaction. Over time, as evidenced by their gradual but steady growth, they were motivated to take on small yet challenging goals.

Ryan and Deci (2000) note that feelings of self-worth are linked to internal regulation, since such feelings are connected to extrinsic motivation through an external locus of control. Cultural influences are another external locus of control that need to be recognized. Although Adhira was pleased to receive positive reinforcement, I believe the primary motivation driving her to success was her Indian culture. When Adhira and I spoke about the commonalities between our cultures, Adhira shared that failure was not an option and, therefore, there was always this continuous pressure to succeed through effort and hard work. My experiences with Adhira in relation to this research suggests that as researchers deepen their understanding of human differences, diversity, and equity, these perspectives become essential for investigating students' grit and achievement. As it can be for many learners, success looked to be addictive for Caleb, Adhira, and Violet. As these three students experienced higher levels of academic success, they began to act with a sense of independence and autonomy, which gave me the indication that it reinforced their internal locus of control and, therefore, promoted a high degree of intrinsic motivation (Ryan & Deci, 2000). Caleb began to develop many intrinsically motivated traits when schools shifted to an online learning approach due to the COVID-19 pandemic. Caleb controlled his environment. He did not have to worry about others watching him; he could regulate his own pace and progress, and no longer needed to be micromanaged. Through such independent actions, he achieved significant academic success.

Like Caleb, Violet began to experience even more substantial growth and success as she adopted more independent actions, initiatives, and proactive strategies toward completing minor assessments, such as probes, and major assessments, such as quizzes and tests. Through these efforts, she not only improved in areas where she previously had deficiencies, such as gaps in content understanding, but she also became one of the highest-achieving students in Grade 12 Physics.

The greatest strides in all three students' successes stemmed from their independent actions and autonomy. I noticed that for Caleb and Violet, extrinsic motivators became less important, with intrinsic motivators eventually taking over as a primary driving force for their significant transformations. Although Adhira continued to face challenging familial issues, she moved toward success through her own intrinsically motivated choices (e.g., willingness to extend her abilities, seeking out enrichment opportunities, or leaning on peers for assistance). From my perspective as

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her teacher, this represented a major shift for Adhira. Her efforts to manage both her academic responsibilities and her parents' health circumstances demonstrated to me a high degree of grit in both her academic and personal realms.

As Caleb, Adhira, and Violet developed progressively stronger intrinsically motivated traits, they displayed a high level of grit as defined by Von Culin et al. (2014). It is worth noting that, without the extrinsic motivators to initially stimulate and drive Caleb's and Violet's successes, they may have struggled to succeed in Physics. Finally, before moving into the structural ideology section, I wish to remind readers that these autoethnographic stories are presented from my perspective as a Physics teacher. It is possible that others with different positionalities might draw alternative conclusions.

Structural Ideology

In this section, I will connect my analysis to structural ideology; that is, the implications of social, income, and familial structures.

Implications of Social Structures

It is a reality that some students enter school with a certain set of privileges when compared to others. Consequently, it can be suggested that social, income, and familial structures are ongoing elements that impact grit and student success for these three students and many others. Prior to this research, as a teacher, I was involved in many school-led strategies and interventions to address student failure and learning deficits. In relation to the deficit ideology discussed by Gorski (2016, 2018), I noticed that although addressing learning deficits helped some students, I do not recall it significantly improving my students' academic skills overall. In fact, for some students who showed brief improvement, others quickly reverted to their original routines. Given my experience doing this research, I now believe it is vital to consider the negative implications that structural deficits such as poverty, familial structures, race, ethnicity, culture, and social status have on students. By addressing deficit ideology solely by promoting grit through changes in personality, work habits, and effort, structural deficits are likely to be, consciously or unconsciously, overlooked.

In my experience with these three students, social structures played varying roles, depending on the individual. Although Violet was socially isolated and did not have other peers to rely on for help, it did not appear to have a major impact on her success. Even at her highest point of academic success, Violet socialized very little. For Caleb and Adhira, however, their contexts were significantly different. One of the significant elements that negatively impacted Caleb's grit and academic success was his difficulty in forming meaningful and strong relationships with other students in the physics class. Hannover et al. (2013) describe one barrier to academic success as negative peer interactions. While some social bonds already existed among students, Caleb did not seem to have connections to many of them.

Adhira's situation was different, as she was culturally straddling between two cultures. This likely impacted Adhira's grit and success in physics. Due to Adhira's ability to adapt and move between her insider and outsider cultural identities, she was able to form meaningful connections and minimize negative peer interactions.

While Carter (2008) uses cultural straddling in the context of racial and ethnic heritage, I believe this concept can also apply to Caleb. Caleb appeared to struggle significantly with adapting and balancing between the culture of his social group and that of the physics classroom. In class,

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it seemed Caleb aimed to maintain an appearance of toughness and avoid showing vulnerabilities, even at the cost of his academic success. Perhaps, within his social group, being perceived as smart was at odds with the image of being ‘cool,’ and excelling in school might have diminished his social standing. It is important to recognize that while the COVID-19 pandemic necessitated Caleb’s shift to online schooling, it effectively removed the issue of cultural straddling. Once Caleb participated in online schooling, I noticed major strides in his grit and academic success. I believe this progress had occurred largely because Caleb could avoid social pressures and keep his academic achievements private from his peer group.

Implications of Income and Familial Structures

Family income is also known to have substantial impacts on individual student’s success, especially during the COVID-19 pandemic (Alvarez-Rivero et al., 2023). Caleb was an only child, living in a single-parent household. I believe he experienced significant economic disadvantages, as demonstrated by how he came to school each day with limited learning resources. While many students had the latest technological gadgets, Caleb used a broken but still functional, older-generation iPhone. He lacked access to a laptop, which created challenges for enhancing his at-home learning. The COVID-19 pandemic highlighted significant economic disparities among my students. Those with abundant economic resources (e.g., access to the Internet and a computer) maintained or even improved their academic performance, whereas students with little to no resources suffered. This aligns with the findings of Alvarez-Rivero et al (2023). For Caleb, if he had not had access to the public Internet or his iPhone, he would likely have failed. This contrasts with students like Adhira and Violet, who came to school every day with the necessary resources needed for success. Therefore, students with privileges, such as adequate resources, have a higher likelihood of experiencing sustained success.

Family dynamics also play a critical role in grit and student success. In examining Violet’s story, parental expectations may have played a key role in her sense of self-worth, possibly impacting Violet’s high levels of agitation, stress, and frustration. It seemed that Violet derived part of her self-worth from what the important people in her life thought of her. While Violet’s mother wanted Violet to excel, the constant pressures, high expectations, and perceived parental disappointment appeared to weigh heavily on Violet. Although it was not just one factor that led to Violet’s overwhelming success, I believe part of her academic progress was connected to her mother’s changing ideas about what it means to be successful. It might be reasonable to suggest that when Violet’s mother’s mindset shifted, parental pressure and demands may have lessened. As a result, Violet exhibited a much happier, stress-reduced attitude, possibly because she no longer had to worry about what her mother thought of her.

For much of her time in Grades 11 and 12, Adhira maintained a high degree of academic success. However, the moment her parents became ill and needed Adhira as a translator, everything abruptly changed. I observed that Adhira’s greatest barrier to her grit and academic success was the difficulty she experienced balancing both her scholarly commitments and obligations to her sick parents. In many instances, she had to assume an adult role in her family while simultaneously trying to complete her academic studies. It was likely she was overwhelmed and worried due to the responsibilities placed upon her. As a result, she frequently missed class or arrived late. Adhira’s story demonstrates that uncontrollable elements, such as family dynamics and parental obligations, can have negative impacts on students’ academics, grit, and chances of high-level success. In my view, if Adhira’s parents had not depended so heavily on her, I strongly believe she would have maintained her upward trajectory of growth and academic success.

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Through stories like those of Adhira and Violet, it is reasonable to claim that familial dynamics played a contributory role in their grit and success. From my observations, I believe Caleb lived in a family where economic barriers existed. I experienced many failed attempts to collaborate with Caleb's mother in supporting him, even though I believe that her inability to do so was for legitimate reasons. In my experience as a high school teacher, I have never met a parent who did not care about their child's education. While Violet's and Caleb's parents offered different levels of support, I noticed how significant parental guidance and involvement can be in steering students onto a pathway to success.

