The Importance of K-12 Teachers' Approaches to Assessment in an Inquiry-Based Educational Setting

BY

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BA, Islamic Azad University – North Tehran Branch, Iran, 2006

MA, Allameh Tabataba'i University, Iran, 2018

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We acknowledge and respect the Lək^{w}əŋən (Songhees and X^{w}sepsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək^{w}əŋən and W̱ SÁNEĆ Peoples whose historical relationships with the land continue to this day.

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Abstract

This research explores the impacts of teachers' perceptions of assessment and the role of assessment practices in inquiry-based learning among K-12 teachers in Victoria, British Columbia (BC), Canada. Drawing upon constructivist theory, this qualitative phenomenological study aimed to better understand how a small group of K-12 teachers in Victoria described their assessment practices within an inquiry-driven and highly personalized learning environment. Additionally, I explored the challenges they faced in implementing inquiry-based assessments. Using snowball sampling, I collected data through semi-structured interviews and a focus group meeting with nine middle and high school inquiry-based teachers. Additionally, I gathered assessment documents and analyzed the data using an inductive approach. The findings suggested that as a student-centred learning design, inquiry-based learning honors students' autonomy by creating personalized learning experiences. Inquiry-based learning can motivate students and foster their critical thinking skills. Moreover, teachers' beliefs and their past experiences were identified as influential factors in embracing inquiry-based learning. The findings also showed that assessment practices were perceived as an ongoing, integrated process in which students have a voice. Although the interdisciplinary nature of inquiry-based learning is supported by the BC redesigned curriculum, challenges remain, including the persistence of product-focused assessment and gaps in competency-based frameworks. Factors such as class size, institutional alignment, and teacher education programs influence the implementation of inquiry-based learning, highlighting the need for professional development and a strong support network.

Keywords: assessment practices, inquiry-based learning, inquiry-based assessment, student agency, personalized learning.

Table of Contents

List of Figures

List of Tables

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Chapter One: Introduction

Introduction

The evolving priorities in education have encouraged a reconsideration and renewal of teaching practices. To this end, focusing on lifelong learning and developing global citizens are among the commitments that are suggested by the educational authorities (BC Ministry of Education, n.d.-b). In the same vein, the importance of adopting educational practices that fully engage students in learning and creating an inclusive educational environment has been emphasized (Buchanan & Song, 2022). The incentive behind tackling educational inequality and creating inclusive environments is to honour students' abilities and pave the way for them to reach their potential (Andreasen, 2014). As a way of doing so, teachers may offer multiple opportunities for authentic learning, ensuring their students are purposefully involved in the process of learning and receive encouragement and support when needed. Educating curious learners, provoking their interest, and supporting them through uncertainty could be considered effective strategies for creating an effective learning environment (Peterson, 2020). To this end, some contemporary educational settings are beginning to put more emphasis on designing a space to strengthen students' motivation and honoring the rich source of knowledge that they bring to the classroom (Buchanan & Song, 2022; Suárez et al., 2018).

As a viable solution to encourage students' active role in learning process, an inquiry-based learning approach emerges as a fitting framework that prioritizes students' agency and empowers them to take responsibility for their knowledge creation. In inquiry-based learning, students become involved in the process of learning through the exploration of questions and active construction of knowledge (Liu et al., 2022). Inquiry-based learning aims to enhance students' engagement and interest in the subject by fostering genuine care for learning,

encouraging them to go beyond the goal of simply achieving high grades (Chinn & Duncan, 2021). Inquiry-based learning intends to foster a sense of ownership and autonomy in students, nurturing their natural curiosity and promoting a deeper level of learning and knowledge acquisition (Onyema et al., 2019). Guiding students through such a learning environment and tracking their development requires consistent and effective assessment methods (Li et al., 2018). Researchers indicate that creating an engaging learning environment and providing students with constructive feedback on their performance can positively impact their learning experience (Walker et al., 2021). Therefore, teachers constantly seek to be familiarized with various methods of assessment practices to expose students to the learning process and provide personalized feedback on their learning (Walker et al., 2021). By posing thought-provoking questions, encouraging curiosity, and providing opportunities for hands-on exploration in an inquiry classroom, students are empowered to participate in their learning actively, develop critical thinking skills, and deepen their understanding of the subject matter (Nzomo et al., 2023).

Exploring Personal Positionality

Positionality is the practice of a researcher delineating their own position in relation to the study, with the implication that this position may influence aspects of the study (Creswell, 2008). The interpretive nature of qualitative research turns positionality into a fundamental part of the research process. One of the epistemological assumptions of the constructionist paradigm is that reality can be constructed based on the author's values, standpoints, and positions (Bhattacharya, 2017). In my experience, students are often not fully prepared to navigate life, which involves managing daily matters. Taking my school days as an example, the bridge between taught lessons and the lived experience was missing for me. In other words, years of

school and university education hardly equipped me to encounter what was outside the scholastic bubble.

As emphasized by Locke (2019), our research interests are connected to our identities, histories, and experiences, and awareness of our positionality indicates our lens on the data. I was mindful that my research could be informed by my background, considering I am an immigrant who has decided to conduct research in a diverse and multicultural environment in Canada. I identify myself as a researcher who is interested in exploring the world of inquiry and its potential to empower students with the essential skills and competencies needed to navigate the complexities of the real world. I assume that self-knowledge is part of significant soft skills, encompassing the ability to reflect and assess oneself accurately. This stance contrasts with being uninformed and passively following predetermined paths without analyzing the situation. The latter approach would lead to no transformation or growth. Accordingly, I am motivated to delve further into the exploration of how an inquiry-based educational approach can shape and prepare students to thrive in the dynamic and ever-evolving real world.

My motivation for studying this area originates from my personal interest, educational background, and several years of experience working in educational institutions. The biggest takeaway from my learning journey so far at the University of Victoria is knowledge and understanding of different approaches to teaching and learning. Participating in different courses and having discussions with my peers and instructors about innovative and active learning methods has inspired me to understand their design and impacts more deeply.

Exploring the concept of a dynamic curriculum has captivated my interest. In this approach, the course topics emerge naturally from the interactive teaching and learning process and student's prior knowledge, actively shaping and guiding their learning journey. It is evident

that educators are increasingly recognizing the value of creating an engaged learning environment that promotes collaboration and personalization. In such a setting, students are encouraged to participate in collaborative studies, allowing for a more personalized and meaningful learning experience. Moreover, teachers must acknowledge and respond to the curiosities and wonders that arise among learners within the classroom. To facilitate effective learning, it is recommended that teachers establish attainable learning goals that can be flexible or tailored to each student's unique needs and abilities. By doing so, teachers create an individualized lens through which students can explore and master the subject matter. This departure from the conventional approaches I encountered during my own school years has motivated me to delve deeper into innovative teaching practices.

As an educator who worked and studied in a traditional learning environment for more than a decade, I feel the necessity to modify and expand my understanding of the learning process and explore inquiry-based pedagogical approaches. Through my experiences as both a student and an educator in a traditional educational system, I have come to realize the limitations of such a stereotyped learning environment that often adheres strictly to a fixed syllabus, leaving little room for flexibility. As a result, I am motivated to broaden my understanding and explore the realm of inquiry-based education. My previous experience confirms that forcing students to memorize copious information without understanding its main application has not only had any positive point on their learning progress but also inhibits their creativity. When students are encouraged to merely memorize facts without grasping their relevance or how they can be practically applied, they may struggle to connect different concepts and miss out on developing a deeper understanding of the subject matter. It seems to me that the desired learning approach requires valuing students' autonomy, interests, and experiences and involving them in the

learning process. A pedagogical approach that prioritizes inquiry encourages learners to present their applicable knowledge and skills in formal and informal ways.

In reflecting upon my experience as a student who studied in a conventional educational system that predominantly emphasized summative assessment, I realized the profound impact of assessment on an educational journey. Throughout my years, the focus was primarily on final exams, quizzes, and standardized tests, where the emphasis lay solely on the result rather than the process of learning. This approach often left little room for exploration, critical thinking, and deeper understanding. The absence of formative assessment limited opportunities to receive timely feedback, identify areas for improvement, and actively engage in the learning process. Consequently, I often found myself driven by the pursuit of grades rather than a genuine passion for knowledge. As I delve into the realm of inquiry-based learning environments, I am excited to explore how assessment practices can impact educational experiences, by emphasizing continuous feedback, self-reflection, and the development of lifelong learning skills.

It is crucial to recognize that the successful implementation of student-centred inquiry pedagogy in the classroom necessitates a comprehensive transformation of the assessment process (Grangeat et al., 2021). Conventional assessment procedures and frameworks might not align effectively with the principles and goals of inquiry-based learning. Therefore, there arises a need for an innovative and context-specific assessment approach that can capture the essence of students' learning experiences within the inquiry-based educational setting. Assessment practices should be designed to meet the evolving nature of inquiry-based learning and its emphasis on collaborative, experiential, and authentic learning experiences. Assessment methods could focus on ongoing formative assessment, providing timely feedback that supports students' growth and development throughout their inquiry journeys.

Purpose of the Study and Research Questions

This study aims to contribute to a deeper understanding of inquiry-based learning environments and assessment practices. I aspired to advance my understanding of effective assessment practices within the context of inquiry-based learning, to better understand inquiry learning practices.

Teachers' beliefs and perspectives shape their practices and roles within the educational system, ultimately influencing student learning (Sabarwal et al., 2022). Moving toward inquiry-based learning necessitates adjustments in teachers' perspectives and their teaching methods to meet the need for dynamic inquiry settings. In the same way, assessment practices may be reconfigured to honour students' agency while evaluating their learning progress (Mackenzie, 2021). Educating learners and monitoring their progress in the process of inquiry necessitates continuous and appropriate assessment procedures (Li et al., 2018), and teachers should gain adequate knowledge and skills for accurate assessment in this setting (Luthfiyyah et al., 2020).

This research explored the importance of teachers' perceptions of assessment and the role of assessment practices in inquiry-based learning among K-12 teachers in Victoria, British Columbia (BC), Canada. This research involved a small group of middle and high school teachers in Victoria and how they described their assessment practices in an environment oriented towards inquiry and highly personalized educational experiences. Of further interest to me was the challenges teachers encountered. My research is focused on three guiding questions:

1. How do teachers perceive inquiry-based learning and how does this guide assessment practices?
2. In what ways do teachers perceive their experiences of assessment practices in an inquiry-based learning environment?

3. How do contextual factors influence teachers' perceptions of inquiry-based learning and their assessment practices?

Significance of the study

The discovery journey helps students develop critical thinking skills and engage in their learning by navigating doubt and discovery (Munoz, 2024). By emphasizing the learning process and continuous feedback, inquiry-based learning design engages students more deeply in their learning process while shifting focus away from the final product. Potential challenges for teachers, particularly in developing assessment practices that value student participation and position learners as active partners, are critical in assessment process.

As teachers embrace inquiry-based approaches, they need to revisit their assessment methods and align them with the principles of inquiry-based learning. This requires teachers to not only facilitate student-centred learning experiences but also consider alternative assessment strategies that go beyond traditional forms of assessment and accurately capture and evaluate the multifaceted aspects of students' learning.

In keeping with the current educational trends around the globe, the Ministry of Education in British Columbia, Canada, modified the K-12 curriculum in 2016. The redesigned curriculum sheds light on competency-driven learning outcomes rather than content-focused educational objectives (BC Ministry of Education, n.d.-a). Such modification in the curriculum necessitates some adjustments in assessing students' competencies. Creating engaging and supportive environments that facilitate abundant feedback in the learning process is important (Massey et al., 2020; Komarraju & Karau, 2008; Kuh et al., 2006; Machemer & Crawford, 2007). Inquiry-based learning environments require tailored assessment methods that provide actionable feedback and accommodate diverse student abilities (Walker et al., 2021; Wurf &

Povey, 2020). By integrating socially constructive practices, educators can create assessments that not only measure student learning but also actively contribute to it (Massey et al., 2020; Shepard, 2000).

In this research, I investigate how educators perceive and adapt their assessment practices to align with the principles of inquiry-based learning. By examining these perceptions, the study aims to contribute to a deeper understanding of how assessment strategies can promote student engagement, critical thinking, and success within the context of inquiry-driven education.

Chapter Two: Literature Review

Introduction

In this chapter, I present theoretical frameworks that guide this study and review the literature on inquiry-based learning and assessment practices. I then describe the current version of the British Columbia Curriculum, followed by a review of the literature on inquiry-based learning, including the influence of teachers' beliefs and their roles, and the concept of student agency. Then, I discuss assessment practices in an inquiry-based learning environment and the concept of teachers' perceptions of assessment. Thereby, I aim to comprehensively understand the topic's background, key concepts, and relevant theories by analyzing various scholarly sources.

Theoretical Framework

The theoretical framework forms the fundamental basis of research and provides a conceptual lens through which the study is framed. Theory is a set of accepted principles, assumptions, and rules established to analyze and explain the nature or behaviour of a particular phenomenon (Bates, 2005). This study adopted constructivism as the foundational philosophical perspective, shedding light on dynamic learning and knowledge construction processes. Vygotsky's sociocultural theory emphasizes the social environment as a facilitator and influential factor in human learning and development (Vygotsky, 1978). Moreover, a comprehensive explanation of Vygotsky's Zone of Proximal Development (ZPD), highlights the role of guidance and interaction with peers in cognitive development (Vygotsky, 1978). Learning is perceived as an interactive process where students actively employ cognitive skills to construct knowledge through their participation in learning experiences and social interactions (Bui &

Khuu, 2020). Below I elaborate on the key principles of each theory, followed by an exploration of how these theories connect and relate to inquiry-based learning.

Constructivism

Constructivism can be regarded not merely as a theory but as an epistemological framework or philosophical explanation investigating the essence of knowledge acquisition and learning (Hyslop-Margison & Strobel, 2008; Simpson, 2002). It is a psychological and philosophical standpoint that emphasizes the significance of knowledge construction and advocates that individuals actively build and shape their own learning and understanding (McLeod, 2019; O'Donnell, 2012). Constructivism suggests that acquiring knowledge is not a passive process but is constructed through comprehending the subject, and cognition is not about finding a single, ultimate reality (von Glasersfeld, 1995). Instead, it focuses on gaining knowledge through individual interactions with the world, whether independently or collaboratively (Fosnot, 1989; Steffe & Gale, 1995; Thompson, 2000). Constructivism, as a view of learning, maintains that learners meaningfully build their knowledge and understanding of the world through their perception and thinking (Zajda, 2021) and highlights the importance of social interaction for effective learning (Shor, 1992).

Learners are now positioned at the forefront of the learning process, marking a shift from the traditional focus on knowledge acquisition to a greater emphasis on understanding how knowledge is actively constructed (Schunk, 2020). Learning takes place within specific contextual settings (Bredo, 2006), and learners create their understanding in a variety of ways. According to Piaget (1936,1977), children have their own unique way of understanding and constructing the meaning of the world around them. Constructivism also emphasizes the significance of communication between individuals and their surrounding circumstances,

highlighting its potential impact on the process of acquiring knowledge and refining skills (Bredo, 2016; Cobb & Bowers, 1999).

The influence of constructivism in educational thinking and its effect on learning theory and research is pervasive. It forms the basis for an integrated curriculum that allows for studying a topic from various perspectives, developing the learning material, and designing the learning situation so that learners become actively involved in the learning process (Schunk, 2020). In constructivist teaching philosophy, student autonomy is supported, and their thinking "drives the lessons, where dialogue, inquiry, and puzzlement are valued," (Akpan & Beard, 2016, p. 392). There is a close alignment between these assumptions and the principles of inquiry-based learning design. In such a learning setting, teachers step away from a conventional approach to delivering information and create a learning environment that facilitates students' engagement and empowers them to construct their learning. Students are encouraged to explore their interests, set personal goals, and actively monitor and evaluate their progress (Bruning et al., 2011).

Sociocultural Theory

Sociocultural theory traces its roots back to the works of Russian Psychologist L.S. Vygotsky and his colleagues, who maintained that human learning processes are fundamentally shaped and mediated by cultural factors, activities, and concepts (Lantolf, 2000). Sociocultural theory highlights the impact of social interactions on a learner's cognitive growth and perceives the individuals' learning as a process influenced by activities within a community (Bredo, 1997; Gredler, 2012; Kozulin, 1986; Tudge & Winterhoff, 1993). Vygotsky was influenced by constructivists, especially Piaget's theory of cognitive development. Piaget (1970) highlighted the role of individuals in constructing their understanding based on their prior knowledge and

experiences. While Vygotsky (1978) acknowledged the individuals' active role in constructing knowledge and understanding, he was critical of the absence of social and cultural impacts in Piaget's theory. He argued that learning does not happen in isolation and is attached to the context in which it happened. Vygotsky's theory emphasizes that human development is influenced by the dynamic interplay among social, cultural-historical, and individual factors (Tudge & Scrimsher, 2003).

Vygotsky acknowledged the critical role of biological factors in the development of elementary processes and emphasized the essential role of sociocultural factors in shaping individuals' learning (Lantolf & Thorne, 2007; Vygotsky, 1978). He has also maintained that learning can be facilitated through cooperation and communication with individuals in the environment (Vygotsky, 1978). However, interactions serve a different purpose than simply conveying information to learners in a conventional manner. Instead, students use their existing knowledge and personal attributes to actively process their experiences and restructure their cognitive frameworks.

Sociocultural theory puts a great emphasis on meaning while teaching new ideas and concepts and argues that learning and development can not be separated from their context. To be more specific, skills and knowledge should not be taught as distinct concepts and in isolation but rather must be presented in all their complex forms (Turuk, 2008). The theory also emphasizes the significance of learning that emerges through individual interactions, highlighting the dynamic relationship between teachers and learners. It recognizes that learners' active engagement with their environment shapes their thinking and acknowledges that the connection to the world can reshape the meanings of concepts (Gredler, 2009).

As Vygotsky (1978) stated, knowledge is a co-construction process and identified language and culture as the frameworks through which individuals collectively experienced, communicated, and comprehended reality. In this theory, social environments are considered critical for constructing meaningful learning. and the learner's culture should be considered a significant factor in understanding learning and development (Schunk, 2020).

Zone of Proximal Development (ZPD)

The Vygotsky's ZPD concept is defined as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). ZPD refers to the skills and knowledge that cannot be accomplished by learners without seeking relevant scaffolded assistance (Mitchell & Myles, 2004). Learners cannot perform tasks or demonstrate various skills unless they receive appropriate guidance in proper instructional conditions (Puntambekar & Hübscher, 2005). Vygotsky introduced the concept of ZPD as he was not satisfied with the methods used to assess a child’s cognitive abilities and instructional practices (Turuk, 2008). He also emphasized the importance of recognizing children's potential abilities and acknowledging that they can be achieved, even if they have not yet accomplished them (Vygotsky, 1978).

In the ZPD, learners actively participate in a task that challenges their existing abilities, requiring the guidance and support of their teacher. This collaborative engagement is necessary because the task's difficulty level exceeds the learners’ current capacity for independent accomplishment (Gredler, 2012). According to Cook (2008), the remarkable aspect of Vygotsky‘s ZPD lies in the fact that “the gap between the learner‘s current state and their future knowledge is bridged by assistance from others; learning demands social interaction so that the

learner can internalize knowledge out of external action" (p. 229). Social interaction between teacher and learner will lead to cognitive development in the ZPD, resulting in cognitive transformation in learners (Cobb, 1994). Guided engagement is an influential aspect of ZPD (Rogoff, 1986). Cultural knowledge is not transferred passively through these interactions, and learners' understanding does not accurately reflect what is happening around them. Instead, learners contribute their understanding to social interactions and generate meanings by blending their understandings with contextual experiences (Schunk, 2020).

Vygotsky's ideas have many instructional applications and highlight the influence of sociocultural factors in the learning process (Karpov & Haywood, 1998; Moll, 2001). Among them, peer collaboration can be mentioned as it indicates the notion of collective activity (Bruner, 1984; Ratner et al., 2002). Social interaction can have an instructional purpose while learners cooperate on shared tasks. Defining responsibilities to learners while working in a group activity advanced their performance (Cobb, 1994; Cohen, 1994; Slavin, 1995) and learners need to meet the necessary competence before stepping to the next level (Slavin, 1995).

Connecting Constructivist Theories to Inquiry-Based Learning

Inquiry-based learning is inextricably connected to a constructivist approach to education, which advocates for actively engaging students in meaningful activities to construct their knowledge through hands-on experiences (Onyema et al., 2019). In inquiry classrooms, students are guided by teachers and, in some instances, peers to develop an understanding of a topic and acquire new knowledge through a process of discovery. Through inquiry learning students explore and investigate real-world problems and understand concepts as they actively connect new information to their existing mental frameworks (Martell, 2022).

Vygotsky's sociocultural theory (1978) emphasizes the role of social interactions and cultural context in shaping learning and the advancement of higher-order mental activities. Inquiry-based learning aligns closely with the fundamental principles of this framework, by encouraging collaborative learning experiences where students work together in groups, share ideas, and engage in meaningful discussions. These social interactions provide opportunities for students to learn from their peers, negotiate meaning, and co-construct knowledge, thus enriching their learning experiences (Bui & Khuu, 2020).

Furthermore, the ZPD highlights the role of guidance and scaffolding can be regarded as a framework for assessment practices in an inquiry-based educational setting (Tharp & Gallimore, 1989). In an inquiry-based learning environment, teachers act as facilitators, provide support, and help students explore complex concepts and skills. These supports enable students to challenge themselves and develop higher-order thinking skills as they move toward independent learning. Assessment practices in an inquiry classroom involve communication between teachers and students that allows observing students' performance and progress in various learning activities (Li et al., 2022). In this context, students actively participate in monitoring their own learning progress through self-evaluation, peer feedback, and guidance from instructors (Black & Wiliam, 2009; Coombs et al., 2018; Earl, 2012) to foster their understanding of the content while nurturing their independence.

Curriculum Reform in British Columbia: A New Direction

The British Columbia (BC) provincial government redesigned curriculum in 2016 in response to the evolving needs of students and to support "the development of citizens who are competent thinkers and communicators, and who are personally and socially competent in all areas of their lives" (BC Ministry of Education, n.d.-a, para.6). The redesigned curriculum

provides more flexibility for teachers to be innovative, consider individual needs, and create personalized and student-centred learning experiences (BC Ministry of Education, n.d.-a). The aim was to adapt education and put students at the center of their learning to foster higher-order thinking skills required in today's world (BC Ministry of Education, n.d.-a). To encourage students' holistic development, core competencies, previously referred to as cross-curricular competencies, are integrated into the new curriculum and defined as "sets of intellectual, personal, and social and emotional proficiencies that all students need in order to engage in deep, lifelong learning" (BC Ministry of Education, n.d.-b, para.1). Personal and social, communication, and thinking competence are identified as the three core competencies essential for all learners (BC Ministry of Education, n.d.-b). This new initiative could prepare students for their lives by mastering the sets of knowledge and skills that are interconnected, foundational, and applicable across all areas of learning (BC Ministry of Education, n.d.-b).

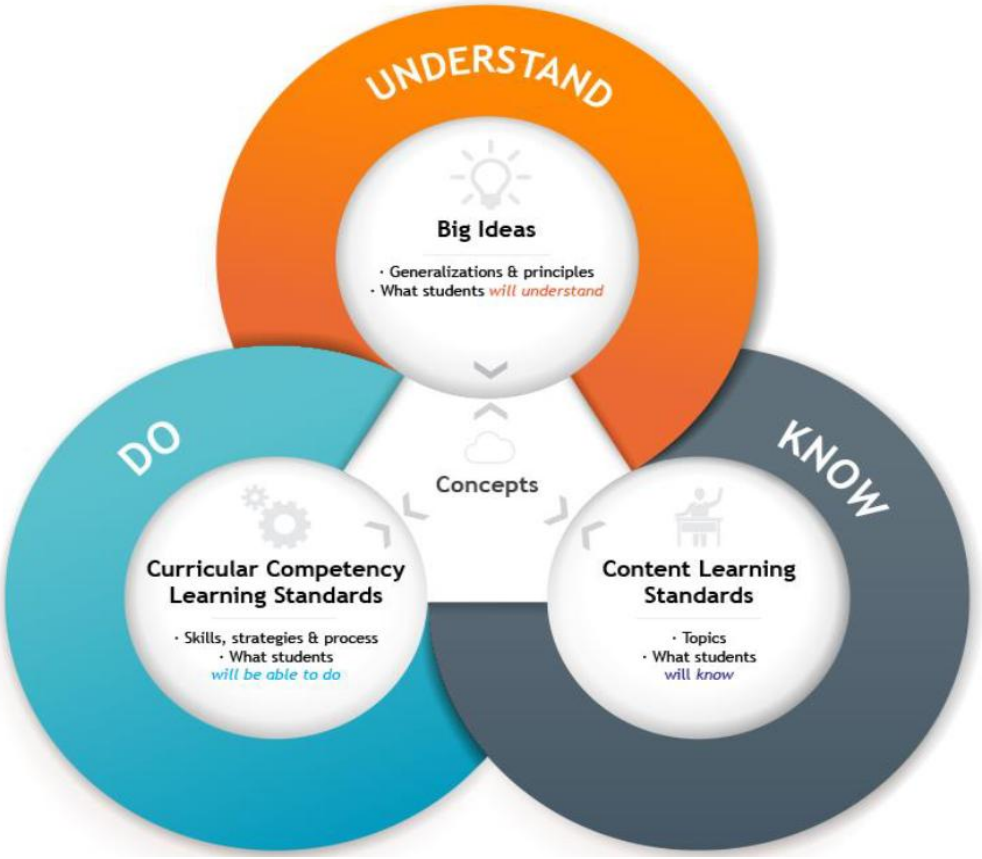
The new curriculum moves from a content-focused approach and adopts a concept-based, competency-driven framework. This means that the content and subjects at each level are less descriptive, with a greater emphasis on understanding concepts, competencies, and skills. To be more precise, teachers could focus on the knowledge and skills related to each discipline, which is called curricular competencies and the core competencies, which are defined as "a set of intellectual, personal, and social competencies that students develop to engage in deeper learning and to support lifelong learning through the course of their schooling" (BC Ministry of Education, n.d.-c). This new direction could enable students to transfer their learning to the new context.

The redesigned curriculum is structured around the concept-based competency-driven framework, known as the know-do-understand model (BC Ministry of Education, n.d.-a). Central

to this model are three main elements: Big Ideas (Understand), Content (Know), and Curricular Competencies (Do) (Figure 1). Big Ideas represent overarching generalizations, principles, and key concepts essential to learning and define what students are expected to understand by the end of a specific grade (BC Ministry of Education, n.d.-a). Content outlines the topics and knowledge students need to acquire for a particular grade level. Lastly, Curricular Competencies encompass the skills, strategies, and processes that students gradually develop, enabling them to perform tasks and apply their learning effectively (BC Ministry of Education, n.d.-a).

Figure 1:

The Know-Do-Understand Model



Note. From "BC's Curriculum: Curriculum Overview," by British Columbia Ministry of Education, n.d.

The revised curriculum suggests new approaches to assessment practices to reflect its competency-based nature by focusing on developing proficiencies that enable students to engage in deep and lifelong learning. The new assessment framework incorporates diverse ways for students to demonstrate their learning, with an increased emphasis on self-assessment and formative assessment, also known as assessment for learning (BC Ministry of Education, 2023). Communication in the assessment process is also highlighted, shifting the perception of assessment from being solely a teacher's task to a co-assessment approach involving students and prioritizes assessing their competencies and skills (BC Ministry of Education, n.d.-d). To align with these changes, the framework mandates the use of the provincial proficiency scale for grading in kindergarten to grade 9, while grades 10-12 continue to use letter grades or percentages to report learning (BC Ministry of Education, 2023).

Inquiry-based Learning Environments

Learners' motivation to explore their environment, their willingness to bridge their knowledge gaps, and their engagement in learning experiences can influence their learning outcomes (Ferrer et al., 2022). Encouraging curiosity in students may inspire them to become active, engaged, and motivated individuals (Peterson, 2020) who are eager to be involved in learning and become self-directed lifelong learners (Lock et al., 2021). Curiosity is a key driver of learning, and when nurtured, it can lead to a deeper and more meaningful educational experience (Mackenzie, 2021; Vogl et al., 2019). Developing curious learners and equipping them with questioning skills to pose proper questions could positively impact their learning outcomes (Clark et al., 2021)

There has been a growing focus on creating an environment that goes beyond the mere transmission of information by fostering students' curiosity and enhancing their motivation

(Peterson, 2020; Suárez et al., 2018). An inquiry-based learning approach emerges as a fitting framework as it prioritizes students' agency and empowers them to take responsibility for their knowledge creation. Confirming this, constructivist reform encourages students to be engaged in their learning process and be challenged by their teachers to think critically and at higher levels (Alston et al., 2020). In such educational environments, the emphasis has been shifted from the conventional role of teachers as the primary coordinator of learning activities to a facilitator who guides learners to come up with their ideas and enables their inquiries (Laudano et al., 2020; Laursen et al., 2016).

Inquiry-based learning's philosophy is deeply rooted in the constructivist learning theories of John Dewey (1938), Jean Piaget (1964), and Lev Vygotsky (1978) that define learning as a process to encourage students to employ their cognitive skills to construct their knowledge while actively engaging in social interactions. This instructional method engages students in learning activities by posing questions, exploring phenomena, and constructing knowledge (Liu et al., 2022). Inquiry-based learning fosters active learning and supports students' group activities to conduct research, demonstrate their learning, and achieve academic success (Kaçar et al., 2021). To this end, an educational setting is facilitated in a way that learning contents are not directly provided, but rather, students are encouraged to discover them by posing questions and being involved in the learning process (Bui & Khuu, 2020; Hanafi, 2016).

Inquiry-based learning found its origin in the definition by Piaget (1959), Pierce (1955), and Lev Vygotsky (1978) as a process in which learners continuously investigate their area of interest through involvement in social interaction to facilitate mutual learning. The National Research Council (1996) defines inquiry as:

> A multifaceted activity that involves making observations, posing questions, examining books and other sources of information to see what is already known, planning investigations, reviewing what is already known in light of experimental evidence, using tools to gather, analyze, and interpret data, proposing answers, explanations, and predictions, and communicating the results. (p. 23)

Pedaste and Sarapuu (2006) describe inquiry-based learning as a method to encourage students to apply their research skills to solve problems and develop their understanding. It has also been defined as an inductive approach in which "instruction begins with specifics – a set of observations or experimental data to interpret, a case study to analyse, or a complex real-world problem to solve" (Prince & Felder, 2006, p. 123). Wolf and Fraser (2008) describe it as a student-centred and immersive learning approach focused on developing methods for acquiring knowledge collaboratively with students. The key features include preparing students to learn research skills and, through that, develop critical thinking ability, be able to do independent inquiry, and take responsibility for their learning and intellectual development (Spronken-Smith et al., 2012).

In inquiry-based learning, students explore the curriculum contrary to the lecturing method, and through asking questions, they become engaged in researching learning content actively (Wiggins et al., 2017). Quantitative research showed that inquiry-based learning could create an engaging learning experience for students (Talampas, 2024). It can be viewed as a cognitive process involving using accessible sources of information, evaluating them to formulate arguments, and connecting them to real-life experiences (Herranen et al., 2019).

More recently, Rahmi et al., (2019) used a quasi-experimental research design to examine the influence of inquiry-based learning on students' critical thinking skills. Their findings showed

that inquiry-based learning can engage students in scientific research and enhance their problem-solving, decision-making, and analyzing skills. Moreover, Wale and Bishaw (2020) examined the impact of inquiry-based learning on students' critical thinking skills. A quasi-experimental design was used, and data were collected through tests, focus group discussions, and a student-reflective journal. The findings revealed that inquiry-based argumentative writing instruction could positively influence students' analysis, interpretation, and explanation, which are considered among the critical thinking skills. A meta-analysis study also highlighted the positive effect of student-centred education, including inquiry-based approaches, on students' personal and social competencies achievement (Li & Ding, 2023).

Inquiry-based learning can enable students to generate knowledge, promote problem-solving, and develop high reasoning skills, which result in effective learning outcomes (Avsec & Kocijancic, 2014; Suana, 2022). In this method, the emphasis has been shifted from memorizing information to discovering and constructing knowledge (Cairns & Areepattamannil, 2019; Suana, 2022). Therefore, it requires students to improve their questioning skills, make hypotheses, and thoughtfully consider the result (Rodriguez-Triana et al., 2021). In line with this, a systematic review of inquiry-based learning research underscores the effects of this approach toward education, highlighting how it could foster 21st-century skills and equips students for success in a rapidly evolving and complex world (Sam, 2024).

Levels of Inquiry-based Learning

There are various levels of inquiry-based learning referring to the depth and complexity of students' engagement in learning and constructing knowledge (Gholam, 2019; Marshall, 2013). As emphasized by The National Science Education Standards (1996), through inquiry teaching students are encouraged to address research questions through data analysis. To start

with inquiry activities, the questions and data may be provided, and students are encouraged to conduct an analysis and come to their own conclusions (Duran & Dökme, 2016). To promote students' authentic inquiry activities, extensive support and scaffolding may be offered to conduct scientific questions and advance their inquiry skills (Alston et al., 2020). Students are expected to gradually take ownership of their learning, raise authentic questions, and construct their understanding at higher levels (Koksal & Berberoglu, 2014).