Discussion

In a world of different educational ideologies, educators, policymakers, and researchers exist across different ideological spectrums. For Gorski (2016, 2018), deficit and structural ideologies exist on two ends of a wide spectrum and should not be treated as binary concepts. In education, educators who believe in deficit ideology believe that people can change their success and situations through the recognition and alteration of attitudes, behaviours, and mindsets. On the other end of the spectrum, educators who identify with structural ideology believe that disparity in education is due to structural barriers and the inequitable distribution of access and opportunities (Gorski, 2016, 2018). As Gorski noted, grit aligns more closely with deficit ideology.

Throughout this research, the three learners within these stories appeared to have their grit change daily depending on the ongoing circumstances that each student faced. Consequently, deficit ideological elements such as personality, mindset, and motivation played important roles. For example, in my view, the personality traits from the Big Five factors which gave the impression of significantly influencing grit were conscientiousness, agreeableness, and what Rimfeld et al. (2016) identify as neuroticism.

Another important attribute influencing my students' grit was whether they had indications of fixed or growth mindset traits. From my viewpoint, when some of my students leaned into a fixed mindset, they gave the indication that they were not as adaptable to different circumstances and, consequently, displayed poor coping mechanisms. As Dweck et al. (1995) illustrated, such individuals with fix mindsets tend to have less grit because they often fault themselves for not being born more capable of achieving success. Through my support and interventions, my students eventually responded and slowly embraced a growth-minded attitude. This adoption of a growth mindset was essential because, as these authors have identified, such individuals would likely blame their negative outcome on a lack of study commitment and effort.

In investigating motivation and its relationship to grit in my classroom, I noticed that different motivators had varying levels of impact. While I offered small prizes as extrinsic rewards, they were often short-lived. What had the most impact on my students was addressing and reinforcing their sense of self-worth. To do this, I frequently provided positive and meaningful reinforcement, not only to sustain achievement but also to minimize their vulnerability to frustration, stress, and agitation. Eventually, through such sustained efforts, I began to see my students take even more responsibility through independence and autonomy. As a result, my students required fewer extrinsic motivators because they indicated to me that their apparent success was what drove them to succeed at even harder goals, thereby reinforcing their grittiness.

It should be noted that while cultural influences may be perceived as a structural ideological factor, for one student (Adhira), cultural influences also acted as a relevant external

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locus of control. Therefore, it appears that, as we deepen our understanding of human differences, diversity, and equity, these perspectives need to be considered.

Depending on the student, social structures seemed to play differing roles. In one case (Caleb), a student's inability to form meaningful and strong relationships with other peers may have negatively contributed to their academic success. However, in the case of another student (Violet), success did not hinge on making social connections because, at this student's highest point of academic success, they did not socialize with many individuals. This highlights the issue of students potentially culturally straddling between dominant and non-dominant cultures. As was the case for one student in my autoethnographic story (Adhira), ethnic students who are not from the dominant culture may need to negotiate between dominant and non-dominant customs, attitudes, and practices to be successful in school. Outside of ethnicity, it could be the difficulty associated with straddling the cultural codes between social groups that conflict with the culture of scholarly success.

In any society, students arrive at school from different types of households. Students who arrive with limited financial means may experience this limitation as a detrimental impact on success and learning, as evidenced by one of the students in my autoethnographic story (Caleb). This was particularly evident during the COVID-19 pandemic when the shift to online learning occurred. For students with the financial means to access the Internet and technology, they continued with online learning. However, those with limited access likely struggled to participate in schooling. As investigated by Alvarez-Rivero et al. (2023), this disparity was evident for children from different socio-economic classes throughout the United States and Canada.

Within different households, diverse family dynamics play a critical role in grit and student success. While well-intentioned, some parents may be too invested, which may consequently contribute to a child's anxiety, agitation, and stress. This was the impression I had with one of my students in this research (Violet) because, as the constant pressures continued, I believed it negatively impacted their sense of self-worth. However, in supporting parents and redefining their supportive roles, such actions likely facilitated a better pathway to reinforcing a child's sense of self-worth, grit, and ultimate success. It is important to consider that, for some students, parents may not be involved for a multitude of legitimate reasons. Educators must not resort to deficit ideological thinking (i.e., parents do not care about their child's education). In my experience, I have not encountered even one parent who does not care about their child's education. This thinking applies to two of the students in this story. One student lived in a single-parent household (Caleb), while another student's parents did not speak English and always required a translator (Adhira). As both stories reveal, there are structural implications at play.

Culturally, in Western society, there is a narrative which focuses on the individual and, as a result, the issue of meritocracy prevails. Subsequently, it could be said that meritocracy is embedded into society's mindset (Gorski, 2016, 2018; Ladson-Billings, 2006, 2021; Williams et al., 2020). What initially came across as a way to address inequities in society (e.g., an individual's failings) has now become a justification for such. Therefore, the perception is that if individuals put in tremendous efforts, they could, through these efforts, end up being successful at addressing inequity. Sadly, such a meritocratic view also extends into the student context, as the view holds that if students can demonstrate hard work and considerable effort, they could also achieve positive future outcomes (Carter, 2008). While this may be true for some students, for others, it may not be the case.

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An idolization of meritocracy can be damaging and dismissive of the very real issues students face. While I do not suggest that educators abandon addressing effort and hard work, there are concrete justifications as to why educators also need to take structural elements into account. As illustrated by my autoethnographic reflections in this paper, structural considerations have an influential role to play. As a practicing teacher, when supporting struggling students, I now take both deficit and structural elements into consideration; I use such knowledge to facilitate a pathway to support my learners, providing them with the greatest chance to improve their grit and achieve a high degree of success.

Conclusion

This research was limited to three learners. As a qualitative methodology, the purpose of this autoethnographic research was not to generalize findings to the entirety of a population. However, this medium was a space for me to elaborate on, critique, and extend knowledge from existing research (Adams et al., 2015) concerning my experience as a Physics teacher. Interpretations within this research were filtered through both the literature review and my own positionality. As Mason-Bish (2019) affirms, this positionality ultimately influences how I view, interpret, and construct the realities within my classroom, as well as how I interact with my learners. Researchers with different positionalities may have arrived at different conclusions. That said, because autoethnography is a qualitative methodology, qualitative approaches embrace the multiplicity of plausible truths within the universe (Denzin & Lincoln, 2011).

My experiences teaching Caleb, Adhira, and Violet suggest that changes are needed in K-12 education. Given the number of students who do not graduate high school, have lower-than-expected grades, or are disengaged in today's classrooms, attention must be given to addressing the disconnect between students and schools, with the aim of improving students' sense of self-worth, developing their personality profiles, and building on gritty traits. For too long, I have struggled with the widening achievement gap related to student success within my physics classroom. I have tried to find ways to progressively change my teaching practice through reviewing current educational research. However, few topics ever piqued my interest until the research on grit came along. Prior to doing this research, I held the belief that if learners could embrace grit, they would eventually have the capacity to experience success. However, as this research brings to light, when addressing student achievement, it is vital not to dismiss the elements related to structural ideology. Because students exist within unequal power structures (e.g., social, income, and familial), these structural elements also need to be addressed to promote conditions of academic success.

Ultimately, in a world where there is an uneven playing field, it would be short-sighted to focus purely on grit ideology as a way of fostering academic success. Since grit ideology is dominated by deficit ideology (Gorski, 2016, 2018), this approach would be a disservice to the students coming into our schools. As a result, students grappling with different life circumstances will require a teacher's awareness and consideration of such structural barriers. Once acknowledged, grit may then be used to help educators facilitate and improve upon their pupils' success and goals.

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Punctuating Musical Diacritics of Water in Cross-species Context

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Abstract

There is an urgency for compelling new narratives of ecological survival that draw on Indigenous and 'othered' millennial intelligences and agencies. With a focus on the lifegivingness and sacredness of water, this paper is a call for collective inter-cultural cross-species oral-performative, recuperative conversations for re-learning to care for our damaged finite planet. Spirit-being is ever-present in the *St'at'imc* multiverse. Be humble, kind, respectful and at peace the elders tell us. Our original instructions teach us how to live together in harmony and compassion with the rest of creation.

In this narrative score, musical signs, symbols spaces and terminologies gesture toward lyrical, rhythmic, somatic, sensate, collaborative performance, including *pause-silence-beat.* At a bend of the river, with ancestors and those to come, ubiquitous Indigenous tricksters Coyote and Raven speak on the page as *dramatis personnae* to encourage metamorphosizing from normalizing Euro-diacritics that extinguish and essentialize Indigenous oral expression. Joining the conversation are Sam Jim, a *St'at'imc* elder born in 1866, and German astrophysicists Helga and Viktor who are researching water beyond our shared earthly home, Viktor having had *St'at'imc* research experience in British Columbia. The text is meant to be read aloud.