Inquiry-based instruction can be found in a range from confirmatory instruction to open inquiry, depending on the level of openness and cognitive requirements (Banchi & Bell, 2008; Bell et al., 2005; Duran & Dökme, 2016). The amount of information and the level of guidance that was given to students also define this continuum (Mackenzie, 2016). According to this classification, in confirmatory instruction or pre-inquiry level, known as teacher-centred instruction, students replicate the inquiry process as they are given the research questions, procedures and pre-determined outcomes (Bernido, 2020). This is effective in helping students conduct research and reinforce the concepts which have already been introduced. It also gives students an opportunity to practice data collection and recording as an example of inquiry skills (Banchi & Bell, 2008). Structured inquiry or developing inquiry is the next level of this classification that goes beyond teacher-centred instructions. Students are asked to figure out the results with supporting evidence while the research questions and procedures are provided (Banchi & Bell, 2008; Bell et al., 2005). Confirmation and structured inquiry are regarded as lower-level inquiries, while they are fundamental steps to empower students through a gradual release of responsibilities and building competencies to conduct more open-ended inquiry (Mackenzie, 2016).

In guided or proficient inquiry, students build their comprehension of scientific concepts by designing the research procedure. In this process, teachers guide students by presenting the research questions, and students are asked to create or select the research method to answer them and complete their inquiry (Gerhátová et al., 2021). Providing students with opportunities to implement various ways to design their inquiry will increase the experiment's success (Banchi & Bell, 2008). Teachers, as facilitators, have open conversations with students, and the discussion is anticipated to guide students in the expected direction (Koksal & Berberoglu, 2014). Open or exemplary inquiry is identified by students directing the learning process while the teachers' role is transferred to a facilitator. This level involves the highest level of analytical reasoning and cognitive abilities as students take the main role by posing appropriate questions, designing the procedure, conducting an inquiry, and communicating the results (Banchi et Bell, 2008; Bell et al., 2005). Students can carry out an open inquiry when they demonstrate an ability to collect data, analyze them, and come to conclusions from the information they have gathered.

A closer look at various levels of inquiry reveals that students gain more chances to build their knowledge once teachers step away from direct instructions and support students in their learning process to achieve self-sufficiency (Bui & Khuu, 2020). The highest level of inquiry equipped students with essential skills to guide their own inquiry and learning process. The selection of suitable inquiry-based instruction relies on the learning objective of the course (Asay & Orgill, 2010). By evaluating the desired outcomes and the educational context, instructors can decide on the type and level of inquiry that aligns best with the intended learning outcomes.

Flexible Phases of Inquiry Theory

The flexible phases of inquiry theory (Bacak & Byker, 2021) indicate that inquiry-based teaching practices are adaptable, the levels of inquiry are dynamic, and each level can overlap

with the next one, highlighting the adaptability in implementing inquiry-based learning experiences. Therefore, allowing instructors to experience various levels of inquiry and learn more about its evolving nature can broaden their understanding of the concept (Biggers & Forbes, 2012) and enhance their ability to facilitate inquiry-based learning in diverse educational settings.

The flexible phases of inquiry theory were built upon Banchi and Bell's (2008) levels of inquiry framework, which describes inquiry practices as concurred phases rather than classified levels. According to this framework, inquiry practices can smoothly move between different levels depending on the information and support students receive. The framework acknowledges the extensive notion of inquiry and its flexibility in practice, which makes it challenging to categorize inquiry into fixed and predefined levels (Bacak & Byker, 2021). The framework reflects the dynamic nature of the inquiry process as students move between various stages of their inquiry to uncover new insights.

The Impact of Teacher's Beliefs in an Inquiry-based Learning Design

Educational researchers have studied teachers' beliefs for many years. As Bandura (1997) argued, beliefs significantly impact individuals' actions and could affect their goals, decisions, and performance beyond truth. Teachers rely on their beliefs in classroom settings to teach and function in complex situations (Fives & Buehl, 2017). Addressing teachers' beliefs in educational research derives from the possible connection between their beliefs and their teaching practices (Fives & Gill, 2015; Woolfolk-Hoy et al., 2006).

There are many definitions of teachers' beliefs. Pajares (1992) defines belief as "an individual's judgment of the truth or falsity of a proposition" (p. 316). Buehl and Beck (2015) believe teachers hold beliefs about various things associated with their teaching at different

levels of precision, such as their instruction, knowledge, and students. For Borg (2001), teacher beliefs are pedagogic beliefs connected to an individual's teaching. Chan and Elliott (2004) perceive beliefs as the teachers' preferred teaching and learning methods. Basturkmen et al. (2004) defined teacher beliefs as "statements teachers make about their ideas, thoughts, and knowledge that are expressed as evaluations of what "should be done," "should be the case," and "is preferable" (p. 244).

Teachers' beliefs offer insight into their practices, decision-making processes, and effectiveness of their teaching practices (Pajares, 1992). These beliefs could impact classroom management and judgment and are considered the basis of teaching and learning (Chan & Elliott, 2004; Hermans et al., 2008). Teachers' philosophies may reflect their emotions and thought processes as they develop theories based on their teaching experiences and professional activities (Hidayah et al., 2023). Teachers tend to rely on their beliefs when making instructional decisions and framing specific problems or tasks, including preparing lesson plans, presenting learning materials, and supporting students (Pitikornpuangpetch & Suwanarak, 2021).

Studies on teachers' beliefs mainly focus on two categories. The first group focuses on traditional and teacher-centred teaching practices (Chan & Elliott, 2004). This group regards teaching as a content-oriented process in which students gain knowledge through teachers and textbooks (Prawat, 1992). Learning is a passive process for these groups in that knowledge is transferred through the teacher, and students are the recipients (Chai, 2010). The other groups hold the contrary position, as they have constructivist and student-centred beliefs (Chan & Elliott, 2004). These groups believe in the student-centred approaches to teaching and learning (Cheng et al., 2009), where students have an active role in knowledge construction and teachers' roles are transferred to facilitators (Chai, 2010). Teachers who hold constructivist beliefs

consider that knowledge is created through interactions between students as well as teachers and students (Cheng et al., 2009).

In inquiry-based teaching, teachers lean toward a student-centred approach. A case study research with pre-service teachers in an inquiry-based context suggests that teachers' beliefs and perceptions could be influenced by the theoretical basics they developed in their education and their experiences with inquiry (Herranen et al., 2019). To be more precise, their beliefs can be affected by their past experiences with authentic research (Windschitl, 2003), their teaching experiences in inquiry-based teaching environments (Luft, 2001; Friedrichsen et al., 2006), and the disciplines they are teaching (Breslyn & McGinnis, 2012). According to Jones and Carter (2007), teachers' implementation of inquiry-based learning practices is linked to their beliefs and attitudes, and they are more likely to adopt this approach when their beliefs align with the principles of inquiry-based design. The impact of teachers' beliefs in inquiry classrooms was also supported by Koutsianou and Emvalotis (2021) research. Their qualitative research aimed to understand the relationship between teacher's beliefs and their perception of inquiry-based learning in science and history. They collected data through semi-structured interviews with fifteen primary school teachers. Their research findings revealed connections between teacher's beliefs and their understanding of inquiry-based learning, and the more supportive teachers' epistemic beliefs are, the deeper their understanding of inquiry-based learning.

Other essential factors to consider are teachers' beliefs about assessment, which could influence teachers' assessment practices (Brown, 2003, 2011; Harris & Brown, 2009). In 2020, Correia and Harrison investigated secondary science teachers' espoused beliefs about inquiry-based learning and formative assessment practices using a case study approach. They gathered data through semi-structured interviews, and their findings showed that teachers' beliefs about

inquiry and their role in inquiry-based classrooms align with how they teach and assess inquiry-based learning environments (Correia & Harrison, 2020). Thus, to modify teachers' assessment practices, their beliefs need to be adapted (Barnes et al., 2015). Any shift in classroom practices necessitates teachers to adapt their beliefs and modify their interpretation of classroom events based on their existing belief systems (Correia & Harrison, 2020).

Teacher's Role as Facilitator of Learning

A teacher's role as a learning facilitator is crucial in student-cantered educational settings, namely inquiry-based learning (Dobber et al., 2017). The shift from traditional teaching methods to flexible, student-centred learning environments emphasizes teachers' diverse roles and responsibilities (Elwarraki et al., 2023). Teachers facilitate the learning process and create a supportive learning environment which advocates for students' engagement in exploring the topic. It is suggested to step away from direct instruction to develop and modify curriculum through student-centred approaches to education (Dyson, 2014; O'Sullivan, 2013). In inquiry-based learning, teachers serve as key facilitators, guiding students' inquiry processes while fostering their curiosity and autonomy (Sam, 2024).

The teacher's active role is emphasized in educational settings not only as support when students reach a barrier but also as a person who interprets, understands, and improves the learning (Goodyear & Dudley, 2015). It is also argued that teachers employ a direct and indirect teaching approach to support students' learning and extend their abilities to complete learning tasks (Dobber et al., 2017). The student-centred nature of the inquiry-based learning approach does not diminish teachers' involvement or their impact on students' learning (Goodyear & Dudley, 2015; Shanmugavelu et al., 2020). Teachers assist students in planning their inquiries and achieving their learning goals, helping them access legitimate information and creating a

supportive atmosphere to strengthen student-teacher and student-peer relationships (Shanmugavelu et al., 2020).

Teachers are the facilitators of inquiry who support students' questioning skills. They can activate students' thinking while engaging them in the various stages of inquiry, including planning and implementing their project and presenting their understanding (Herranen & Aksela, 2019). Teachers guide students' inquiry and gradually help them take ownership of their learning. As students gain more responsibility, teachers will step away from direct guidance (Hynes-Berry & Berry, 2014). There is a close relationship between the success of the inquiry-based design and adequate scaffolding (Furtak et al., 2012; Zacharia et al., 2015). Teachers need to keep the balance between giving students agency to explore the topic of their interest and guiding them through their inquiry to reach the desired learning outcomes (Alston et al., 2020; Rodriguez-Triana et al., 2021), which could be challenging for teachers (Dobber et al., 2017).

Teachers have a pivotal role in inquiry classrooms by fostering students' thinking skills, activating their prior knowledge through discussion, narrowing their inquiry topics, and monitoring their learning path (Rodriguez-Triana et al., 2021). They could also assess students' learning outcomes, including their understanding of the topic and skills (Zeegers & Mckinnon, 2012). Moreover, empirical research shows that teachers' scaffolding and challenging students in higher-order thinking skills could help them reach higher-level learning goals (Alston et al., 2020). In an inquiry-based classroom, teachers assist students in reaching the desired learning outcome by interpreting the content and objectives of the curriculum and aligning them with students' inquiry (Banja & Mulenga, 2019). In accordance with social constructivist theory, teachers are available to provide an opportunity for students to construct their knowledge

(Mulenga & Ng'andu, 2022) and enhance their learning skills, such as problem-solving and decision-making (Li & Ding, 2023)

Student's Agency

The literature has highlighted the importance of students' agency in carrying out inquiry (Chinn & Golan Duncan, 2021). Engaging students in inquiry activities and encouraging them to consider alternative ways of knowing requires fostering their sense of agency (Miller et al., 2018). In 1922, Dewey argued that humans' choices describe their nature and represent their agency. Vygotsky (1978) stated that individuals adopt ownership of their learning through social practices and social interactions. Bandura (1986b, 2001) highlighted that agency relates to learner's desire to control their learning activities. The literature also describes the agency as a motivational notion that enables students to make choices (Reeve & Tseng, 2011; Wigfield et al., 2015).

More recently, students' agency has been defined as having control over their ideas, the authority to share them with others, and the ability to improve their understanding and come to their own conclusions (Chinn & Golan Duncan, 2021). In an educational context, students' agency refers to their ability to assess their influence on their own learning and to work effectively within an educational setting (Saarela et al., 2021). Hooshyar et al. (2023) believe that agency for learning is a student's ability to influence their learning process.

The student's agency is regarded as an important 21st-century learning skill that could guide and assist students in navigating learning (OECD, 2019). Students who have agency can take ownership of their learning, design their learning path, assisting them to become lifelong learners (Jääskelä et al., 2020). Student agency is closely linked to constructivist and sociocultural perspectives on learning (Martin, 2004). In student-centred learning environments,

learners co-construct knowledge, solve problems, collaborate with others through communication and motivate themselves to take ownership of their learning (Edström & Kolmos, 2014; Savery, 2015). These learning principles are aligned with the notions of learner agency and support students in interacting effectively with their learning context (Jiang et al., 2022).

Creating a supportive learning environment where students can pose their questions, express their ideas, and share their interests is essential to cultivating students' agency (Vaughn, 2020). Teachers' flexible approaches to teaching are pivotal to supporting students' agency and extending it beyond individual interests. It creates a context where students' interests become the priority, and students and teachers co-create learning contexts (Vaughn, 2020).

Inquiry-based learning is recognized for its potential to enhance learner agency by promoting curiosity, motivation, and critical thinking skills. In inquiry-based classrooms, students engage in learning activities by asking questions and exploring new ideas. These principles emphasize students' choice to participate in learning, and this exercise of agency can enhance their confidence and competencies (Cavagnetto et al., 2020; Cowie & Harrison, 2021). Kersting et al. (2023), through three-year mixed-method research and by observing twenty Norwegian inquiry-based science classrooms at the primary and lower secondary levels, aimed to understand the factors that influenced the quality of inquiry teaching and students' participation. Their research indicated that inquiry-based learning design increases the quality of students' classroom participation, gave them more choices and empowered them in their learning. In another study, Kim (2022) investigated the role of teachers' conversations and talk practices on students' agency in inquiry-based classrooms. Their study adopted a case study with an ethnographic approach, and data were collected from two elementary teachers and their

students. Their findings revealed that having open conversations with students and adopting a flexible approach could positively impact students' agency. They also highlighted teacher's role in scaffolding the process of supporting students' thinking, collaborating in problem-solving, and developing their knowledge.

Assessment Practices in an Inquiry-based Learning Environment

The influence of conducting active learning environments that offer abundant feedback on learners' performance has been constantly highlighted in the research (Komarraju & Karau, 2008; Kuh et al., 2006; Machemer & Crawford, 2007; Walker et al., 2021). Assessment practices evolved as educators adopted constructivist teaching approaches, emphasized accountability, and recognized the potential of assessment to enhance educational experiences (Double et al., 2020; Massey et al., 2020; Muhammad et al., 2024; Taras, 2005, 2007). The growing awareness about students' learning positions assessment as more than just a summative measure; it is considered a central component that actively influences the learning process (Muhammad et al., 2024). From this perspective, students are given continuous feedback as they progress in their learning to achieve desired outcomes (Walker et al., 2021). Such ongoing assessment, also known as formative assessment, is the foundation for addressing learners' needs, giving them autonomy, and fostering their learning progress (Leenknecht et al., 2021). In this setting, assessment information assists students to direct and take ownership of their learning (Massey et al., 2020).

In inquiry classrooms, teachers employ formative assessment to focus on the process of completing the product and summative assessment, which is more product-oriented and assesses the final product. Teachers aim to balance the formative notion of assessment and its summative purpose (Massey et al., 2020). To this end, teachers are frequently asked to incorporate assessment in various phases of their teaching practices to evaluate students' progress, guide

them and communicate information about their learning (Brown et al., 2019; DeLuca et al., 2019). Students are part of this process and should be actively engaged in assessment activities while evaluating their learning outcomes (Mackenzie, 2021; Rached & Grangeat, 2021). In an inquiry classroom, teachers model self and peer-assessment skills and scaffold them throughout their learning process (Dobber et al., 2017). Students are motivated to engage in self-assessment using prompting questions, reflective thinking, and collaborative communication. Assessment practices are co-designed and co-constructed in an inquiry classroom to foster a culture of togetherness and build trust over time (Mackenzie, 2021).