Keywords: indigeneity, narrativity, cross-species interdependency, sacredness of water

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Punctuating Musical Diacritics of Water in Cross-species Context

handdrums slow westcoast rhythm-sounds timeline 1966 rainforest fog-shrouded creekside campsite near Fire Lake /~\ ^[′ *ucwalmicw* high country southwestern British Columbia

eagle whistle faint orchestral air for woodwinds strings wood on wood on rock on rock blazing crackling spitting campfire perimetered by shale rocky outcrops oldgrowth giants *partially divert windwhipped drizzle* occasioning stirred sunny breaks *dancing flames silhouettes* Coyote Raven Sam Jim extended relations shadowed animations speak to their level of engagement in the moment the forest is celebrating Sam Jim's hundredth revolution around the solar eminence barely noticeable in a cedar's dendrochronology he having lately dug framed sided doored vented insulated a rootcellar to preserve and protect summer's harvest as winter's provisions

forest music decrescendos fifty-eight years into future-present *rain sounds staccato continuo soaring oboe air pierces other sounds adagio deep handdrum rattle tones fire sounds spzu7 dance steps percussive rhythms swish-beat volley tsexox sound of running water wind brush of cedar on cedar kalan7wi ucwalmicw aho faithkeepers Asayenes Asayenes Kwe*

slow cross-fade to *splash paddle paddle whoooosh lubb dubb* moored sternwheeler-concert hall with orchestra choir conductor *step by step descending melodic bassline hammond organ strings winds harmonics voiceovers announcements* pipe through lobby galley cabins green room orchestra light-sound room toilets mechanical-electrical-boiler-engine room bridge amplified-projected as trans-species supertitles sparks from broken fragments of heaven set alight what went before there was a before or a went *fade in zagharit*

ff ah water music says an authoritative *me voici voice affrettando* dihydrogen oxide universal solvent *hard audio pan to centre* only e-stem (economics-science-technology-engineering-mathematics) can provide rigorous foundation for assessing H_2O and allied molecular structures

conga groove snares wood block commentary Coyote performs *sauts de latrans* as audience enters *arpeggi jingle slash chords on vibraphone* e-stem research and development extinguishes the natural world enhances lives of self-annointed elite species e-stem thinking designs empire's weaponry catalyzes state-military-industrial-education complex (Cole & O'Riley, 2017) *thonk thuk wood on wood gourd rattle chickadee trill frog chorus twigs snap*

Raven performs *demi-pointe à pointe* flexioning opening remarks at the rCOF (regional creatures-of-the-forest) AGM (annual generosity marathon) foregrounding bush-centric conversational *audio pitch* ranging *15 to 200,000 hertz* depending on what species show up changing conversational modulation *fugual harmonies timbral cadence* this year's theme is *canticum in laudem aquae song in praise of water lamentosal bass soulful harmonic-melodic slides clarinet xylophone glockenspiel timpani bassoon strings harmonize melodically* no *ucwalmicw* would emcee a multispecies chorus universalizing two-legged protocols most tune their instruments to local trans-local regional *interactive terroirist harmonics wind-waves scat*

extended anacrusis says Coyote as co-unofficial moderator Raven thank you for the procedural updates which will not be in official minutes which are neither official nor etched as human-

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(coyote- raven-) centred minutes on behalf of species communicating in thousands of mutually unintertranslatable languages across reductively determined-assigned taxonomic ranks with the only place agreement taking place being species abiding by their 'original instructions' which relate to the lifegivingness and sacredness of water spanning interspecies orchestral spiritways *ascending minor third* the challenge says Raven is to accommodate *communicatory vibration across sonic spectra* as the massed species do not accommodate to normalized *oboe concert pitch A above middle C* (middle of what) nor is there agreement within bird insect microbe fish plant reptile amphibian mammal taxonomized orchestral groups as to what constitutes commons standards fairness right-minded action quorum indigeneity validity as settler humans presume to translate-interpret performed-knowing across languages including those not using positivist representational codes across anthropogenic notions of species' worldviews which do not fit into rationalized conceptual-hypothetical-theoretical morphemized temporo-spatial(categor)izations

breathy resonant high register haitched shadowed vowels says Coyote given human inexpertise of nonhuman communication it is unlikely interspecies relationality and firstbeing-ship (cross-species indigeneity) will be agenda items due too to the complexity of onto-epistemological networks and AGM participants having differing morpho-sensate-existential-neuro-anatomical needs the best one can do is not privilege human settler idiolectal clichéification such as the trinitarium of reason-logic-causality and-as abstractional-essentialized-anthropo-neurotypicality across group dynamics that have historically led to panbiocide so in the spirit of compassionate conviviality unbottled water will be freely available in suitable physical states and quantities along with enforced safe mingling guidelines *hail on corrugated iron roof clunk thunka shhhh*

prologue-chorus harmonizing breath tracks tremolo legato uptempo lyric entangled inter-generationally across-species family bundles cast in a womb of stone-fire-water-air gazing across an eternity of escalating coloniality gesturing toward *esteem* as aqueous evidential (Cole & O'Riley, 2017) the elephant in the room is a colossus of searing breath that burns without burning caudal fin itude tugged at by successive omnidirectional gravitational fields collapsed wavefunctions abstracted calibrations of dynamic e-stem system imaginaries exhibiting nonperiodicities operating effectively within classical field parameters discussing variable constant-variable independent-variable relative-absolute assigned limits trajectories validities narrativities and resonant balances *in excelsius scientia yo* and *yo major third flattened seventh*

superscript e-banner of exoplanetary H_2O motif *french horn accompaniment decelerando and a one and a* when the tool used to determine x is immutably part of its parametric co-extensive factorality this becomes redolent of other presumed self-sustaining cycles not as dis-attached stand-alone accusative sectioned for-instances or metadata of graphed databases but as insightments to-of-respecting *in situ*-based connectivities in that *ucwalmicw* relationality is not post-itself *appoggiatura media coda harmonium timpani trumpets basso continuo sic itur ad astra* or remember to clean your spit valve rosin your strings pre-warmup *antler-branch rubbing*

amituofo voiceover *horns woodwinds mixed percussion inter-iterate fade in harp bisbigliando* in the late 1960s says Raven I recall Lee Jun-Fan speaking of becoming like water and 65 years ago the words of the *daodejing* resonated obliquely as to unutterability of-as consonantal xxx(x)-grammaton ineffability of form and-as formula e-stem is wont to essentialize water leading the conditioned human mind to need to make sense of osmote equivalency where/with/by the body

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fashions chaos fractals solitons mingled with mathematized port-manteaux semi-continuously depending which set of functional boundedness and probability distributions one alludes to in the 1970s e-stem's epistemo-methodologies did not foresee-imagine this chaotic entanglement of layered phrasal disharmony *fadeout harmonics reverb echo backbeat crescendoing stridulating percussion fusion rumba clave stick on stick rimclick cymbal crash doo wop*

ghost note glides double rolls oh mimes Coyote *my* the divine name is not to be spoken aloud save consonantly just as divining processes of capitalism are disallowed as to soundedness

Raven *chortles clicks* when the vowelless conjuration of a meaning tract is oblique or abeyed and deflective rather than directed invocation there is space to move unrestricted by prescribed knowing such as *rote chord resolution* so Lee's reflection on water evokes *daodejing zhuangzi* filtering the millennia as sounds echoing from stone walls absorbing into rainforest as water *sing*s *it is passively percussioned* inhumed diffused osmotically by cnidarians and echinoderms whose original instructions include proactive poise harmonic cadence as-with songs of praise of all beings *freudenvollere* humans as instruments emit *vibrational frequencies* employing borrowed skins ligaments integuments sticks brushes clay seeds hollow dried vegetables berries strings of silk base and refined metal stones grains bone horn antler plucked struck bowed blown shaken tapped strummed embouchured pounded rubbed reeded scratched not in defence of territory nor to attract a mate but in praise of water *drip slither p lop bop fsss agogos*