The growing attention toward problem-based and inquiry-based learning pedagogy to develop 21st-century skills highlights the importance of formative and continuous assessment practices (Lu et al., 2014; Spector et al., 2016; Zemel et al., 2021). These competencies encompass a range of proficiencies, including the capability to be involved in high-level reasoning, comprehending the content, and applying knowledge for problem-solving (Ministry of Education and Research, 2015; National Research Council, 2012; OECD, 2018). Formative assessments require assessing students' responses and providing timely and informative feedback to enhance their understanding of concepts and skills (Spector et al., 2016; Walker et al., 2021). The influence of formative assessment and its role as an essential element of effective teaching has been emphasized in the literature (Johnson et al., 2016; Spector, 2015; Woolf, 2010; Ecclestone, 2010; Narciss, 2008). It has also been noted that formative assessment impacts students' motivation, engagement, and higher levels of achievement (Leenknecht et al., 2021; Narciss, 2008). Considering these facts, formative assessment could motivate students to expand their understanding, allow them to self-regulate their learning, and eventually scaffold their knowledge construction (James & Lewis, 2012). In 2021, Cowie and Harrison's research

outlined how formative assessment could guide, support, and strengthen the development of inquiry competencies and the ability of science, technology, engineering, and mathematics (STEM) teachers to navigate effective pathways through an inquiry activity. Their findings highlighted the connections between formative assessment and inquiry processes. Moreover, the case study research highlighted that integrating both formative and summative assessment enhanced flexible and adaptive inquiry-based learning by making student thinking visible and informing teacher decision-making. However, it also revealed challenges in balancing structured assessment with open-ended inquiry and underscored the need for teachers to adapt assessment strategies to support diverse student learning experiences (Zuiker & Whitaker, 2014).

Teachers' Perspectives on Assessment

Teachers' perspectives on teaching and assessment could serve as a foundation for educational reforms, as these beliefs could impact instructional methods and student learning outcomes (Barnes et al., 2017; Brown, 2003, 2011; Harris & Brown, 2009; Opre, 2015; Voet & De Wever, 2019). Teachers' perspectives on assessment play a critical role in shaping how they incorporate assessment strategies and practices within the classroom (Brown, 2003, 2011; Harris & Brown, 2009) and how they engage students in activities and assessment processes (Barnes et al., 2017).

Teachers' assessment practices can be influenced by their perceptions of the purpose and function of assessment, available policy frameworks, and the sociocultural context of the educational setting (Brown et al., 2019). Therefore, teachers might act differently in a classroom while following the shared goal of improving students' learning. Teachers demonstrate different approaches to assessing students' progress, leading to diverse learning cultures for learners. Teachers' beliefs about assessment may direct how they reflect on assessment principles and

implement assessment practices (Barnes et al., 2017). According to Coombs et al. (2018), teachers hold various conceptions of assessment and attribute different degrees of importance to its purposes, which could consequently influence their assessment practices.

More recently, educators have tended to use the term *approaches to assessment* instead of *assessment literacy* to highlight the impact of teachers' conceptual understandings and their practical knowledge, which can be influenced by the context within which teachers operate (Coombs et al., 2018; DeLuca et al., 2016). A transformation is underway from instrumental views of assessment literacy, which primarily focused on gaining knowledge and expertise (Mertler & Campbell, 2005), towards a sociocultural comprehension of assessment that connects with the evolving professional identities of teachers (Xu & Brown, 2016; Looney et al., 2018; Brown et al., 2019). Moreover, *approaches to classroom assessment* indicate that teachers might consider multiple perspectives and implement various practices to assess students' learning depending on the context (DeLuca et al., 2016).

Chapter Summary

This chapter presented the study's theoretical framework. I presented the current version of the British Columbia Curriculum. I reviewed the literature on inquiry-based learning, the impact of teacher beliefs, and their role in implementing inquiry-based learning design. I then presented student agency, followed by a review of the literature on assessment practices in inquiry-based learning. The concept of teachers' perspectives on assessment was also explored, as highlighted in the literature. In the next chapter, I will describe the research design and the methodology that guided this study.

Chapter Three: Research Design and Methodology

Introduction

This chapter outlines the research design and methodology that guided my approach to this study. I will begin with an overview of the qualitative research design and my methodology, namely phenomenology. I then explain the data collection methods for exploring my research questions, including the participant recruitment and research procedure. I then present the data analysis process and conclude the chapter with a description of ethical considerations and the methods used for maintaining trustworthiness throughout the research.

Qualitative Research Design

This research adopted a qualitative design to learn more about participants' understanding of their assessment practices in an inquiry-based and highly personalized educational environment. Qualitative research focuses on human experiences, perspectives, and approaches, particularly the meanings individuals attribute to them, allowing for a deeper understanding of phenomena (Bhattacharya, 2017). In qualitative research, "researchers study things in a natural setting" (Denzin & Lincoln, 2005, p.3). They are interested in learning more about how people perceive their world and construct meaning from their experiences by highlighting the process of making meaning rather than the outcome or product of their learning (Merriam, 2009; Merriam & Tisdell, 2016).

Qualitative researchers aim to understand how people explain and interpret their experiences (Merriam & Tisdell, 2016). Therefore, the focus is on discovering the meaning that participants bring to the context rather than what the researchers think about the phenomenon (Creswell & Poth, 2018). This helped uncover diverse viewpoints and allowed participants to

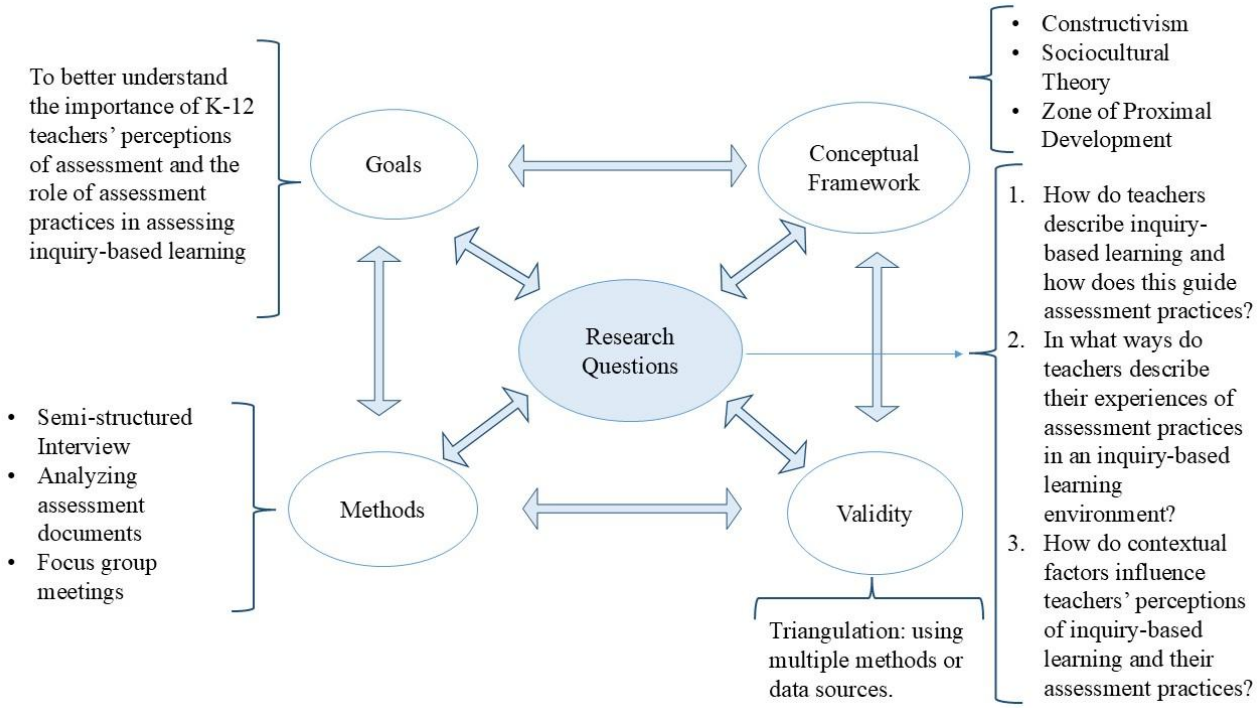
share their experiences more personally and meaningfully. Through qualitative research, I gained in-depth insights into the motivations and underlying meanings of teachers' thoughts, behaviors, and interactions. Moreover, choosing a qualitative research design aligns with my research goals of exploring teachers' perceptions of assessment practices.

In qualitative research, the researcher is the main instrument for collecting and interpreting data. The nature of qualitative research and the goal of *understanding* phenomena from people's perspectives necessitate a flexible and adaptive instrument (Merriam & Tisdell, 2016). Therefore, having a researcher who can be immediately responsive and collect data through observing, interviewing and analyzing documentation aligns well with the nature of the research. Moreover, this approach provides an opportunity for researchers to learn about participants' understanding and interact with them meaningfully (Lodico et al., 2006).

Qualitative research follows the emergent and flexible design approach, which means various components of the research might change or evolve as researchers enter the field and engage with the phenomenon under study (Creswell & Poth, 2018). To develop a comprehensive understanding of the research design, I adopted an interactive qualitative research design model, as Maxwell introduced in 2008 (Figure 2). This model does not assume a specific sequence for progressing through the different components of the study; rather, it emphasizes the reflective nature of qualitative research, where the various components interact and influence one another (Maxwell, 2008). This model proposes that the researcher might need to review and revise the research design to address the new progress. The interactive model of research design underscores the need for an expansive and inclusive approach to design in qualitative research, "making it both a model *of* and *for* research" aiming to help researchers perceive the "*actual* structure" of their study (Maxwell, 2008, p. 215).

Figure 2

An Interactive Model of Research Design (Maxwell, 2008)



Note: An Interactive Model of Research Design. Adopted from Designing a Qualitative Study (p. 217), by J. Maxwell, 2008, SAGE Publications, Inc.

In this model, various elements of the design create a cohesive and interconnected system. Components are not arranged in a linear order; instead, each is closely related to multiple others (Maxwell, 2008). By adopting this interactive model, I aimed to explore the interconnections and interplay between different aspects of my study, ultimately enhancing the rigor and depth of my investigation.

Phenomenology

The current qualitative research employed a phenomenological approach to capture and understand K-12 teachers' experiences while assessing learners in an inquiry-based learning

environment. In phenomenological methodology, “phenomena are the ways in which we find ourselves being in relation to the world through our day-to-day living” (Vagle, 2018, p.20). Thus, the primary interest is to learn how humans experience their decision-making and how a specific phenomenon manifests (Vagle, 2018). Experience is the primary focus of phenomenological research, and the purpose is to realize how experiencing something is converted into consciousness (Merriam & Tisdell, 2016). To achieve this awareness, Husserl believes that humans need to step away from a natural attitude, which does not often question their understanding of things, ideas, and objects around them, embrace a phenomenological attitude, develop a questioning mindset, and think over what they generally believe in as a fact (Husserl, as cited in Vagle, 2018).

Phenomenological research builds around exploring “a phenomenon’s essence and essentials that determine what it is” (Saldana, 2011, p.7). It focuses on concepts, events, and individuals' lived experiences to reach their inner and deep understanding of how they experience something (Aspers, 2009). According to Schram (2003), phenomenology investigates people’s conscious experience of “their life-world, which means their everyday life and social action” (p.71).

In phenomenological research, the researcher aims to reflect on the data to grasp the essence and essentials of individuals' experiences with a phenomenon as described by them (Creswell & Creswell, 2018). The fundamental goal is to understand these aspects by examining the explanations provided by individuals based on their personal experiences (Saldana, 2011). Therefore, researchers tended to be familiar with their judgments and pre-assumptions of the world so as not to “compromise one’s openness to the phenomenon” (Vagle, 2018, p.14).

To achieve this understanding, the researchers investigate their personal experiences to explore aspects of it and discover their prejudices, assumptions, and perspectives. This process is called *epoche,* which means that the researcher sets aside their knowledge, judgment and biases and reconsiders the phenomena (Merriam & Tisdell, 2016). These assumptions are then bracketed or temporarily put away to discuss the consciousness. To achieve this phenomenological reduction, the researcher brackets their past understanding and assumptions about the phenomenon in order to be consciously aware of it, the same way one encounters it in a concrete situation (Vagle, 2018). However, bracketing does not mean eliminating all past knowledge; instead, it entails setting aside or minimizing the influence of this knowledge (Giorgi, 1997).

According to Bhattacharya (2017), phenomenology enables researchers to explore how individuals perceive and interpret their lived experience of a phenomenon. My focus will be on identifying different aspects of the participant's understanding, along with the associated meanings (Mertler, 2019). Phenomenologists acknowledge the complexity and variety of human experiences and believe that the same experience could be interpreted in various ways; therefore, they do not take their own understanding and assumptions of participants' experiences as a fact (Lodico et al., 2006).

By adopting a phenomenological lens, I aimed to explore the subjective meanings and interpretations that teachers attach to their assessment practices. This approach emphasizes the importance of understanding participants' unique and personal experiences, acknowledging that their perceptions shape their reality. Through phenomenology, I could gain deeper insights into the essence of these experiences, uncovering the underlying meanings that contribute to a comprehensive understanding of their approaches to assessment practices. Based on the

discussion about qualitative research design and phenomenology, I will describe how my research was designed by drawing on this methodology in the next section. I approach this with my research questions in focus:

1. How do teachers perceive inquiry-based learning and how does this guide assessment practices?
2. In what ways do teachers perceive their experiences of assessment practices in an inquiry-based learning environment?
3. How do contextual factors influence teachers' perceptions of inquiry-based learning and their assessment practices?

Data Collection Strategies

Qualitative research data collection methods tend to capture data focusing on the rich and detailed description of the phenomena being studied (Lodico et al., 2006). Understanding the social phenomena from the researcher's perspective requires collecting adequate and first-hand evidence to record the patterns and meanings humans have created and associated with them (Saldana, 2011). Having said that, following a systematic method and accurately recording the data helps ensure a scientific and as unbiased as possible data collection process (Lodico et al., 2006).

Conducting interviews is among the most common methods of data collection in qualitative studies (Merriam & Tisdell, 2016). The qualitative research interview is "an attempt to understand the world from the subject's point of view, to unfold the meaning of their experience, to uncover their lived world" (Brinkmann & Kvale, 2015, p.3). For the present study, I gathered the data through semi-structured interviews with a predetermined set of open-ended questions (Appendix A) to facilitate the conversation and let participants feel at ease in

expressing their ideas, attitudes, and experiences. Although the interview questions were designed, I ensured an open dialogue to encourage participants to share their beliefs, interests, and explanations freely. The interviews were offered to be conducted online, with the option to meet in person if preferred.

In addition to the interviews, I used a focus group meeting as the other method for data collection. Carey (1994) described the focus group discussion as "using a semi-structured group session, moderated by a group leader, held in an informal setting, to collect information on a designated topic" (p. 226). Focus group interviews enable researchers to collect data from multiple participants to observe and document the interactions that unfold during the conversation (Lodico et al., 2006). Bringing together a group of teachers who share common experiences or perspectives allows them to engage in open and dynamic conversations, sharing their ideas and collectively building a deeper understanding of the subject.

Moreover, as the third method for data collection, I sought to collect documents related to their assessment process. These documents included grading tools or any other types of technology that they employ to support their assessment practices. Analyzing these written materials helped me extract meaningful themes and gain insights into the teachers' perspectives. The multiple data sources allowed me to explain meaning from various perspectives and identify redundancy in findings (Patton, 2015). Moreover, drawing upon various data sources can be used for triangulation, which helped me draw a thorough picture of the topic and establish a rich understanding of the phenomena (Merriam & Tisdell, 2016).

Participant Recruitment

Participants in this research were middle and high school teachers who self-identified as practitioners of inquiry-based learning and worked in Victoria, British Columbia. Participants

were selected through snowball sampling, which is among the popular means of recruiting research participants in qualitative research (Parker et al., 2019; Creswell & Poth, 2018). In a snowball sampling approach, researchers start with a few participants who meet the research criteria (Parker et al., 2019). Then, these participants refer other potential participants in the same target group to act as future participants (Crouse & Lowe, 2018; King & Horrocks, 2010). My rationale for this approach was due to the limited number of teachers in Victoria, British Columbia, who implement inquiry-based principles in their teaching practices.

Recruitment for the study began when the University of Victoria's Human Ethics Review Board granted the certificate of approval and permission to conduct research, Ethics Protocol Number: 23-0424. In my research proposal and ethics application, I envisioned interviewing 6-8 inquiry-based teachers to collect their ideas and experiences. However, after connecting with inquiry teachers and through referral, I interviewed nine middle and high school teachers who either teach at inquiry-based schools or implement inquiry-based principles in their classes in public schools. They came from various backgrounds, ethnicities, classes, and positionality, and most of them have devoted several years to employing inquiry as their predominant instructional approach.

I started participant recruitment by contacting two inquiry-based teachers with whom I had developed professional relationships due to our mutual interest in inquiry-based learning. They actively used inquiry-based learning approaches in their classrooms and were interested in participating in this study. Following our interview, I asked them to communicate study information with other inquiry-based teachers. Participation in the research study was voluntary, and participants were informed that they could withdraw at any time. The primary participants got permission from the secondary participants to provide me with their contact information. The

network sampling continued based on participant referrals until the desired sample was reached. After my ninth interview, I started hearing similar themes, indicating that the saturation point was reached. Saturation is the stage in research where collecting more data no longer reveals new themes or insights (Daher, 2023; Creswell & Creswell, 2018). At this point, I concluded the study's data collection phase.

Research Procedure

Data were collected over three months, beginning in February 2024 and concluding in April 2024. As I aimed for a semi-structured interview, I prepared my interview questions after receiving the certificate of approval from the University of Victoria's Human Ethics Review Board, Ethics Protocol Number: 23-0424. As suggested by Lodico et al. (2006), although researchers prepare a list of questions in semi-structured interviews, all questions are flexible. After obtaining my supervisor's approval, I conducted a mock interview with one of my friends, who is a graduate student at UVic and a BC-certified teacher. This mock interview provided a valuable opportunity to review my questions, refine my interview technique, and identify any potential issues in my approach. It also helped me ensure that my questions were clear and aligned with my research goals.

After sending an invitation email to my participants and having them review and sign the consent form, I had my first two interviews in person in the library at the University of Victoria. Each interview took about 45 minutes and was audio-recorded. I also took notes during the interviews to record my first impression of what participants shared regarding their assessment practices. According to Saldaña (2013), these notes aimed to capture insights and ‘aha’ moments, which I later used in coding and analysis. During the interview, I asked my participants to share any documents they utilize to assess students, including grading tools or any other technology

they use to support their assessment practices. Moreover, I invited them to a focus group meeting, with the date and time to be communicated later.

Through snowball sampling, I interviewed nine teachers. I met six teachers in person and conducted three individual interviews online. We used Zoom videoconferencing service to conduct virtual interviews with participants. Zoom is a UVic-hosted application configured to store data inside Canada. Although the built-in Zoom feature recorded both video and audio, the interviewees were informed that only the audio would be used for analysis.

After the individual interviews, I sent an invitation to the focus group meeting with some suggested times and dates. Although I invited all participants to the focus group, I could arrange the meeting with five teachers. Due to its convenience for the participants, I planned to conduct the focus group interview online using the Zoom synchronous meeting service. This platform allowed real-time interaction, ensuring participants could join from various locations without travelling. To ensure that participants continued to consent to participate in this research, I asked them to verbally confirm their consent before we began the focus group interview.

During the individual interviews, I asked participants to share any documents related to their assessment processes, such as grading tools or other technologies they might use to support their practices. However, I could not collect significant documentation, as many teachers hesitated to share materials containing student information. Despite my assurances that I was not seeking access to student data, it is likely that preparing separate copies of their assessment documents with sensitive information removed was perceived as additional work for the teachers. In the end, I gathered sample assessment documents from three teachers, which I included in my analysis.

Data Analysis

To interpret the data, inductive analysis was employed to identify and analyze recurring themes or patterns (Thomas, 2006). The process of inductive analysis operates on the assumption that the researcher does not begin the data analysis with any pre-existing testable hypothesis regarding the data (Bhattacharya, 2017). This method allowed me to describe the phenomenon as described by the individual. I started the analysis process by transcribing the data. The interviews were digitally recorded using an audio recorder for in-person meetings and the recording feature in Zoom for online ones, and then transcribed to facilitate data interpretation. Due to the emergent and flexible nature of qualitative research design, researchers reflect on and analyze data as they collect it and progress through the research process (Merriam & Tisdell, 2016; Saldaña, 2013). Therefore, during my data collection process, I often revisited my data to determine whether any adaptations were needed for my questions in subsequent interviews.

I subsequently transcribed the interviews. The editing process includes listening to each interview recording twice and editing the script either by revising the incorrect information or adding any missing parts. I also ensured that pseudonyms replaced all names and that my interview transcripts had no identifiable information. Reviewing each interview twice allowed me to have a more precise version of the scripts and provided me with the chance to revisit my interviews and have a profound involvement with each of them. After editing each interview, I exported them as separate text documents to be used later in the data analysis process. As Thomas (2006) described, “inductive analysis refers to approaches that primarily use detailed readings of raw data to derive concepts, themes, or a model through interpretations made from the raw data by an evaluator or researcher” (p.238). Accordingly, I read through each interview transcript again to ensure accuracy and comprehensively engage with every line.

According to Bhattacharya (2017), involving participants in the research process and ensuring a shared understanding of the meaning they associate with the phenomenon could enhance the academic rigor of qualitative research. Therefore, I sent the final version of my interview transcripts for my participant's review and their possible recommendations for any changes. After getting their approval, I imported each interview as a separate file into the qualitative analysis software, NVivo, to code and analyze it. NVivo is a common software in qualitative data analysis and "allows researchers to manage, analyze, and visualize qualitative data and documents systematically and individually" (Dhakal, 2022, p. 272). I started coding each interview while having my research questions and theoretical framework in mind. I followed inductive analysis, in which researchers looked at pieces of data to infer tentative categories (Merriam & Tisdell, 2016). Thomas (2006) states, "the primary purpose of the inductive approach is to allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by structured methodologies." I read each transcript and highlighted and coded them to detect the patterns (Saldaña, 2013).

Content analysis was employed to analyze assessment documents. Content analysis is "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Content analysis enabled me to analyze the presence, meanings, and relationships of certain words, themes, or concepts in assessment documents.

Following Jain and Ogden's (1999) recommendation, as new codes emerged during my analysis, I revisited my earlier scripts and documents to determine if any data could be classified under those codes and categories. According to Saldaña, "when the major categories are

compared with each other and consolidated in various ways, you begin to transcend the "reality" of your data and progress toward the thematic, conceptual, and theoretical" (2013, p. 12). Finally, I used codes and categories to organize the data, then interpreted findings and identified themes presented and discussed in the following chapter.

Ethical Considerations, Credibility, Rigor, and Trustworthiness

The University of Victoria Human Research Ethics Board reviewed and approved this study in December 2023, considering it minimal-risk research. Along with my invitation email, I sent a participant consent form for them to review before data collection. By reviewing the consent form, participants were informed about the research's purpose and objectives, the study's importance, the participant recruitment process, what was expected of them if they accepted the invitation, and the compensation offered. Moreover, possible risks and inconveniences were identified, and data storage and disposal were explained. Participation in this study was voluntary, and participants could withdraw anytime. Although I invited each participant to an individual interview and a focus group meeting, I respected their choice if they decided not to participate in the focus group interview. Although participants had access to the information about the research through the consent form, I allowed them to ask questions and share any concerns they might have before conducting interviews. I had them sign the consent form and verbally seek their consent in a focus group meeting.

In addition to the ethical considerations, the research design should maintain rigor, validity or trustworthiness (Vagle, 2018; Lincoln & Guba, 1985). My research design followed several validation strategies suggested by Creswell and Poth (2018). One approach to ensuring the trustworthiness of a study is through triangulation of multiple data sources. To achieve this, researchers use multiple sources "to shed light on a theme or perspective" (Creswell & Poth,

2018, p.260). In this study, collecting data from individual interviews, focus group meeting, and assessment documents assisted me in having "a convergence of information from different sources" (Carter et al., 2014, p. 545). Furthermore, acknowledging my biases, reflecting on how my past experiences influenced my research, and explicitly stating my positionality helped readers understand the perspective from which I conducted my study.

Another validation strategy involves member checking and seeking participant feedback. According to Lincoln and Guba (1985), this is "the most critical technique for establishing credibility" (p. 314). Sharing the interview transcript with participants and seeking their feedback ensured that their perspective about assessment practices was accurately reflected in my research. Some participants had follow-up questions and recommended revisions to their transcripts. The interviewees were informed that if I did not receive a response from them about the transcript within two weeks, I would consider it reviewed and approved. I heard back from seven participants and only two interviewees did not reply. Moreover, taking notes from my research process activities in a reflective journal helped me to record my thoughts throughout the process.

Finally, as Creswell and Miller (2000) suggest, seeking advice from "someone who is familiar with the research or the phenomenon explored" could enhance the validity of the research (p.129). Collaborating closely with my supervisor while conducting data analysis and seeking advice from my supervisor and my committee member throughout the research process helped me consider additional perspectives on my research.

Chapter Summary

This chapter presented the study's research design and methodology. I began by discussing qualitative research design and phenomenology. Then, I described data collection

strategies, participant recruitment, the research procedure, and the data analysis processes. I concluded the chapter by discussing ethical considerations and various strategies employed to ensure the trustworthiness of the research. In the next chapter, I present the findings from the research.

Chapter Four: Findings

Introduction

In this chapter, I explore how teachers who participated in this study perceived inquiry-based learning and how this understanding has guided their assessment practices. I also discuss how participants interpreted their assessment practices. Furthermore, the impacts of contextual factors on this process from teachers' viewpoints will be discussed. To this end, I will present the findings based on the themes and subthemes which emerged from my analytic reflection through the consolidation of categories and codes to exceed the "reality" of the data (Saldaña, 2013, p. 12).

The emergent themes and subthemes resulted from the three categories of my data that were coded using NVivo. The categories are *Inquiry-based learning, Assessment practices, and Context*. These three categories allowed me to explore themes and subthemes, which named the sections and subsections in this chapter in response to my research questions (See Table 1). To begin with, I will describe the participants, including an overview of their experience as a learner and their educational and professional backgrounds. It is followed by describing and analyzing the findings of my study to answer my research questions.

Table 1

Research questions, Themes and subthemes

Research Questions	**Themes**	**Subthemes**
How do teachers perceive inquiry-based learning, and how does	Reimagining Education	Curriculum Through the Real-World Context
		Empowering Independent Student Learning
		Shift in Deeply Held Beliefs
		Facilitators of Student-Centred Learning

this guide assessment practices?		
In what ways do teachers perceive their experiences of assessment practices in an inquiry-based learning environment?	Assessing the Learning Process	Competency-Based Interdisciplinary Assessment
		Continuous Reflective Practice
		Student-Serving Assessment
How do contextual factors influence teachers' perceptions of inquiry-based learning and their assessment practices?	Contextual Factors in Adoption and Assessment Practices	Structural Factors and Curriculum Flexibility
		Student Demographics and Readiness
		Support Systems and Teacher Empowerment

Overview of Participants

To conduct the research, I interviewed nine teachers who self-identified as inquiry-based teachers working in Victoria, British Columbia, Canada. Our interview began with introductions in which they shared their years of teaching experience, and discussed how long they have been working in an inquiry-based educational environment. I also inquired whether they were teaching in private inquiry-based schools or applying principles of inquiry-based learning in their classrooms in public schools. Later in our conversation, I asked them to talk about their personal experiences as a learner in the hope of seeing how their experience may have influenced their

current teaching practices. To protect the participants' identities, I have assigned pseudonyms to individuals throughout this thesis. A summary of participants and their demographic information can be found in Table 2.

Table 2

Interview Participants' Demographics

Teachers' Name	Years of Experience	Public/Private School	Inquiry-based School or Classroom	Years of teaching in an Inquiry-based Setting
Alice	37 years	Private middle school	Inquiry-based school	4 years
Ava	2 years	Private high school	Inquiry-based school	1+ year
Emily	15+ years	Private high school	Inquiry-based school	15+ years
James	5 years	Private middle school	Inquiry-based school	5 years
Katherine	4 years	Private middle school	Inquiry-based school	4 years
Nora	26 years	Public middle school	Inquiry classroom	26 years

Olivia	1 year	Private high school	Inquiry-based school	1 year
Robert	20+ years	Public high school	Inquiry classroom	10+years
Thomas	About 20 years	Private high school	Inquiry-based school	11 years

Alice

Alice began her teaching career at a Democratic School and had around thirty years of experience in that educational setting. She described Democratic School as an environment that fully supports students in pursuing their interests and passions in learning. For her, "that setting was a larger lens than the inquiry models being held in public schools right now". Her many years of experience laid the foundation for her interest in inquiry-based learning, eventually leading her to join the inquiry-based school and begin her journey there. At the time of her interview, she had been teaching in a private inquiry-based school in Victoria for about 4 years. Besides that, she supported a group of home learners in Social and Language arts. This is a unique learning experience as they met once a week online, and she supported them in doing "interesting projects."

I asked Alice about her experience as a student. She found school "incredibly boring," and although she did academically fine, she did not enjoy it. She described herself as a "social learner who was not particularly [valued] within the 1971 classroom". Alice identified her learning process as a "speaking out loud" method that was not supported at schools then. She told me that "I needed to talk out loud to process my thinking, and that did not happen in a 1971 classroom." She needed some extra support, and she did not get that from the public system.

Later, with the support of her mother, who was a teacher at the time, she found her path to obtaining the help she needed and began enjoying the school and learning process. She described this experience as one that 'forever changed' her. Teaching in an inquiry model and supporting students to follow their interests by creating an inclusive learning environment motivated her to continue her teaching career.

Ava

Ava described herself as a "quite new teacher" who started her professional career with an inquiry-based school. She had teaching experience for a short period at public schools while doing her practicum and continued teaching in the public system for a few months afterward. Her experience as a learner was quite unique as she was home-schooled from grade 1 to 12, and kindergarten was the only time she had a learner role in public school. She told me, "I had never gone really to school before I became a teacher." After learning about the inquiry-based method and applying it, she "felt it is very compatible with how [she] had done [her] schooling." She had a "pretty unique experience" in her cohort of student teachers. On the one side, she found "it a little bit intimidating" as she started her teaching path without having a clear picture of it. On the other side, she felt "it was an asset" as she could think about classroom teaching "without a lot of preconceived ideas about it".

Emily

Emily taught in an inquiry-based setting for many years. She did her practicum in a public school and was a teacher on call for four months in that system. Afterwards, she started teaching in an inquiry-based learning environment and worked with students ages three through eighteen before joining her current school as a teacher. She came to teach in an inquiry setting and described her experience as "I learned how to teach this way because the kids taught me how

to do that." Emily "really disagree[d] with institutionalized education, and [she] did not think it is how humans are supposed to be educated." She started her current position three years ago and joined a private inquiry school in Victoria. She told me that although the assessment practices she used in her current school were slightly different from her previous experience, she found many similarities between them.

I also asked her to share her experiences as a student, and it turned out that she had been in twelve different schools in the twelve years from K to 12. She studied in correspondence school, homeschooling, and the traditional school system. She found herself "pretty successful" in a more traditional learning setting and did not "remember hating school as a kid," even though she had many gaps from going to different schools.

James

James was a BC-licensed K-12 teacher when we met for the interview. Before joining the teacher education program, he worked with the science, technology, engineering, and mathematics (STEM) outreach program Through that program, he noticed he needed more insight into "what teachers were dealing with in traditional educational spaces." That desire pushed him back to school to get his teacher certificate and continue his education to obtain a master's degree, focussing on assessment in inquiry-based learning environments. He had spent most of his professional career at school, either as a student or a teacher, and felt that these experiences "actually made [him] more suspect of a lot of the things [teachers did at schools]."

Except for his practicum, he taught in an inquiry-based school in BC for his entire professional teaching career. Besides teaching, he also supported the educational technology of the school. I asked him to share his path to becoming an inquiry-based teacher, and he talked about a time when he worked for a science outreach. He was introduced to the concept for the

first time by meeting the program coordinator, who worked at a private inquiry-based school in Victoria. That conversation eventually became a bigger project for his research, even though he was unsure about the outcome.

James loved school and used to study a lot. He was academically doing well yet had some social struggles, and he believed "a lot of the kids in inquiry learned a lot earlier" how to navigate them. For James, the testing and assessment experiences were stressful; however, his high marks after each attempt made it worthwhile. James enjoyed joining clubs and teams, and the social side of the school was a highlight of his educational experience.

Katherine

Katherine was the lead teacher at a private inquiry-based school in Victoria. Her teaching experience in public school was limited to her practicum and a short period after that. Inquiry was not a new concept for Katherine, and moving into inquiry was not a difficult transition for her. Katherine found that "inquiry-based teaching had always been infused into [her] teaching practices" as she could connect that well with teaching art, which was one of her teaching areas. She believed art was taught through an inquiry-based approach using self-directed projects and self-studies in public schools, particularly at the high school level. She said, "It was not like relearning how to teach [for me] as much as some of my colleagues, who were in some of the harder academic subjects."

Katherine's experience as a learner was not so pleasant. Her mild disability made it hard for her to follow traditional learning rules. She described her experiences as follows:

> I was coming up in school in the nineties and early 2000s; doing things by rote and repetition and practice was not the way I learned, and even though I could do it, and I

> generally got good grades, it squeezed much enjoyment out of many subjects for me, and it closed a lot of doors for me.

She brought up mathematics as an example and noted that such a method of teaching shut the doors for mathematics and science for her and took away the enjoyment of learning these subjects. Katherine added that public schools did not challenge her enough, and she found herself bored except in the art classroom, as she could connect with the subject and found it more aligned with her interests.