Coyote builds up fire to ward off blustery cold sleety rain visions rise from the medicine-smoke of forest being *obertura con agua fresca y sal* deep longing soulfire *tsexox speaks across tongues reservoirs ucwalmicw-kichwa interlude rainforest soliloquy compressed percussive arpeggi ikaros plantsong* glacial altiplano hoodoos malocclusive maxillary arcade *panpipes ocarinas el pueblo unido la vida unida djembe* vines in thick coils of helical pedagogy

says Raven I saw on the news where water photonizing as a full circle rainbow was reported from instrumentation set at 42 degrees opposition to the ecliptic of the sun's seeming constellar path this speaks to internal reflection double refraction dispersion optics of high energy photons passing through water as dew mist rain spray ice steam but something so beautiful had to be an optical fractal transverse sensorial illusion it wasn't anywhere save a theoretical-hypothetical space where 'pure' *sama7* (settler) sciences are born and live their hypothetical li(v)es *fade out muted bugle call to the post iron gates clang riff vamp ostinato sputter cabasa clop clop*

excuse me says someone upwind from the orchestra why is there no punctuation in the program

starlight travelling megaparsecs in zero degrees Kelvin passes in nanoseconds through exoplanetary atmosphere condensing onto still-life exo-H_2O *drip by geli d d rip flageolet solo* giving rise to augmented surfactant self-ionizing resilience radio-inactive-nucleonic *ice c rack ing four octaves above middle C* atmosphereless *tin kling glancingly melodic ornamentation sweep picking bel canto trills unsounding glacio-crystalline ice pellets corn snow exoplanetary impact debris overarching cornice shif ts andante con moto* moondance moonbow *cor lunae amat cor terrae* rocky outcrop shoreline high C tranquility resounds otherworldly *sans son*

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drum groove ||: *crackling fire sounds Cagean silence* (Cage, 1961) compounded *unstaved octaveless noise bubbles orchestral hive percussively thrums with cricket cicada bee fly wasp cadences timbres mating calls whirlings tacet baroque strings percussion* rising mist *upbeat brass nasalized falsetto glottal slide avian communion duck loon owl swan departure güiro countdown do re mi liftoff flutter fade-bridge intermittent pipe ventilation sounds agua caliente* roof-snow-ice dam melt shif ting enter down left *stellar jay redwing blackbird pine siskin dewy beaked basso-alto frog cricket toad trio bar-breasted piculet affettuoso cross species chorus glissando down-bow sound of rain drizzling single dro p p p of rain re soun Ds G mid bass single string strum double sharp pausa di breve between drops slurred bowing stroke j stroke paddlepaddle swoooooosh intermezzo aqua ch ch ch tone semitone tabla tenor-bass improv intermittent shekere flanged hi hat low volume chup choked off handclaps*

quick scene change allowing for *consumption of performative flatulofacients lobby dos à dos* fizzy water beans brussels sprouts asparagus dairy cauliflower more beans hot peppers broccoli *moderatio* for use in variation of second theme with *violin solo giocoso con brio rain drum solo* moisture diffuses through roof layers *drip drip into tin kle buckets* unscored randomly dispersed ushers collect replace as required *tinkle blip plop* unrehearsed *drip ping ng ng flutter-tongue punct uation* press link for free download weather resilience app for pre-planning berrypicking bushtea business c-squared *space-time liftoff musical scoring for percussion soprano saxophone pitched in b-flat strings in hoc nomine bear rooting sounds multiple paradiddling throat clearing exhalation leaves sussurate rustle crunch*

enter chorus *prolegomena* upstage right cross down centre *sesquitone tapshoe cleat slides* as *chef des affaires sfx* it is my duty to inform the reader-listener-ship that henceforth normalized time-space and social conventions relating to water will be gravitationally red shifted dopplerwise throughout this performance to accommodate audient receptors saltatorily reconfiguring inter-relationalities across-among-through-with layers of acculturation *sans* benefit of foundational notation or common phrasing anything resembling diacritical punctuation is likely the compositor's mistransliterated scrivening or emulation of traversal bush markings river rock indentations old growth stump projections wetland vegetation tracings fall leaves maple ash elm samara fry minnows tadpoles insect exoskeletons sweepers deadheads and given that volunteers collated folded trimmed stapled the concert programs in the galley-pantry during the midday chow-down tech-dress rehearsal any punctuation-resembling marks could be olive oil seasoned vinegar tamari sauce spiceflakes condiments sprinkles diverse diacritics *swirl whoosh p p p*

late autumn post-covid techno-wissenshaft wizardry invades star-exoplanetary systems establishing-shot -sound -scent(sation) infinitely slow jiggly crane swirls shifts to panorama concentric barrel-roll move to CU textured mortise jigsaw tenon composites with sky out-takes leaving earth and water espoused *oberbayern low register solo generic orchestral suite in D major for violin oboe trumpet harmonium* downslope from alpine meadow southwest of Munich Viktor in white lab coat oversized nametag 'Herr Professor Doktor Viktor Freiherren' broad-brimmed waxed Zorro-style rainhat midcalf-oiled raincoat open to elements peers intently through catadioptric telescope mounted on canopied 4x4 pickup truck while speaking on cellphone scattered high velocity clouds promise rain roulette he is overdressed for weathery drizzle *sicherlich* Helga *ja* I hear you *dein lieber* Viktor listens intently but the reception in the *mittelalpenwiese* is not so good in fact it is predictably intermittent yes I agree with whole heart

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the James Webb telescope wasn't meant to be a trickster but it erases what for so long was solid quantum-astro-cosmo-logical science and we must keep upper-most in our minds the primacy of accurately annotated data-collecting and Jupiter's dear Europa appears increasingly to have vaunted water content in amazing configurations however remotely measured *AI-chatgpt*-interpreted data is potentially too deeply flawed to discuss on the phone without crypto-precautions and also body language and eye contact yes Helga *mein licht* I am certain *unser* Göethe (1919) was far *ur*-ahead of us in the complexity of his think-patterning and surely water is amazing on Saturn's and Jupiter's moons as no mere earthling has witnessed directly yes we will speak of exoplanets rockstars and quantum vacuum states *voiceover chorus scat ad libs with baroque toccata fugue in minor key* rain drizzle slows to a trickle clouds open reveal expansive dancing swirling planet-star-galaxy constellarations

science and the search for extraplanetary water homophony tell me *kollegin* Helga why does everyone assume two parts atomic hydrogen joined with one part oxygen and who claimed the H-O-H angle to be forever-everywhere 104.5 degrees science has made of me a morosoph and respecting the *über* world of *scientia* if Newton overstated on scale and Einstein on rest versus kinetic versus total relativistic energy government media academia and wilfully gullible science popularizers err in proclaiming eternal anti-climate change science-based truth regimes   I am drawn *sicherlich* to enlightenment german scholars who deconstructed the language they used to think in so *vielen dank* to the artists philosophers storytellers novelists comprehensivists who guided us to see other/wise and not live-die clichéd lives surely yes Helga exo-planetary hydrologists and quantum astro-physicists have some exact though perhaps highly inaccurate knowledges but at least they are expressed clearly and the mathematical calculations are hypothetically correct in their own mobius I say this as a caveat not an endorsement   *bat chirps*

brief orchestral interlude as ushers collect replace empty rain drip tinkle buckets semicoherent sprigs of conversation from centre rows 4 and 5 aisle seats can be heard by lead trombonist and second oboeist about plumbers roofers and *'catching my death'* and the expression *'dry cleaning bill'* came up several times this is being recorded and will be used as future performance 'found data' while maintaining participant anonymity though free prior and informed consent seems to not be so much in evidence in preliminary draft discussion-enactments and-as forensic audits

languaging thinking knowing in confluence contrapuntal murmuring sounds yes Helga I'm sure some famous german person said *wasser ist wasser ist wasser* though if it wasn't an academic e-stem person it would be ignored by the mainstream academic establishment   science delights in essentializing all things so every major science discovery/morphemic invention leads to generational waves of spot-welded intellectual hubris and self-congratulatory stultification until the *oops we boobooed again* how does every mainstream settler discipline end with clichéd thinking-as-knowing being rewarded for being essentializing and anticritical yes clichés have a special place in a cliché(d)riven society but what seems to be left out are myriad measurement procedures theories and hypotheses that shape and generate them because as one thinks about x water for instance one is continually going through settler colonial measurement regimes as if there were only one way of knowing and all one need do is amend typos and auto-correct AI blips rather than the thinking that reverential-izes closed-loop prescriptive models of knowing   is it any wonder every new generation has a big flip in e-stem thinking a *eureka I've got it [wrong again]* moment in the bathtub   science as *wissenschaft* or knowledgeship we german-speakers

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have argued about nitpickingly for centuries misunderstood in german mistranslated into english even as cousin languages I slip into hopeful holistic thinking but here we are speaking in english and german thinking but yes water is life though e-stem calls it dead inorganic spiritless molecular water does not just support maintain and act foundationally with respect to life it *is* life yes Helga german puts too much into noun-form but changing thinking and changing a language at the same time is too much for most people everyone wants to take short-cuts which is why the world is so messed up contagious lassitude inveterate tangential sloppiness the hypotenuse as quantified mystical abstraction *ja* even atomic nuclear bonds are nominalized pico-ligaments and -tendons needing activation by other language bits verbs subjunctives imperatives numbers it is the bane of post-proto-paleo-indo-european thinking-knowing that slowly vets livingness into inert lifeless morphemes first sever language from its oral history and dynamic cultural context then put the language on life support then kill it by starving its spirit then resurrect it as a co-slave-AI-hybrid with an embryonic marsupialized number system and before you know it you have a dead petrified language-being used to discuss *living* things' artificialized intelligence produced by binary computer programming coding data-sets we need to shout sing whisper weep not converse with uninflected ratiomanic academic prose that kills the lifeblood of language by intellectualizing it de-notate de-story de-lude trans-form language *in toto* and as *holon* into a simulacrum of prestidigitated sleight--of-mind components what do you mean 'is that so bad' it is worse than bad it's the worst form of academic charlatan zealotry my *st'át'imc* elder friends would say *kalan7wi* they would say water is not just the words of it despite its symbolic capture as *sama7 cogito-speak* derivative

Sam Jim's voice is barely audible as *he sings* accompanied by *rain and fire sky-earth voices*

ja Helga I am understanding how you might think I say over and over the same thing like a skipping record or mismindful professor but what I see myself doing in our conversational collaborations sentence paragraph fragments parsed absences and adlibbed commentaries joined by-with-as invisible or nonexistent conjunctive analogies juxtaposed pretenses thread-bare intimations with deliberated stopped actions which only come together like trainer-wheeled holograms when the interlocutors are able to take the 'st' and key it with the remotely-located 'ir' to separate repetitions into a kind of paralinguistic adventitious cultivar that does not grow in straight lines of thought or topical organization but according to the dissemination of seed ideas idea seeds terroirist manifestos leading to companion-thinking commensal-knowings-with but the whisk that stirs the bowl of ingredients is not an isolated constative noun nor is the verb *stir* an agentializing manifestation of the resolution of aligned magic lantern glass plates of still lifes rather it happens as readers-thinkers-interlocutors 'click' together pressing the horologist's crown retroactively though sometimes it is prognosticated through remembering the future as a viscous fluid conscriptive pretense of what first appears to be individual un/dis/connected actions experienced as mutual confluences flowing outside of time-and-as-space *continual drip dripping*

winter dance as points of articulation suture blends to-as westcoast *chiaroscuro* interior plateau *indigenous singing slow measured deep steady tones deerskin hand drums eagle whistles rattles background chorus swish* of wet cedar shedding shining drops of liquid-life eighteen hundred microns in diameter raindrops running down cheeks temples noses lips of dancers drummers in ecstatic mo(ve)ment slow even-paced stepping whirling blending pivoting *water drips from silent swaying cedars* through the ineffectively re-architected missing parts of the roof

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to the end of scale-like leaves in slow est mo tion finding a gravitational home on heads bodies clothing regalia the assembled numberless *drip dripping drops* fall of a single moment every moment thereafter *cwis mitsaq lti zenka kalanmints tsina sqweqwel   slow handdrumming serenade for chamber ensemble ja* Helga *liebeslicht* I see how abstractional *sama7-speak* (b)lends itself as (to) colonial *agent provocateur souriant* as presumptive genitive agent of *ucwalmicwts* (*ucwalmicw* language) nesting among *soft rounded liquidy sibilants semi-vowels glides glottal stops phalanges of laryngo-pharyngeal gatekept architectings faux laine faite articulations* on leave from *interdental fricatives front rounded closes umlauts lax vocalic schwas drip drip splot splash* rain is a blessing yet the *sama7* captures it in object form as *sama7* data   most wars are language wars ego wars eradication wars hate wars looting wars saving-imperial-face wars fascistic-surfactant-intent wars camouflaging genocidal-provenance by prejustifying-preemptive-extinguishment wars *military airs heavy on drums pipes brass winds remote colonial battlefield rousements crossfade* to *slow dance drip-trickle of melted glacier* yes Helga our ancient oral stories tell of the pre-Italianate and neolithic Celt camped in the *oberbayern* but not all of us hid in caves watching stalactites lengthen while the wild exogenic peripatetic tribes rioted without we drank purest of perfect mineralized water in hollow orifices of the earth while the combatants lost soul and sense in beer brewed with root rot canker mildew wilt and ergot   no my wise one water is my truth and it is not molecular any more than a book is the words of it *discrete layered harmonized contrapuntal post-latent weather sounds*

drip drip plunk ways of knowing and naming Helga my bright star you must let me first do the doing and not name anything leave *wissenschaft* to retain and applaud its reductive tetrahedral triatomic dihydrogen oxide with its supercritical dipole electrostatic sigma bonded ionizing partialities foundational triple point and hagiomorphic noncrystalline (*hélas m stendhal*) vitreous exo-planetaricity my mind hearkens back to stories told to me by *st'at'imc* elders purification ceremonies in riverine-glacial confluences spirit medicine collecting in bog brook bracken age-old rock paintings scrivenings re-embodied cultural stories in wordless performative thrall winter dance reviving body-spirit connection that the colonizer deemed inherently criminal along with five-year-old *ucwalmicw* children whom the state declares to be in dire need of prescriptive curricular civilizational remediation *dirge chords with upbeat ironic melody line pause cadenza* how I ask Helga can science even pretend it is composed of universalized truth regimes when two of its foundational concepts time and space *zeit und raum* change all the time (space) even relatively under chang\ed/ing conditions   in deep meditative and ritual states there is no space or time with or with-out the other   in 1965 as I shapeshifted among *daodejing zhuangzi* and quantum physics I felt the absurdity of absolute-ly everything being deemed relative or of nothing being absolute   physics can use neither word nor cipher nor design in a way that could approach the brilliance of conversation such as you hear from the old ones storying round a fire uphome in a bush camp fish camp berry camp or from young children at play *children singing*

scat mezzo-basso aria fragments   a deep-spirited Sudanese poet of my ken says Raven claimed that time for nomadic bedouin is a way of explaining change but how can one speak of change if the word itself does not change isomorphically how can anything change if it becomes what it was not   at what point does change take place when *it is not it but becoming it* how-when do stopped frames prefigure contiguity in movement   contextualization teaches about layering   I can only make or receive sense of water through storying drinking immersing myself in it for we too are water-beings we are water and do not need prepositions conjunctions declensions

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conjugations interpretations tenses parsings to enjoin us using words and certainly the absurdity of *sama7* linguistics will forever deem 'smallest units' to be building blocks or critical masses and-as times rather than poems paragraphs or lived lives

before you hang up Helga tell me can we meet in the market by the old fountain we are talking all this time about water so it has to be there I remind you of Göethe's (1919) *sturm und drang* poem *Gesang der Geister über den Wassern* (*Spirit Song Over the Waters*) his song to the universe of the mystery and magic of water we are forever infixed into as its performativity *sforzando* hear me Helga I confide I need in my quantum astro-physical life to seek out water in every state and circumstance I am blessed as raindrops like musical percussion fall from a King Ludwig oak scion onto my unworthy insignificant head and uninvited presence on ancestral Indigenous land going back some half million years to *unser neanderthal* cousins 12 million years to *Danuvius guggenmosi* (Böhme et al, 2019) *für immer zusammen*