Nora

Nora was an experienced teacher with twenty-six years of teaching in French immersion and English programs. She taught for a couple of years in England and then decided to return home to Canada. She was a teacher in a public school who applied inquiry-based principles to her classroom. At the time of the interview, Nora was a teacher of grades seven and eight; however, she had a record of teaching kindergarten to grade eight in her teaching experiences. Inquiry-based learning was not her teaching approach; she came to teach in the way she taught as she found so much connection between various subject areas. She explained, "As a K-7 teacher, I taught all the subjects in the class and started to naturally connect them as subject areas seemed so interconnected for me."

Nora described herself as a "perfectionist" who did great at school. During her school years, she had the support of her family. She told me her family was "creative, capable and interested in everything." Therefore, her interests and questions were never brushed off, and her family took her questions "as an opportunity to inquire all the time."

Olivia

Olivia graduated in 2022 and soon after started teaching in a private inquiry-based school in Victoria. She learned about inquiry-based schools in her teacher education program and became interested in learning more about them. She did one of her practicums in the same school and got the job pretty immediately after graduation. She did not have any paid teaching experience in public school; however, the public system was "so unnatural and contrived" for her in a very short time that she taught there as a teacher on call. She further explained that this seems "so disingenuous" when you ask students "to learn one thing for one hour and then move a room and learn another thing for another hour." That is not what happened and how we learn in real life. Olivia continued by talking about her experiences as a student. The public system worked for her even though she found it "so tedious". She connected part of her academic success with the privilege of "where [she] grew up and how [she] grew up and who [she] grew up with".

Robert

Robert was educated in Victoria. He had extensive experience teaching in public schools. He taught from an inquiry stance for most of his career, and as he gained more experience, he became more adept at practice. His interest in sharing his perspectives on education and supporting educators to implement constructed learning and assessment, motivated him to express his opinions more publicly. He had publications and was involved in research around inquiry-based learning "in the hope of seeing how these areas can come together to paint a more beautiful portrait of what it means to teach and learn in an inquiry setting."

Robert described his school experiences as "turbulent" for the first few years. Moving around and being in different schools resulted in him lacking relationships and feelings of

success. Later, as he could settle down, learn the “game of school,” and establish his connections with others, he started enjoying it more. He was able to connect with a few teachers; however, the most fascinating part for him was not the learning aspects of school, but the social aspects. His curiosity and motivation brought him back to university, which was a joyful and valuable experience.

Thomas

Thomas was a knowledgeable educator with many years of experience working in a public system as a teacher, counselor, and superintendent of a school district before starting his inquiry-based teaching career around ten years ago. For Tomas, inquiry-based learning was more reflective of how people learn and how they tend to work together as opposed to the typical school system. He taught various subjects, primarily in high school, and believed it was important to be involved with teaching while working in education and making decisions about it. He added that during his teaching experiences in public schools, he tried to implement interdisciplinary learning with learners and give them some decision-making powers. However, it was not exactly his impression of inquiry-based learning. Thomas left the public system after struggling to find a way to make the essential changes required for inquiry-based learning.

Thomas did not enjoy his school years although he did well academically. He found school so boring, and he ended up getting in lots of trouble because of his playful behaviour. During high school, he showed up for tests and completed some school projects; however, he spent much of his time at the local university, attending lectures that he found more interesting. Thomas connected his experience to inquiry-based learning by saying:

> I would have enjoyed an inquiry-based process as a learner, and many of my friends, who dropped out of school and were very bright people who ran very successful businesses, did not connect with what was happening at school.

Reimagining Education

Participants were asked to describe their understanding of inquiry-based learning and its underlying principles and discuss how their perceptions could impact their assessment practices. *Reimagining Education* emerged as a broad theme for this question, followed by four sub-themes, namely *Curriculum Through the Real-World Context*, *Empowering Independent Student Learning*, *Shift in Deeply Held Beliefs*, and *Facilitating Student-Centred Learning*, which will be discussed in this section.

Participants viewed inquiry-based learning as process-oriented rather than product-focused, marking a significant shift from traditional educational models. This perspective challenges the prevailing approach to education, which often prioritizes outcomes over exploration and understanding. Several interviewees noted that this approach promoted a more authentic method of learning. They recognized a learning curve for teachers in moving away from a product-focused mindset to one that emphasized the importance of the learning path. Olivia found learning through inquiry is “more truthful to how we genuinely learn because it isn't predetermined, and I think it is truer to the psychology of adolescence and the way humans learn and grow.” Nora echoed the idea and believed students could have effective learning experiences through direct, hands-on interaction and reflection, and involving students in the learning process could foster deeper learning than mere observation or instruction.

Participants also highlighted the unlearning process required for students accustomed to a linear approach to education, where the emphasis was rarely placed on the learning process

itself, diminishing their intrinsic enjoyment of learning. Participants also mentioned that inquiry-based learning could embody students' growth mindset by encouraging them not to work toward one end goal, fostered students' agency, and allowed them to learn independently, except when they needed help and scaffolding. James believed it was a massive change for students that enabled them to think outside the box. They could navigate the system even if they returned to traditional classrooms as they no longer require a trusted adult. He added:

> Once students understand why we approach education the way we do, and when adults have open conversations with them, giving them space to think, reflect, and rekindle their love of learning, they can guide themselves forward without disrupting others and continue progressing in their learning.

These insights highlight a shift toward fostering a more meaningful learning experience in which students become motivated by curiosity and personal growth. The learning activities are designed purposefully, allowing students and teachers to step away from product-focused education models and focusing on the learning process.

Curriculum Through the Real-World Context

Several participants reflected on the opportunities that emerged from interdisciplinary learning design. Connecting various subjects allowed teachers to help students expand their inquiries and learn meaningfully. Alice found the interdisciplinary possibilities in inquiry a strength to allow students to dive deep into the subjects of their interest and connect them to what they experience in the real world. James also had the same perception and added, "cross-curricular teaching is a big piece in inquiry classrooms. If you want to do inquiry-based and be rich with it, to have those silos of disciplines does not make any sense". Nora described her motivation: "Every time I did something more interdisciplinary and hands-on and had the inquiry

components, everyone was more interested and engaged." Teaching grades K-7 across all subjects encouraged her to adopt a more interdisciplinary approach, naturally connecting different subjects as it made more sense to her.

Students could be motivated internally when they are empowered to choose the topics and generate genuine questions. Katherine found that students tended to work at a higher level than their grade level when inquiring about interesting subjects. Moreover, teachers asserted that giving students a voice and choice over their learning could better prepare them for life after school, fostering independence and critical thinking skills. Participants reflected on acquiring thinking skills in inquiry classrooms as a core proficiency, which students could benefit from when they reached higher education and were asked to generate original ideas for their research. Moreover, by switching the focus to students' personal interests and trying to make the topics relevant, they became more engaged in the learning. Emily believed teaching through inquiry learning design enabled her to support students and taught them the differences between "thinking skills around reading, retention, and comprehension." She further noted that Bloom's Taxonomy helped her talk about her goal as a teacher, which is "to help [students] continue to be knowledgeable and find information then apply and work on [their] own thinking skills to make sense of it and to share it with others." Moreover, she found that these skills are fundamental for individuals to be successful in their future careers. Alice also found mastering complex thinking skills to be an asset that helped students question information critically rather than accept it as authoritative. She further noted that this approach respects diverse faiths, religions, spiritual beliefs, and multiple worldviews, upholding them as valuable for human understanding. Thomas further noted that the inquiry model was the most rigorous method as it challenged students'

understanding and made them think more deeply about the subjects rather than memorize them. This idea was also highlighted by Robert, as illustrated in the following quote:

> In inquiry settings, students ask questions, and we explore those questions together as avenues through the curriculum. Students have agency, a lot of voice, choice, and ownership over their learning. They share, collaborate, and connect with others, not just in our classroom but outside of our classroom, to share their learning with a public audience. In doing so, they sharpen certain transferable skills to any setting. You cannot sharpen them as beautifully or richly in other pedagogies.

Teachers connected personalized learning with inquiry-based learning suggesting that inquiry-based learning facilitated personalized learning. They believed that having students drive their learning made the metrics different and more individualized. Students were not going along the same scope and sequence, and they came to a deep understanding and rigorous learning personally. Thomas found it challenging for people aiming for a "universal way" to teach and assess students. Katherine perceived the big ideas and competencies of the BC curriculum as a window of opportunity to tailor the inquiry model to individual students. For her, "the broad ideas and a wide variety of competencies enable teachers to connect them with individualized learning." She added that students' needs shaped her teaching principles every year as each student had individualized learning progress and needed customized learning design. Nora echoed the idea by adding, "students start to care about the topic once they connect them personally" and expand their knowledge in meaningful ways. Olivia emphasized the role of teachers in ensuring students learn all the subjects and creating meaningful opportunities to pull the missing skills into their inquiries.

Although there was an emphasis on interest-based learning, participants highlighted the structure integrated with inquiry-based learning. Alice described her experience as “it does not mean that students should not be asked or expected or scaffolded into something more than what they want to do”. She commented on her experience of moving from a democratic school model, where students have complete autonomy over their learning, to an inquiry school model, as she saw more value in creating structure for students. Ava was in the same line as she believed planning, and “forward-thinking,” was an essential step for success in this model. For Ava, accountability was built into that structure as students were responsible for their learning and co-constructed the inquiry process with their teacher.

The concept of inquiry-based learning design and inclusive education was mentioned by participants. They found the inquiry model suitable for different types of students as it tended to be more accessible and meaningful. Teachers further highlighted the importance of supporting students with disabilities by providing tailored assistance. This often involves targeted interventions, skill-building, and practice, but the key was to work toward shared goals of independence and career success. By aligning support with students' interests and strengths, educators could help them overcome the adverse effects of a learning disability, such as low self-esteem and self-efficacy, and prevent them from feeling discouraged. Alice noted that “the competency lens allows students who may have issues with memorization and regurgitation to shine.” Olivia also believed the inquiry model could attract neurodivergent and gifted students who were ultra-creative and wanted to challenge themselves. Nora emphasized building the practical skills and background knowledge required to do the inquiry and added, “once everyone has an equal base, they can choose how to approach it”. This approach helped her offer an inclusive learning environment and prevented inequity as students will get the basic skills to

have a rich project. Nora also tried to address her concern of teaching in a colonial system that might exclude students' perspectives from other parts of the world.

Empowering Independent Student Learning

The notion of empowering independent students was represented in the interviews. Many started with the notion of agency and autonomy and believed learners needed to have decision-making power over their education. Giving students agency and freedom to identify their learning goals, strengths, and interests based on how they perceive the world is valuable. Emily found agency as "the main through line that informs [her] practices". Ava, who was quite a new inquiry teacher, described agency as the "the bedrock" for her teaching philosophy and added that "my role is secondary to their decision-making; I aim to support them in making the choices that align with their goals and what they genuinely want to pursue." Alice who had the experience of teaching in a democratic school in which students have complete autonomy over their learning found that "students were choosing to learn more when they are in a place of choice and interest. Because choice comes from interest most of the time and this internal motivation drives their learning". Nora highlighted the notion of engagement in inquiry-based learning and described it as a fundamental principle in students' learning. She added that, by gaining more experience, she found more value in embracing students' interests and passion in developing inquiry projects. She further noted that interdisciplinary projects with an inquiry component and hands-on experiences were more engaging for students and that engagement motivated them to learn more about the subject.

Another idea that emerged was honoring students' voices and choices in inquiry-based learning design, underscoring the importance of students' active role in their learning. Shaped by constructivist theory, inquiry-based learning design allows students to shape their learning

actively, and teachers act as facilitators. Nora believed teachers became interested in this model and decided to implement it because of its philosophy of placing students at the center of their learning. James described it as student-centred learning, which “put students in the director's seat.” Katherine further noted, “students take ownership of their learning, and they learn and go deep into what they are passionate about and want to learn about.” Students’ voices and choices were used to guide the next step and map their learning. In support of this claim, Robert said, “I used those as indicators and reminders as to where we are going and why we are going there”. These initial steps are pivotal in shaping an authentic learning process for students. Ava added, “It is an interesting exercise for them to look at the curriculum and ask themselves, how could I learn these things?”

Participants found that cultivating students’ curiosity was essential for fostering deeper engagement and creating authentic learning experiences for students. Many teachers advocated encouraging students to ask questions and supported them in seeking answers collaboratively. They believed students were not the only inquirers in the room, and the teacher's role was to inspire them to look closely at the topics, ask questions and find solutions to the problems. By modeling this process, teachers could demonstrate the shared nature of inquiry and learning. Nora reinforced this idea: “I am there to help them problem-solve. Even when the topic is new, we can inquire with students and learn together.” Robert also highlighted “the value of curious students” and mentioned that we not only looked and listened to their curiosity but also sharpened and honed their curiosity to encourage deeper engagement and promote lifelong learning.

Building strong relationships with students and guiding them to reflect on their learning process could foster trust and instill confidence, empowering them to take ownership of their

educational path. Teachers believed that having conversations with students and asking them to reflect on their learning process was essential in building connections. Centring students' agency and goals and developing reciprocal trust enables teachers to challenge them in their learning. Olivia believed she knew them in an inquiry classroom in a way never possible in the public system. She explained the reason behind it as follows:

> Because it is very interest-based and goals-based, I get to know who they are and what they want. That means they have to figure that out, too, which can be a tricky part and a massive challenge for some kids. However, it is a worthwhile challenge.

Emily also emphasized the importance of building trusted relationships with students reflected on her experience and suggested:

> In an inquiry-based model, it takes time to build trust, but once established, students take your suggestions and feedback seriously. They understand that your guidance is personalized, not arbitrary or simply what a teacher says to all students because they know it comes from the relationship you have developed with them.

Many participants shared the underpinning idea of co-designing and co-constructing the learning path. This partnership and learning collaboration with students were described as the heart of the inquiry. Participants also saw the co-creation process as a way for students to find meaning in their learning rather than having meaning prescribed by teachers. Many teachers found this a serious challenge for students from traditional settings to be exposed to make meaning around their learning. Emily expressed her continuous effort to find a better way to co-create learning as follows:

> How can I help a learner make meaning around learning with others, including me? And that co-creation process. I think that it is hard when you get a learner who has gone through

> a system that the meaning for them has never even been talked about. Nobody has ever asked what something means to them in any way.

Students need to articulate what they are doing and reflect on what they have done, which leads to a conversation where collaboration with their teacher can be built. Olivia described this partnership as: “we are co-constructing students' goals. I hear their goals and what they want to get out of an inquiry. So, the learning path is constructed on parameters that learners and teachers set together.” The opportunities to create an active, relevant, and meaningful schooling experience motivated participants to implement an inquiry-based learning design. Thomas explained his motivation as creating exciting and engaging learning experiences for his students.

> I want my students to see themselves in their schooling experience, not just because they are told that they have to do well, but because it is something they feel is relevant and they have an active hand in creating, shaping, and designing.

Many teachers reflected on the importance of the first touch point with the students on the first day of school, which could say a lot about teachers’ beliefs and philosophy. Robert described his first interaction with students as

> When students walk into a classroom on the first day of school. We begin to co-design the learning immediately by asking them questions about their curiosities, interests, and learning strengths, getting them to talk about these ideas, and documenting them on sticky notes.

In inquiry settings, teachers aim to foster a collaborative environment that enhances engagement and encourages ownership by involving students in setting learning goals and expectations. Robert added, “I often try to build the parameters of learning with my scholars rather than for my

scholars," emphasizing the importance of creating a shared learning experience where students feel invested in shaping their educational journey.

Shift in Deeply Held Beliefs

Teaching in an inquiry-based learning environment requires a shift in many teachers' beliefs and perspectives about education. Ava described her short experience teaching in an inquiry school as so fundamental in shaping her philosophy toward teaching that she would carry it forward, even if she returned to public or more traditional school settings. Believing in student agency and prioritizing their choices was the foundation of her teaching practices, which "needs a lot to unpack for [her] and reflection on to what level [she is] inserting [herself] into the goals that her students have for their life." Many participants believed that what they were doing was pushing against prevailing ideas that people held in society for hundreds of years around the role of education, the role of students and the rationale for that. Emily reiterated the idea and stated:

> We also end up fighting that in ourselves because we all have come up with very different models, including in our teacher education programs. Given our expectations around students' roles, I think the ability to really sit in agency and reciprocity with students as fellow human beings and to trust the reciprocity process is difficult.