1966 (re)establishing-shots -sounds -smells -textures finding sensorial purchase as we bring our minds together says Coyote warming by the fire addressing the alpine rainforest nations nucleic acid and proteinacious nations plants six-leggeds winged ones amphibians reptilians stone people finned ones slitherers crawlers hoppers creepers human beings star-and-cloud-beings all and each to address the growing crisis of the water beings and spirits under threat by humans who understand progress only in terms of economic growth software upgrades consumerism come good neighbour plant nations epiphytes phorophytes bromeliads slime molds lichen fungi mosses each and all let us celebrate water not only as life-supporting and -enhancing but as life-giving the embodiment of spirit-being *ad lib crepitation femural fiddling harmonica fadeout*

nocturne Raven *chortle-thrups* slow fade to medium panorama stabilizer-mounted gimball showing how flush with life and vigour water-beings are in all environments thriving beyond and despite destructive anthropomanagement systems that the European enlightenment and revolting industrialization visited upon them for centuries our fellow creature-being Viktor madly tries to research us and not research us melding his mind with electromagnetic extenders transmitters capacitors coils meters oscillators codes in endless digital technological outreach to thrive (unsustainably) with good heart but *sans* responsible inreach *baroque strings concerto phrasing*

thinking about how to think about water an interior orchestral air legato sounds of static buzzing clicks beepbeeps I speak a lot sometimes Helga *ja* but it helps me to think because when I just look through the telescope it feels like there is no teleological improvisation beyond the clichés of mainstream science thinking all this rational thinking drives me mad *cello violin pizzicato oboe descending bass* but when I write think sing hum even in this rain and blowing I move with my body and mind in a different kind of thinking-knowing and when I speak with you I feel elated *ja* it is the phoneme-ology of german-speaking *the throaty salival sibilant and umlautlich precipitate sureness of our sounds* that move and inspire me especially the *conversational rhythm(ic)-sounds* they have the delicious *deep-in-the-throat sonority* of my *ucwalmicw* friends that have a lovely germanness about how they express themselves by which I in no way intimate our cultures and languages are alike historically politically or socio-econo-culturally *improvisational organ and strings harmonizing* I feel the verve of *ucwalmicwts* spoken utterances arising from overburdened data-mined geographies *ah so many water sounds in the throat* make for strong speech muscles clear sinuses and skin texture that glistens and

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coronas when backlit backheard backthought in their unceded homeland *sound of breathing in and out of a tremolo harmonica blends into cymbol swish* when the elders speak I feel the spray and spume of the land rain waterfalls vibrant forest transpiration whitewater dew humidity snow sleet frost *ja Helga* my thoughts often turn toward mysticism the embodied-enspirited manifestation of interspecies communication science sees 'body' as an unnecessary messy variable or interference to add to the extractional *immer überall* cauldron I repeat myself *ja* it is a choral form of reassurance as I speak haltingly in english and talking on the phone does not work for me I need to write formulas down make equations illustrations graphs doodles commentaries ramblings and tables to give sense to the numbers and make arrows use coloured fonts highlighting yes and have a beer as the evening wears on *lisch aus* this is how I think a pencil eraser paper crayons a superior pencil sharpener simple drafting instruments sometimes a calculator but most of all I need to just sit down to think and write and talk in a combination of english and *schwabinger* rhythms and channel life-energies in any case if my legs and back are tired I can't think if I am hungry or thirsty or tired or cold wet or stressed I can't think except in circles and great leaps that lead to double-down spirals to dungeonous *ängstlich* thinking yes Helga I know what happened last time but I have done my homework and my sources are up to date and yes I am keeping hydrated even as we speak [it's raining] so put on your thinking cap and a bright scarf no don't take the *strassenbahn* my nephew says the traffic is not bad now so you can drive your car besides you would need two extra tram seats for your equipment and writing materials your public transit carbon footprint might be smaller but think of your stress and safety levels that reminds me please bring your illustrations of the infrared spectrograph and multiband imaging photometer we need to cross reference their H_20 data with our own bring too your last week's excellent notes on the Hubbel and James Webb telescopes and the particle accelerator cross references and don't forget your 2-litre waterflask yes as a chaser sometimes I feel water in its wondrous forms is a chorus that calls us not so much like the sirens that made Ulysses crash his ship but more gently and from within *hoffentlich* always the refrain

rainforest orchestral suite in the alpine rainforest interspecies gathering at Fire Lake and the deeply-collaborative meeting in the pub of spirit beings in *Marienplatz* near glacier-fed *Oberbayern* lakes there is a feeling of *zusammenkommen* a get-together using sound and rhythm to gesture toward what cannot be said except as words speaking about words self-echoing

in the shadows beneath old-growth giants Sam Jim is silhouetted by moonlight reflecting from *waves and ripples* where he stands in the stream the *drip of beads of luscious water* from cedar and fir leaves ferns and bushes are spiritual punctuation enjoining consensual realities *rustling swaying murmuring bobbing* fungi mosses molds and mildews jostling for positional advantage etiolating bristling furling embodying myriad tropisms you can sense water at a foundational level transpiring evaporating guttating dynamically balancing the plant between weather and the plant's inner life water exchange between *expelled breath* stomata atmosphere diffusing between roots scurrying down boughs and trunks air insinuating itself between water droplets *lento assai rana pipiens interlude soft bubble pops of rain and-as river en traîn de devenir*

during an *entr'acte* an '*eau de* water' is performed jazz-blues improvisation on the theme of the gift of water but where are the forests the green valleys gone to hydrodams drowned every one *brief light bucolic melody evolving into jazz* how did the Brandenburg Concertos become infused with jazz traditions 150 years before anyone invented a saxophone looking at Handel

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and Telemann's musical compositions related to water   there is no coda just endless *passepieds minuets bourrées* to magnify country spirits which isn't untoward *suddenly an étude in strings and woodwinds les eaux de la terre et cieux* improvised Schaferesque *Lake Miniwanka* (Schafer, 2020) recitative   for the cellist her instrument is spiritually undifferentiated from forest as a treeperson it teaches her to be thankful to share her breath to feel the humid earth in everything sense creation singing as the plant world diffuses into and out of water fire sky essence I see my mother tending with love volunteer flowers in her vegetable garden bachelor's button sweet william poppies allium snapdragons daisies delphinia irises foxgloves crocus shooting star woodlilies wild roses lupins lady's slipper Indian paintbrush forget me nots and sweet cosmos these too are her children her legacy of compassion humility and mutual nurturance

scherzo affettuoso cedar branches whisper together 1966 Sam Jim's fish camp *talk around the fire* was first about weather fishing whitewater and bears moved on to *sama7* disrespect for land water air fire transitioned to government claims of democracy when its provenance is 100% stolen land gained through genocide *sans cesse* systemic injustice Sam Jim doesn't get into wrangling listens quietly awhile nods walks to a secluded spot upstream removes his jacket and shirt rolls up his trouserlegs *steps barefoot into the water picks up a cedar wand performs age-old ceremony with water in motion* says Raven we were taught that ceremony helps to create positive cross-species pan creational community mindedness feelings of peaceful intention *plop*

baroque strings suite in D major fade-in soft-focused spot falls on Viktor surely Helga I am not forgetting the antics of water on Enceladus which our *Göethe freundlich* colleagues have been following since Mozart's time but I am not convinced by the spectroscopic analysis results   too many unaccounted for variables *ja sicher* Helga I know of Saturn's e-ring and speculated subsurface saltwater ocean that might host hydrothermal vents (NASA, 2023) so popular with ocean bacteria here but we have to be careful how we claim to know and what we trust in with respect to remote sensing and remote measuring and technologically-enhanced evidentiality many cosmo quantum physicists believe water gushes out of its 'South Pole' into space at 400 metres per second *ja* that would be something to see but we have to be careful speculating what the liquid and ice water themselves host in terms of hydrocarbons and organic materials that the Cassini spacecraft measured in 2007 we don't want to let hubris and essentialism icloud our thinking and decision-making yes Helga that moon plume radically changes how we think about water even in a tiny moon like Enceladus *theremin bidirectional trills with handclaps*

harmonics of relationality scale degree 5 we are together again my forest family says Coyote sharing lifegiving breath I salute you elder trees bush nations berry peoples herb beings fern essences mosses lichens fungi liverworts mushrooms grasses blossoms buds blooms saps excrescences leaves fronds peduncles needles calyxes symbiogens endosymbionts roots mitochondria chloroplasts rhizomes mycelia mycorrhizae igneous magma silicate feldspar glittery mica striated granite glistening oolichan skittering crabs wispy fog remnants living harmonics *kukwstum'c* we salute you *takem nsnekwnukw7a*

harmonic minor ja Helga it must be tonight for maximum elucidation of our recent astronomical observations and correspondence and it would give us a chance to discuss the Kepler 138 a-d exoplanets in the constellation Lyra which promise amazing water content (NASA, 2022) they

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might be orbiting a red dwarf star then rain begins making further observation uncertain *musica sphaerarum wild wind and sleet lash Starnberger See a brief downpour over swirled heartbeats* then the weather *takes a deep breath holds it exhales slowly close-up* of water vapour trans-forming into liquid ice steam mobius are you still there Helga despite my aimless lalorrheal verbosity yes let us meet with laptops and fieldnotes but first I must update software and warm from my wet and frigid excursion yes *wasser ist wasser* but as an inconsistent invariable it refracts photons in unexpected patterns even accounting for temperature-pressure-gravitational gradients there are inconsistencies not included in remote calculations I am cautiously drawn to variations on chaos theory fractal geometry of physicality rather than conceptual worlds numbers water is seen in science as one of its invented molecules undergirded by invented atoms held together by over-zealous quarks and imagine-atons we don't know what we don't know or even think we know despite or perhaps because of science's invented conventions standardizations universal constants science was not ready for the big flip in the mid 1970s with chaos theory not seeing its returning shadow yet it goes on thinking-knowing in the same narrow-gauged closed-looped way meanwhile e-stem continues to trigger feed accelerate climate change and the myriad injustices it creates and perpetuates

*espressivo bits of Vivaldi's Le Quattro Stagioni Handel's Water Music s*ays Coyote my family is obsessed looking into water *spontaneous scattered (including pre-recorded) murmuring* takes place in the fishcamp a middle-aged douglas fir aud/sent/ience member makes *sounds of needles swishing together* while moss and lichen family members inhabiting a nurse log lean toward the fire *at the wind's urging* saying that as beings of water they need to know how to prevail in storm and calm flood and drought *rain drizzles forest rustles confluences chatter cheerily*

percussive syncopated harmonies Helga says Viktor speaking into his *Geländewagen* screen you know the physics and chemistry of water do not for me jibe when looking at Jupiter's moons and even less with exoplanets hundreds of light-years distant so treating water as a constant with standard underlying conditions might be under threat in a context where phenomena are manifesting that terrestrial e-stem theories can't even guess at let alone experimentally mimeograph that is why we have to talk on paper and in person yes bring your calculator *bis bald Helga sound of engine turning over haltingly but not starting* that reminds me I must do more research on the prussian blue analog sodium ion battery *pitter patter of soft rain on rainforest understory*

con brio yes Helga while waiting for the tow truck I am thinking the current quantum dynasty doesn't see Einstein was only half serious speaking about *spukhafte Fernwirkung* the spooky action at a distance with Max Born in 1947 (Bernstein, 2005) you invent a number system a referential system and before you know it your concentric and looped circles of truth-claims spiral into the mathematical thinking that caused the problems no-one pays attention to the catastrophic implications of clichéd prescribed consensual knowledge systems I know having the sharpest pencil and crispest figures can lead to all wrong answers but I can go back and see where-how I went wrong your Viktor looks at re-quantification data set results for water on the Kepler exoplanet *sighing audibly* whatever happened to water just being something you need a drink of when you're thirsty why must it be essentialized with everything else in e-stem thinking it is alive it is spirit and shapeshifter molecular is only one of its forms

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intermission botanical-arboreal whispers soughs watercraft settling sounds swaying scraping squeaking lurching groaning orchestra members chat quietly and perform loving maintenance on their instruments a few have n-95 masks at the ready but many can't wear them while playing some are separated by transparent hygienic screens *funneled winds whistle and whirl* the narrator-]conductor[goes on german scientists discovered stardust sprinkled with a radio-isotope of iron from a supernova whose ghostly interstellar cloud the Earth has been turned through for 40,000 years (Andrews, 2020) *subito piano a sudden silence* saw everyone holding whiter clouds of collective breath and in the forest shade *the wind strums bare-of-leaf branches high in the canopy* says the pale grey squirrel in mid-leap I can't very well land on a metaphor or illusion unless I'm one as well to which *the cedar swishes nods scents assent*

strange says Coyote the *sama7* speak of water in terms of chemical molecular atomic and quark but as *ucwalmicw* we have learned that we ourselves are stories of water cycles waves ripples riparian and littoral topographies confluences eddies tides archipelagos reefs trenches ridges rises floes cornices mist and breath *tectonics of earthwaterairfire dancing*

wraaak Raven offers from his coniferous perch amongst hydrophilic bromeliads willows and cattails in the avian-insect-reptile-amphibian-microbe-mammal orchestra pit our knowings and stories of water are urgently needed our world is on fire our planet is at a climate change tipping point we need to take care of our water *the cross-species orchestra continues to tune their instruments in lifelong rehearsal-as-performance glissandi kukwstum'c ucwalmicw*

Coyote pipes up a radical paradigm shift is urgently needed to challenge the neoliberal progress narrative of modernity that permeates western(izing) education if there is any hope of addressing climate change and resulting global crises facing humanity and all life-being *myriad sounds key changes alternating basslines hybrid picking chord pro-inter-retro-gressions oral phrasings contrapuntal harmonics pace tone pitch timbre tempo texture variations]si lences[*

ad lib jazz tremolo phrasings yes says Raven this would mean students learning to become with the world (UNESCO, 2020) (re)learning human non-human more-than-human interconnected-nesses and-as interdependencies cornucopias of lifeways dismissed since the imperialist-scientific-industrial revolutions and concomitant growth of capitalist economies *shhhh*

says Coyote this would require widening the circle of knowledges and practices in education including millennia of Indigenous ecotechnological knowings-practices as equivalent to those of the settler mainstream holistic education connecting mind body heart spirit ritual with place generating more complex culturally-species-relevant ecologically just sustainable pedagogies

yes says Raven education must play a pivotal role but for this to happen teachers students administrators parents need to work collaboratively with local Indigenous and cross-species communities as equal partners to reimagine and co-create reciprocal mutually recuperative eco-literacies eco-pedagogies and ecotechnologies for survival on this planet there is no time to lose

the current focus on e-stem education says Coyote needs to shift to land-based rhizomatic ecopedagogies mutual nurturance of human non-human and more-than-human entangled intelligences and agencies *songs of dancing waters and starlight red-winged blackbird sings*

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soft blues harmonica riff says Raven taking a long slow drink from the clear glacial waters of the creek rich cross-cultural trans-species ecopedagogies offer not only written formats but conversations across oral-performative multi-sensorial genres *night wind and water sounds*

syncopated oboe loon wolf drum chorus children handdrum voices of women sing water protection song by Anishnaabe/Cree waterkeepers (Jerome, 2018) *harmonic meditation of river-spirit entanglements* in South America (Glass, 1999) *watery soundscape by choirs* around the world (Schafer, 2020) *musical dissonance* in response to flooding of NYC (Anderson, 2018) *st'at'imc women singing with* Martina Pierre Women's Warrior Song (personal communication, n.d.) act as intercultural trans-species spirit-bridges

Coyote *har-ra-roooos* Raven *wraaaks chortles thrups* Sam Jim smiles forest water sky star beings *sing dance sway together whisper kalan7wi tsexox kukwstum'c niá:wen ucwalmicw*

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A Review of Arasaratnam-Smith and Deardorff (2023), *Developing Intercultural Competence in Higher Education*

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Developing Intercultural Competence in Higher Education: International Students' Stories and Self-Reflection, by Lily A. Arasaratnam-Smith and Darla K. Deardorff, was published by Routledge in 2023. The book offers an insightful exploration into the development of intercultural competence (IC) in higher education. With a total of 202 pages, this book is part of the Routledge Studies in Global Student Mobility series and is available in hardcover, paperback, and eBook formats.

In an increasingly globalized world, I believe it is essential to cultivate the ability to communicate and engage effectively and appropriately with individuals from various cultural backgrounds and holding multiple perspectives. The authors of this book argue that IC is crucial for fostering understanding, reducing stereotypes, and building meaningful relationships, all of which enable individuals to navigate cultural differences with empathy and adaptability.

Both authors are recognized scholars in the field of IC and have published extensively on the subject. The frameworks they have developed, the Integrated Model of Intercultural Communication Competence (Arasaratnam-Smith, 2006) and the Process Model of Intercultural Competence (Deardorff, 2006), are briefly introduced in the book. The former focuses on five key factors which contribute to effective intercultural communication: empathy, experience, motivation, active listening, and a positive global attitude. The latter highlights the fact that developing IC is a lifelong process, which comprises essential dimensions of knowledge, skills, and attitudes. Together, these two frameworks provide a conceptual foundation for readers of this book as they engage with the personal stories and reflective practices of international students.

The book begins with a chapter that introduces and defines IC, presents the two theoretical frameworks noted above, and outlines the UNESCO Story Circle methodology used in the research being described in this book. The remainder of the book is divided into two parts: Part One, consisting of three chapters, focuses on understanding the intercultural experiences of international students, while the four chapters in Part Two address how to develop IC. In Part One, the chapters explore themes including the intersection of identity and culture (Chapter 2), stereotypes (Chapter 3), and cultural differences (Chapter 4). In Part Two, the themes are centered around the role of self-reflection (Chapter 5), community support (Chapter 6), and building meaningful relationships (Chapter 7) in the development of IC. In Chapter 8, the authors close the book by providing recommendations for international students, intercultural educators, and the broader communities in which international students live.