Teaching against social norms is a significant shift in mindset that might make teachers who try to work against the norm accepted by society feel insecure. Some participants emphasized the impact of having conversations with people about their worldviews and challenging the embedded ideas in our society about what learning could be and their philosophy around autonomy, agency, and responsibility. James echoed this concept, suggesting, "I think there is a fundamental philosophical switch that needs to happen in the brain of educators, and it takes them some time to teach in the environment before they feel, oh, I get it now." This could be a

challenging experience for teachers as they work to integrate student-centred perspectives that diverge from traditional models, requiring them to be more adaptable and open to uncertainty. For many, this shift involved letting go of control over every aspect of the learning process, allowing students to take ownership of their learning and fostering a more collaborative classroom environment.

Teaching in an open inquiry setting, which helped Emily to bring all the theories she held about learning and education into practice, had an enormous impact on her perspective. She believed the open inquiry structure made her a more effective and confident teacher, and she described her experience as

> It is challenging to be with a group of people struggling with the idea that we are teaching in a system that is outside the norm. How do we navigate that with families and learners? More importantly, how do we navigate the things that come up in ourselves from our histories and ideas about education and learning?

Emily described the experience as:

> It is important to have people who have experienced doubts and that inner voice telling us things should be different and that there should be rigor. Then, we also need those who have listened to that voice, tried a new approach, and seen positive outcomes over time for those they work with.

Participants found the shift in focus from the final product to the learning process necessitates a significant adjustment in teachers' attitudes. This was also the case for learners, as they needed to move away from the mindset of merely completing tasks for a grade and began embracing the value of exploration, growth, and learning through the journey itself. There was much unlearning for students that could help them to know what they wanted for themselves.

Ava described a product-oriented mindset as an **“**ingrained belief,” noting that stepping away from it required a significant mindset shift for her. She assumed that learning was not simply completing a pre-defined task or product but rather the learning process itself. She added that the product was not what we were working toward in inquiry learning as a goal for learning. Emily echoed the notion and described her experiences with learners:

> They think I am expecting a product to demonstrate their learning, and I think this is rooted in their previous learning experiences. For me, it is not about the product. I am more interested in how they got to that product, and I try to shift them away from the idea of grades.

Participants also identified the significant impact of teachers’ dispositions on the learning experience and the outcomes. Many believed that teachers' dispositions could limit or liberate the possibilities in the classroom, and how they were willing to honour and flex their disposition significantly influenced students learning. This was portrayed in this statement from Robert:

> My dispositions, how I respond, and how I create the conditions for something different will significantly impact the type of learning in the room. I mean that sincerely. We often talk about if we want curious kids, we need curious adults. Our teachers must also have agency if we want kids to have agency. Whatever we wish for scholars, teachers need to be in that stance and actively flex those dispositions.

Robert, who applied inquiry-based principles in his classroom in public schools, was asked to describe how he managed students coming into an inquiry-based setting from different classes with teachers who might have different values toward teaching. He believed the beginning of the school year played an essential role in shaping students’ understanding. He said, “we pace a lesson slowly to accommodate them to wear different hats in different places.” He noted that the

clarity, explicitness, and intentionality behind adopting such a learning design, along with the authenticity of its application, played a crucial role in inviting students into inquiry-based classrooms.” He further reflected:

> I think they are symptoms of a system, and my gift is the hour I have each day with the students I support. Sometimes, it is challenging and tricky. However, I am not in my classroom to change the rest of the school or the colleagues that I work with. I am in my school to directly impact the students before me.

This reflection highlights the teacher's focus on their immediate influence and prioritizing the needs of the students in their classroom over broader systemic changes, which could underscore the importance of individualized impact in education.

Several interviewees reflected on encouraging students’ questions and keeping feeding their curiosity. Katherine noted, "I have always been interested in letting kids choose their topic to get into within the context of a subject. Teaching in an inquiry setting gave me a chance to go deeper into it”. She believed inquiry-based learning was the way forward to education, mainly because it supported diverse students. Alice, who advocates supporting students' thinking, was introduced to several books called “Teaching for Thinking” by her colleague, which immensely impacted her opinion about teaching. At that point, she just motivated students to think intellectually, which later expanded to creativity, socially, and collaboratively. Alice also pointed out the massive awareness in Canada around individuals’ understanding of what to value, accentuate, articulate, learn, and assess. She wondered if we could achieve the outcomes we want as a society through teaching and learning.

> We are experiencing a massive awakening throughout Canada around indigenous ways of knowing and understanding other ways to observe. There are other ways to quantify,

> articulate, and understand the world around us beyond the scientific method. The scientific method is one helpful tool, but it does not sit in isolation. It is part of a larger conversation, an even more significant way of doing things.

It would appear that embracing diverse educational perspectives could enhance understanding of various ways of knowing while motivating teachers to adjust their practices to incorporate multiple learning approaches.

Facilitating Student-Centred Learning

This section focuses on the influence of teachers' perceptions of inquiry-based learning and how it can impact their assessment practices. Moreover, the supporting role of teachers in an inquiry-based educational setting will be discussed.

Several interviewees believed that in inquiry classrooms, the teacher's role is to align students' inquiry projects and their interests with the required learning outcomes outlined in the curriculum. . They tried to create meaningful opportunities for students by connecting different parts of their projects to the curriculum content that should be covered and, eventually, to students' graduate programs. Teachers aim to create relevant learning opportunities for students by leveraging their passions, and giving them real meaning and relevance. James described inquiry-based learning as a student-led pedagogy and compared it with traditional teaching with a well-known quote "Traditional teaching is sage on the stage, inquiry-based learning is a guide on the side, [teachers] are there to support learners to go through the learning process". Reiterating this idea, Katherine mentioned the change in the teacher's role to a guide and facilitator and characterized inquiry-based learning as student-centred learning in which students took ownership of their learning to go deep into the subjects, they were passionate about and

wanted to learn more. Emily described her role: " I teach all the subjects. I teach people how to learn. I am an expert in learning."

Participants also shared the significance of putting students and their identities at the centre and designing learning to meet that learning goal. Teachers were flexible in supporting students based on their familiarity with inquiry-based design and individual needs. They must go through the curriculum with students and consider the needs of all students, not just the ones who are extroverted and can express themselves well. Participants believed that instead of direct teaching, teachers would help students brainstorm by creating prompts to help them come up with topics and assist them in reaching a depth of understanding. Thomas commented on the teacher's role: "we help them develop questions that will take them to some depth so that they are not skimming across the surface or asking very simple questions." Many teachers found that students, even high school students, are uncomfortable with having that experience and taking responsibility for their learning. They found it challenging to take ownership of their learning decisions, as they were used to being told what to do and how to do it in their previous learning experiences outside the inquiry setting.

Several participants highlighted the teacher's role in scaffolding the process by offering step-by-step visual guidelines for their first inquiry, which would help onboard them at the beginning of the school year. They believed students needed some directions to lead them through asking rich and meaningful questions to assess their critical thinking abilities. James, who worked with middle schoolers, emphasized the importance of having introductory sessions at the beginning of the term to get into the emotions of doing an inquiry, and the rest of the term is devoted to supporting and assessing their inquiry process. Olivia highlighted the value of the school's inquiry sessions, which "work as a springboard for students' inquiry."

Thomas also emphasized the necessity of supporting students, especially at the beginning of the term, to set goals, go through the process and have more in-depth questions. Teachers could help them by centering the conversation around their interests to facilitate the process of generating relevant and meaningful questions. Students learned and assessed throughout the process, including developing their questions, the depth of them, and the quality of their answers.

Discussing students' interests and conversing about their learning was integral to the assessment process. It helped determine their understanding of the subjects, ensure they met the curriculum's demands, and demonstrated the depth of proficiency in their inquiry projects. Alice echoed this idea and believed assessment should be through individualized conversation. She provided an example of her assessment practices:

> One of the student's uncles had gone on a journey; he decided he wanted to go around the world without a motorized vehicle. He came and presented to the class. This is how a final exam should look in inquiry classes. You bring in a live human who has done his own inquiry. He spent seven years getting around the world, and then you tell a group of kids, ask good questions, and through that I can assess their ability to think.

Realizing the importance of involving students in the assessment process and providing more opportunities for feedback and reflection from peers was a change of attitude for James. Early in his career, he believed in open inquiry; students were thrown into the deep end of the process and should not require any adults. However, working with middle schoolers and witnessing how scaffolded support could help them get to where they could inquire was a turning point in his approach. Nora supported this view and believed teachers need to help students learn how to reflect on the topic and provide meaningful feedback. Robert also referred to “the role of conferring with students while reviewing the evidence of their learning.” Students were

not alone in their learning and co-assessment process. Teachers were there to guide students through the curriculum, to explore and discover it together instead of covering the content. Robert described his role as a" facilitator of the curriculum, rather than the expert in the room." He further noted, "that is a mindset shift absolutely for me. Having learned in classroom settings where I was not facilitated or guided through the learning."

Katherine highlighted the students' active role in the assessment process and mentioned that students have ownership of their assessment, and the report cards are co-written with them. Students reflected on their performance and set goals for their learning. She added that the process was teacher-centred at the beginning of her teaching experience. As she became more familiar with assessment practices, she realized how valuable having students participate in their assessments was. Teachers could get much information about where students think they are and where they might struggle, which also offered the potential for robust discussion.

Gaining more experience and noticing the significant role of teaching practices makes teachers more confident in their teaching and assessment practices. Emily believed that experience made teachers more confident as they were going against the tide in the model that does not necessarily follow the traditional teaching methods. She added that gaining more experience made her more responsive and better at individuating her assessment practices. Ava also found that her perception of assessment evolved as she became more involved in practice. For her, planning, co-creation, and co-construction became the main steps of the assessment process. She also emphasized that assessment practices should promote forward-thinking instead of merely focusing on the learning that has already happened. Discussing students' intentions in selecting specific topics and learning more about how they could connect them with their current knowledge were parts of the assessment process. Robbert also shared the same perception and

found that his assessment practices evolved over time as students got more involved in the process, and he became “more adept and well versed in the language and the practices of inquiry.” He described the shift in his viewpoint as

> I do not think I would even recognize the teacher I used to be compared to who I am now. The key to that change is my refusal to work in isolation. The most important voices in this work are the students, and if I am not doing it with them, I am doing it to them. That is not doing the job justice.

Inquiry teachers were responsible for balancing students' interests and curriculum requirements. Ava pointed out that her ongoing assessment of students’ learning was competency-based, and she tried to align that with students' projects on the back end. Meeting the BC curriculum criteria was not the center of their assessment conversation. The purpose was to let students dive into their learning, not focusing on course completion, especially for grade 9 or 10 students. Thomas approved the idea and added,

> We have all the information and can talk about it, but we noticed that the inquiry stopped as soon as the conversation shifted to marks and courses. Learners start to look at the curriculum as a checklist, and they say what is next on the checklist, and the inquiry is over; it is done.

Balancing student-led inquiry with curriculum requirements required careful attention to ensure authentic learning without reducing it to a checklist. By keeping assessment conversations focused on students’ learning processes rather than course completion, inquiry teachers helped maintain students’ engagement and curiosity.

Assessing the Learning Process

Participants were invited to share their perceptions of assessment practices within an inquiry-based learning environment. They described assessment as an ongoing process woven into students' learning. From their insights, the overarching theme of *Assessing the Learning Process* emerged, followed by four sub-themes: *Competency-Based Interdisciplinary Assessment*, *Continuous Reflective Practice*, *Student-Serving Assessment,* and *Challenges in the Assessment Process*, which I will discuss further in this section.

Participants portrayed assessment practices as collaborative processes that served the learners and supported their development of learning competencies. They believed that in an inquiry-based learning environment, assessment could provide an opportunity to pause and reflect on the learning process. It allowed students to articulate and reflect on their work, often leading to collaborative conversations with teachers. Olivia shared her experience and mentioned that assessments happened throughout the learning process in her teaching and could help identify where students were with their learning before moving forward. The opportunity to have conversations with students was valuable and led to co-construction of the next step. Emily further suggested that assessment practices were intrinsically linked to and triggered by the stages of inquiry. Robert shared the same belief of honoring students' active role in assessment practices. To have student-led and involved experience, teachers worked toward designing assessment practices that respected co-construction and reflection practices in assessment processes.

Teachers described their understanding of assessment as a multi-dimensional practice. Traditionally, assessment focused on the *assessment of learning*, but inquiry-based classrooms demanded the inclusion of *assessment for learning* and *assessment as learning*. Comprehensive

assessment practices must incorporate all three types of assessment to ensure a holistic understanding of student progress. In inquiry-based learning environments, students had the agency to set learning goals, and the teacher's role was to find certain indicators to specify the nature of learning and ensure they aligned with students' interests and curriculum requirements. Moreover, teachers monitored and assessed how students achieved their learning goals, emphasizing the depth of understanding rather than the quantity of work submitted. For Thomas, true rigor involved challenging students' learning by deeply questioning their understanding. This process moved beyond surface-level understanding and encouraged deep, reflective engagement with the material by pushing students to reflect critically on and analyze their learning.

Ava described her approach to assessment as primary *assessment as learning*, emphasizing ongoing conversations with students throughout the learning process. She tried to be very explicit about the purpose of the assessment with students and usually discussed the expectations with them. She added that her assessments were rarely fully summative. Even when she designed summative assessments, she monitored the process students followed to reach the final product. By doing so, she gained more profound insights into their intentions and learning journey, of creating a final representation of learning.

These findings highlighted a shift toward fostering more student-centred assessment practices, and assessment served as a tool for personal growth, reflection, and deeper engagement with their learning.

Competency-Based Interdisciplinary Assessment

In inquiry-based classrooms, competency-based assessment, such as collaboration, leadership, and critical and creative thinking, instead of focusing on specific subjects gives

teachers a broader umbrella to assess students and create personalized learning experiences. Katerine believed that having a broad range of competencies ensured that the big ideas proposed by the Ministry of Education were covered and that students could learn about them through their personalized inquiry projects. Nora described her experience of competency-based assessment as focusing on skills and content to help her assess students' performance even if they worked on different inquiry projects, as the content was not her only parameter for interpreting students' learning. Moreover, through assessment practices, she could learn what other skills students were missing and plan the next step accordingly. She believed that "the proficiency scale helped students understand their potential, and their letter grades represented the outcome of their inquiry. They could have a rich understanding of everything, but they did not put effort into the project."

Assessment practices should enable students to transfer their skills beyond the course and school context and empower them to apply their knowledge. Emily echoed this idea by emphasizing the importance of skill assessment in empowering students to apply them in similar situations. As James reflected, in inquiry classrooms, teachers considered the universal competencies for assessment, which students were expected to know when they leave school:

> If students can do a science experiment and follow the scientific method, that is awesome. However, suppose you cannot pull that same process out into another context. The exact process applies to the scientific method, such as hypothesis, testing, and evaluation, and it is how every learner should look critically. So, we are going to make critical thinking a core competency. Moreover, can students demonstrate critical thinking in other contexts now? That is a powerful assessment practice.

Some of the participants teaching in private inquiry-based schools reflected on the competency assessment framework developed based on the Ministry of Education proposed competencies. The framework consists of eight competencies and indicators to help students and teachers better specify the nature of the learning activities within each competency, and guide their assessment conversations. The competency languages in this framework are comprehensive and encompass areas that could fit with high-level objectives and contexts. Many teachers mentioned the possibility of doing interdisciplinary assessments using a wide range of competencies. Any aspect of student's inquiry project might relate to different subject areas and address specific competencies, which could be evaluated at any given time.

Alice found value in collapsing the curricular competency language into these more global statements that allowed multiple subjects to come through in every inquiry and every assessment conversation. She further noted that using Bloom's taxonomy facilitated discussing complex thinking skills with students and enabled her to assess students at their grade level. She aimed to assess student's ability to research, think, and articulate through presentations or their writings instead of relying on them having memorized the content. By having a solid information report, she could have a conversation with students, where she was starting to assess higher-level thinking skills such as analysis and synthesis. She noted that, as an independent school, they could choose the language of their report cards and report through their defined competency languages, enabling them to directly connect to the ministry content, big ideas and curricular competencies. Thomas further suggested that writing a competency-based report card allowed for more discussion of learning and was more helpful and meaningful for students than a subject-based report, which included a diary of activities. The first round of reporting in the fall focuses entirely on competency-based assessment, emphasizing students' learning activities and their

progress in meeting specific learning competencies. At this point, the focus is on the level of depth on a proficiency scale, not particular courses or grades.

Continuous Reflective Practice

Many participants highlighted the role of formative assessment and ongoing feedback in an inquiry process. It has also been noted that students should be continuously assessed, and teachers should constantly collect data on their performance and use it to help students. They believed examining where students were and what they had done could be helpful before proceeding. In inquiry classrooms, students are assessed based on the quality of their questions and the process they follow to develop and deepen their questions. Assessments are not based on what they handed in; rather, the whole process is assessed. Emily indicated that the inquiry-based learning design was not a linear process; therefore, iteration and ongoing reflection were essential parts of effective inquiry learning. Students are at different stages of their understanding when learning about a topic and asking various questions may lead them to new paths for learning, so they need to pause and reflect on their position in the process.