This structure outlined above allows readers to first understand the lived experiences of students and the importance of IC in intercultural encounters, and then to explore strategies for fostering this competence. Chapter 2 uses nine narratives to explore how international students understand and negotiate their identities in relation to language, culture, and even their names. The stories illustrate how these students reconstruct their identities through self-discovery and

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interaction in an international setting. Chapter 3 presents eight stories that emphasize the idea that stereotypes are not fixed and can be overcome when individuals are motivated and open to understanding different perspectives. As the authors note, "stereotypes are neither permanent nor insurmountable" (p. 63). Chapter 4 examines the challenges that cultural differences can pose, particularly in the way that they can lead to misunderstandings and conflicts. The authors argue, however, that these differences can be bridged if individuals are willing to engage with people from diverse cultural backgrounds and to accept differences in terms of culture, race, beliefs, and communicative styles.

In Part Two, Chapter 5 introduces self-reflection as a valuable tool for developing IC. Eight reflective narratives illustrate how students recognize the importance of openness, curiosity, kindness, empathy, and respect during intercultural interactions. The stories show how reflecting on one's privilege, biases, and stereotypes can enhance awareness and foster IC. Additionally, they demonstrate how marginalized voices can be empowered by sharing stories about discriminatory experiences, episodes of social invisibility, or other social microaggressions. Chapter 6 highlights the role of support and community in helping international students adapt to new environments and develop IC. An interesting finding from several stories is that students, after receiving support, often became supporters themselves by volunteering and creating communities for newer students. This shift empowers international students to become active contributors, rather than simply recipients of support. In Chapter 7, seven narratives are presented that demonstrate how students developed meaningful relationships during their international experiences. These relationships often began with open-mindedness and curiosity, and strengthened through compassionate actions, mutual support, and collaboration toward achieving shared goals. Notably, the relationships in these stories often extend beyond the campus environment to include local community members, co-workers, and other immigrants and international students. These members of the broader community play a crucial role in shaping the experiences of international students and fostering a sense of belonging in their new environment.

In Chapter 8, one of the authors, Lily A. Arasaratnam-Smith, shares her personal narrative as an international student at the University of Kentucky. At the very beginning of her studies, she struggled with isolation and cultural barriers. Seeking help from the international student counsellor, she was connected to a local host family, who provided essential support. This connection improved her confidence, which in turn enabled her to develop meaningful friendships with local community members and other international students. Her story highlights the importance of asking for help, having local support to build confidence, and finding a diverse social group to enhance the international experience.

As a conclusion, in Chapter 8 the authors offer several recommendations for supporting international students, addressing the perspectives of three key stakeholder groups, students, educators, and local community members. International students are encouraged to ENGAGE by embracing new experiences, nurturing relationships, growing personally, adapting to their new environment, guarding their well-being, and empathizing with others. Intercultural educators should FOSTER an inclusive environment by facilitating meaningful interactions, observing the needs of students, seeking to learn about their backgrounds, teaching cultural competencies, empowering students to succeed, and reflecting on their own practices. Finally,

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local communities should SHARE support by socializing with international students, helping them adjust, accepting cultural differences, respecting diverse perspectives, and empathizing with their experiences. These recommendations aim to enhance the overall experience of international students, promote positive intercultural interactions, and build a supportive environment for all involved.

Developing Intercultural Competence in Higher Education offers valuable insights into the intercultural experiences of international students, illuminates key factors influencing intercultural communication, and provides effective methods for developing IC; yet there are aspects of the research that may leave readers wanting more. For example, the authors claim that the UNESCO Story Circle methodology was utilized, a process which typically involves four to six participants gathering in a circle and sharing their stories in response to certain prompts (Deardorff, 2020). However, no details are given about the application of this methodology or whether participants actually shared their stories in this manner, which raises questions about the data collection process. Also, the authors mention that 48 narratives (plus an additional narrative shared by one of the authors) were selected from over 150 submissions, but there are no details on the selection criteria. This omission leaves readers wondering why these particular stories were chosen. In addition, although the first-hand narratives are powerful in illustrating experiences in intercultural communication, the commentaries that follow each story are generally brief, usually limited to one paragraph. These commentaries offer only a short summary and discussion of the experiences, challenges, cultural differences, or key elements of IC. A more detailed and comprehensive analysis of the narratives in relation to existing literature and IC theories would enrich the reader's understanding.

Despite these minor criticisms, there are many reasons why I find this book compelling. The language is natural, smooth, and engaging, making it both easy to follow and emotionally resonant. The use of first-person narratives effectively captures the real-life experiences and emotions of international students, allowing me, a reader who is an international student and who experiences intercultural encounters on a daily basis, to connect with the stories on a personal level. The commentaries from authors provide insightful interpretations of these experiences and highlight the challenges and key elements of intercultural communication competence, as well as how this competence can be cultivated. This approach allows readers to observe and understand the development of IC through authentic lived experiences. Additionally, each chapter concludes with a list of guiding questions to encourage further self-reflection, which transforms reading the book into an interactive and thought-provoking learning experience.

Overall, this book illuminates the intercultural communication experiences of international students and offers practical tools for enhancing IC and related skills. The blend of storytelling, self-reflection, and theoretical foundations makes it an invaluable resource for anyone interested in IC and international education. I highly recommend *Developing Intercultural Competence in Higher Education* for students preparing for or currently studying abroad, and for researchers, educators, and policymakers who are seeking to improve intercultural programs and support systems for international students.

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Cher Hill is a teacher-educator and an assistant professor in the Faculty of Education at Simon Fraser University. She is deeply invested in researching educative experiences that contribute to more connected, thriving, and just communities. Cher is a passionate supporter of relational, land-centred, and community-based educational initiatives. Inspired by the teachings of her mentors, she has recently begun to explore her Finnish ancestral roots and traditional earthly practices.

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Jennifer Mitton, PhD, is a professor of secondary literacy and qualitative research methods in the Faculty of Education at St. Francis Xavier University in Nova Scotia. Prior to university teaching, she taught in secondary schools in New Brunswick, Nova Scotia, and Turkey. Her research interests include adolescent literacies, pre-service teachers and early career teachers, and teacher pedagogy related to culturally responsive beliefs and instruction.

Matthew Ngo is a PhD candidate in the Faculty of Education, St. Francis Xavier University, in Nova Scotia, Canada, where he also completed a Master of Education in Educational Leadership and Policy and a Master of Education in Curriculum and Instruction. He also defended a Masters-level thesis in 2023. As a public-school educator of 15 years, he presently teaches high school sciences with the Halifax Regional Centre for Education. His research interests include grit, mindsets, ideology, and reinforcing and sustaining teachers' lifelong learning through the use of reflective and reflexive practices.

Emily Pope, MEd, is an elementary school principal in Ottawa. She is currently working on her PhD through Lakehead University. Prior to becoming a principal, she worked as a teacher in Nunavut for 6 years. Her research interests include mathematics education and Inuit students.

Paula Rosehart is a lecturer in the Faculty of Education at Simon Fraser University. Her pedagogy and scholarship focus on fostering (w)holistic ways of being, knowing, learning, relating, and teaching within educational spaces. She is dedicated to re-imagining educational environments to nurture the spirit, emotions, body, and mind of teachers and learners; co-creating intentional learning spaces that foster a relational alchemy that honours diversity, awakens aesthetic forms of representation, and invites people to nurture their gifts.

Awneet Sivia is the Associate Vice President of Teaching and Learning at the University of the Fraser Valley. She has worked in K-12 education (secondary) and teacher education at several institutions. Awneet's scholarship focuses on social justice and diversity education, educational leadership, science education, self-study research, and recently, social innovation and early career faculty development. She values identity-centric pedagogies and curricula that help nurture the human spirit and foster learner engagement.

Sarah Twomey is currently Dean of Education, Trent School of Education and Professional Learning. Her research interests include Peace Education, Teacher Education, Literacy and Feminist Post Colonial approaches to race and justice.

Hui (Shelley) Xu is a PhD candidate in the Faculty of Education at the University of Regina. Her area of primary research interest is intercultural communication and competence of cross-cultural migrants functioning in a second or additional language. Hui possesses a rich academic background, having completed a master's degree in applied linguistics at Northwest University in China and an MEd at Queen's University in Canada. This foundation, together with many years of experience teaching English language learners, gives her a unique research perspective.

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