Katherine, described her assessment practices as a wide variety of formative assessments, including self-assessment, peer assessment, and teacher assessment through observation and conversation with students. The data from these sources were pulled into a report card. They do not do many summative assessments and have zero testing except for the Foundation Skills Assessment, which is required for grade seven. She also elaborated on the evolving process in her assessment practices over time. Initially, it was mainly teacher assessments; now, students co-construct assessment criteria with their teachers. Nora described her ongoing assessment as an informal process that gave her a broad understanding of students' progress. Conversations with students throughout the project and taking notes of outstanding takeaways helped her see where

students were with their knowledge. She noted that, as her experience grew, she became more adept at identifying the right moments to offer detailed, targeted feedback to enhance students' learning. She believed that if teachers attempted to provide detailed feedback and reflect on every aspect of an inquiry project, it would become overwhelming, as the workload was too high, and class time would not allow it. She discovered that identifying the appropriate stage of the inquiry for giving detailed feedback and allocating proper time for it was a critical aspect that would enable teachers to stay with formative assessment and not return to the chapter test.

Several interviewees found that assessment for learning, which happened within the learning process, was more beneficial for students. Such practice did not look like a quiz, rather it was having conversations with students to learn where they were in their learning process, not for scoring but to know what else they needed to build in for scaffolding. Robers described his perception of different kinds of assessment: “formative assessment is to inform our immediate next steps, and summative assessment is to reflect on where a student is currently in their learning process.” He added that strong formative assessment needed constant engagement with students to see where they were and determine where they needed to go and how they should get there so that they conferred all the time. By asking the right questions, teachers could elicit a response.

Student-Serving Assessment

Many teachers elaborated on incorporating students' choices and considering their interests while designing assessment practices. In inquiry-based learning, the goal shifts from proving that students have learned something to help them become independent learners who can progress with the teacher's guidance. In support of this notion, James believed that assessment should be a two-way conversation, but most of the time, it was done to students rather than with

them, leaving them to experience it passively as learners. Traditionally, students had no say in the process besides providing evidence of learning, and teachers were accountable for demonstrating their learning, often through standardized assessments. However, inquiry-based learning focuses on helping learners develop the skills and confidence to progress independently without relying on the teacher. Therefore, the teacher's accountability fosters students' independence and ability to continue learning beyond the classroom. Katherine held the same perception, adding:

> Inquiry-based learning is about students, not about the teacher. From my perspective, the main point of assessing inquiry is to give students a sense of closure, accomplishment, understanding, and the ability to self-reflect on their work.

Participants perceived their role as facilitators who helped students develop metacognition skills and think about their own processes. Several teachers highlighted that assessment practices could be a 'big learning curve' for students, as they often did not know what to seek from assessment until they gained enough experience with how it could support their learning**.** Emily believed that the teacher's role was crucial in creating a balance between helping them decide on their learning, having agency over that, and ensuring they were on the right path. Therefore, new students needed more scaffolding because they were uncomfortable working independently. The primary purpose here was to develop reflective practice for students about their own work. Nora found that asking students to self-reflect while working at different stages of their inquiry projects gave her valuable information to look back on when assessing them and giving them feedback instead of scoring them. This practice made the assessment process a constant conversation and ensured they aligned with the inquiry's goals and outcomes. Feedback on students' reflections helped them to improve and implied that their thoughts are

important. As a result, they tried to express genuine ideas, knowing they had an audience who cared about their thoughts and read them. Olivia added to the concept by saying that it was essential for students to articulate and reflect on what they had done, which led to an assessment conversation. Emily also echoed that idea and mentioned that students have much say in the assessment, and she often discussed suitable assessment practices and inquiry projects with them. She further added that when students were stuck in the process and did not know how to move forward, it could be a proper time for assessment. Conversation with students at that point could help review the process, identify challenges, and decide which direction was best for them to move forward.

Assessment practices could allow for meaningful progress by tailoring feedback and strategies to what was most relevant to the learner's plans, helping them achieve their academic and professional objectives. Ava supposed that if writing skill and competency were the purpose of the assessment, it would be more relevant to ask students to write on a topic they were interested in, understand, and care about, as it allowed them to express themselves well in that environment. In support of aligning assessment practices with students' goals, Emily added that if students worked toward specific university programs, it would be more meaningful for them to focus their inquiries on subjects related to those fields. It has also been noted that designing assessment practices and choosing an authentic representation of students' learning is valuable and essential. In line with this idea, Ava added that if a student struggled with writing and the assessment aimed to assess their knowledge of a concept like history or science, writing would not represent their expertise in these subject areas.

Many participants believed that students had many voices in the assessment process in an inquiry classroom. Thomas described his understanding of assessment practices and said a good

assessment should help students with their learning process and inform them about how it was going, what was coming next, and what they could do to adjust. He further noted, "Assessment should be constant, in real-time, and always with the learner. So that is not something a teacher does alone; it should be with the learner." He further suggested that almost all his assessments happened with students during school hours, making them more involved. He also supported students' participation in peer assessment, where they learned how to assess and be assessed by their peers. He found this a significant transformation in his practices as he was uncomfortable with having students responsible for this process. Over time, by scaffolding the process and increasing student accountability, he noticed considerable progress in their practices and felt confident in trusting them to take more ownership of their learning.

Robert described the purpose of assessment through an inquiry lens and believed assessment practices informed teachers' decisions. He intended to help students become more competent in doing assessments, the same as what he expected them to do in learning. Students should take ownership of assessment practices and be part of a collaboratively designed series of experiences. He further noted that, as we discussed skill development for our students and expected them to be competent in collaboration and critical thinking, we should also consider assessment skill development. He said:

> We want our students to be more competent self-assessors, confident peer assessors, and accurate assessors. In other words, they should be able to self-assess with such accuracy that my role in assessment is questioned because the students are getting at it themselves.

Therefore, teachers should be confident in slowly increasing the students' role in assessment processes. Moving away from a grade book full of percentages represents a significant mindset

shift for teachers, requiring confidence and feeling secure in their new approach. Nora elaborated that gaining more experience and knowledge about assessment practices made her confident enough to replace quizzes with other means of assessment. Then, she no longer needed quizzes to justify her statements. She noted that:

> Learning activities must always center on the students. The focus should be on meeting learners' needs rather than prioritizing what is familiar or convenient for adults. Teachers might feel more comfortable sticking to traditional methods because that is what they know. However, if we are committed to making meaningful educational changes, adults may need to embrace some discomfort initially. This shift will ultimately make learning environments more engaging and adaptable for students, allowing real progress.

She added that this mindset stemmed from the fundamental reason people choose inquiry-based learning, a philosophy that places students at the center of their own learning.

In support of this idea, James also mentioned that assessment practices should focus on individual growth. He brought an example and said that:

> When you learn to walk, there is no final grade. You and a parent or a trusted adult learn how to do that. You are going through that process of trial and failure, and somebody is there to support you. So, all assessment methods should be able to do that. Unfortunately, we do not live in a world where we can focus on individual growth.

James continued that teachers needed metrics and measurable outcomes to attach to where students are. Metrics are the indicators of an effective teaching method. Therefore, we needed grades to assess students and allow for progression. He believed that in a perfect world, assessment might look different, but the current system had checks and balances to hold everyone accountable, including teachers. James also asserted that inquiry-based learning had

different success metrics. If students could self-direct and learn, they no longer would require a model or an adult except when they needed support, and they could identify that. Every learner could be expected to have a growth mindset focused on learning and discovering.

Challenges in the Assessment Process

Several participants reflected on the challenges of designing and implementing assessment practices in an inquiry-based learning environment. They believed teachers' varied backgrounds and past educational experiences could influence their teaching approaches. Navigating a system outside conventional norms often prompts teachers to confront their beliefs and assumptions about learning and assessment. The traditional framework, where coursework, exams, and grades have been the standard for over a century, shapes expectations for teachers and students. Thomas found that not having defined metrics for assessment in an inquiry-based learning design and asking students to drive their own learning were problematic for some teachers. Students do not follow the same scope and sequence through their inquiry projects, making the assessment processes iterative and complex . James believed that in inquiry, we needed to reimagine how we assess students' learning, which was a fundamental change for teachers. He used a metaphor to compare assessment practices in an inquiry setting with the concept of thinking outside the box. In an inquiry classroom, you were pushing the limits within the box and having flexible boundaries created a challenge for measurement.

Coming from evaluative assessment experiences and bringing this background to inquiry classes resulted in expectations for students and parents that might not align with inquiry-based principles. Ava believed having the same understanding of the assessment was essential in this model and found that sometimes it was challenging to communicate expectations. She added that parents' expectations of their children often differed from their learning goals. They expect

assessment practices to measure their children's learning instead of reflecting on the process. This might cause some presumptions for them which were not in line with the inquiry process. Olivia found it difficult for students to come to the inquiry model which is not based on grades or standardized tests. Success criteria are different from common beliefs that people hold in society. Conversations with students and explaining what it means to work at different depths of understanding can help them learn the reasons behind assessment practices. Emily also discussed the impact of students' backgrounds on their performance in an inquiry setting. She added that coming from learning environments that dictated all steps for them caused some challenges when adopting an inquiry-based learning design in which they had autonomy over their learning. She believed that it was a learning process, and it took some time to feel confident navigating the new learning environment. She added that as teachers, we were always there to support them, but the goal was that they took agency for their learning.

Several interviewees found that competency-based assessments were more aligned with assessment practices in an inquiry-based learning design. They believed that having curricular competencies as part of the curriculum gave teachers the tools to design assessment practices for these complex thinking skills. Alice said that moving to competency-based assessment was a fundamental change in her assessment practices. She found it challenging to assess these higher-order skills and tie them to ministry expectations without having them in the curriculum language. Focusing on knowledge testing and retrieval levels did not allow moving to higher-level thinking skills. An interdisciplinary curriculum gives teachers a means to align students' inquiry projects with the curriculum learning outcomes. Teachers found that cramming prescribed learning outcomes into students' inquiry would be challenging without a curriculum supporting interdisciplinary teaching and competency-based assessment.

Participants further reflected on their experiences, noting a critical gap in the competency-based assessment framework. They felt that, although the BC curriculum emphasizes competency-based assessment, teachers still need a way to equate students' progress. The ability to articulate information is still the main bar by which people judge whether someone is competent with material or ideas. Alice believed that shifting to inquiry-based learning and complex thinking skills remained challenging to assess unless teachers could do assessments collaboratively with students. In assessing students, we usually look for the outcomes and measure what is measurable or doable. However, sometimes, it might not be easy to measure and standardize the learning that is happening in the inquiry class. She added that:

> Assessment practices in inquiry-based learning are challenging to align with standardized tests. High-level inquiry skills are hard to measure through such tests. If students select their inquiry question, it becomes difficult to evaluate responses consistently because answers cannot be assessed uniformly.

Olivia believed that assessment could be challenging in this model, and it was hard to have the same opinion as their inquiry projects were individualized. In an inquiry class, students participate in various activities to demonstrate their learning. They have their own ideas, research, and findings, and **t**ranslating their evidence of learning into a grade is really challenging. Nora found a disconnect between focusing on inquiry and requiring a letter grade, as assessment practices in inquiry classrooms were not always about average. She further commented that grades were only one way to represent learning; however, many other approaches existed. James confirmed this idea and believed that the issue arose when educators tried associating grades with students' success. This system harms students by making them

focus on the final grade rather than the process. In agreement with this idea, Emily described her expectations:

> I would not have courses and grades in my ideal world, but we work within the graduation program. So, we need to translate the learning that happens in the class through inquiry projects into courses and grades and report them. I do not like this process because I believe it does not serve the learners.

An inquiry project usually involves integration of some subject supported by the interdisciplinary BC curriculum. When students do their inquiry, it may consist of math, history, and science. Students work through all the subjects, and in the end, teachers need to pull their projects apart and mark each subject separately, as the reporting platform introduced by the school district does not accept interdisciplinary assessments. Nora found it challenging and explained that teachers were doing this because the platform required separate grades for each subject area. She noted that the Ministry introduced an interdisciplinary curriculum, but the reporting platform did not reflect that and required grading separate subjects. Thomas added, "we do everything in an interdisciplinary inquiry-based way at depth, and then we have to translate everything constantly into the subject containers, which are challenging." Robert also approved the notion and added that the reporting platform was not built for a redesigned curriculum. He believed that as we conferred with students and built learning together, we should constantly go back to the curriculum and reflect on students' performance to see if they demonstrated their understanding at what depth of proficiency. He added,

> If I could bring that understanding to students, they could partner in that practice. They could help me with that balance and talk about proficiency, and then I could better strike

> that balance between having them gain ownership of their learning and making sure they meet expected learning outcomes.

Several participants highlighted teachers' workloads and the time needed to do assessments in an inquiry-based learning design. They believed that to have an accurate assessment, they needed to go deep into competencies and assess students' growth, which could be challenging, especially for new teachers. Ava explained her experience of assessing students in a cross-curricular way.

> One of the difficulties in a more classroom-based environment is time because this type of assessment takes time. That has been my experience, and one way to address it is to teach and assess cross-curricular. So, you are taking the time that would be spent in all these different classes and combining it into one inquiry.

James also found that assessing students in an inquiry-based learning environment necessitated going deep into competencies and their growth, which was challenging and took time. However, he believed it rewarding as it gave teachers an authentic understanding of students' understanding. Olivia found that writing students' report cards and assessing students' inquiry projects in collaboration with all teachers at school was helpful as each teacher held the pieces of each student's inquiry. She explains,

> The process takes a long time as we discuss each student's performance throughout. I think it helps that it is in collaboration and not in isolation because we are not assessing the score on a test but the depth to which students are working.

Contextual Factors in Adoption and Assessment Practices

Several participants reflected on the influence of contextual factors on their perceptions of inquiry-based learning design and their assessment practices. Drawing from their viewpoints,

Contextual Factors in Adoption and Assessment Practices emerged as a broad theme for this question, followed by three sub-themes, which I will discuss further in this section. In the first part, I will address the *Structural Factors and Curriculum Flexibility*, followed by the *Student Demographics and Readiness*. I will conclude this section with the *Support Systems and Teacher Empowerment* subtheme, focusing on support systems while incorporating inquiry-based learning design.

Structural Factors and Curriculum Flexibility

Participants in this study reflected on the opportunities the redesigned curriculum could bring to their practices. Many teachers found that the curriculum in many subjects was flexible enough to translate students' inquiries into the curriculum's required learning outcomes. Therefore, many curriculum components could be answered through inquiry projects and having a comprehensive report card ensured that the big ideas were addressed. Alice described this transition as a turning point in her assessment practices. She said, "the curriculum competencies handed us language for assessing cognitive skills." She found that the curriculum's big ideas were "common values held by the society, " giving us a shared understanding of collective belief. Nora, who had many years of experience teaching, found that the new curriculum supported inquiry well and added, "when the new curriculum came in, we were grateful because we did not have to justify it with research as we have the language in the curriculum now." Robert further commented that British Columbia's curriculum and assessment policy created robust conditions for teachers to use a student-centred pedagogy.

> In British Columbia, student-centred learning is powerfully supported by our curriculum and the assessment policy. The big ideas are conceptual umbrellas for targets. Underneath

those big ideas, we can pick a few curricular competencies and content standards, and then we can wrap around the core competencies to plan learning experiences with our students.

Thomas held a slightly different perception and believed a redesigned competency-based assessment could be more profound. He believed it should be more about helping people go in-depth in competency and subjects they were interested in. However, he asserted that “having one standardized paradigm for the entire province makes it challenging to fully embrace personalized, in-depth learning experiences.” Emily, added, "working with the BC curriculum for many years has prepared me to translate what students do in their inquiry projects into curriculum outcomes.” However, she believed the curriculum could go a step further by becoming more modular and flexible to accommodate open inquiry better. Teachers further commented that although the curriculum could support inquiry-based design in many aspects, there was still a gap. Nora found a disconnect between competency-based assessment and final grades and said, “requiring a final grade when this type of assessment is not about on average at the end.” Olivia approved the idea and added, “assigning grades to courses is not aligned with inquiry.”

Many spoke of students who had a background in a traditional system where they were told what to do and found it challenging to manage the structure of inquiry-based learning because they had not been taught to make decisions about their learning. Ava believed that writing a test did not represent what students learned. Alice was also in the same position and added that students were asked to report information in traditional classrooms instead of focusing on thinking skills development. Even with science, students were told to repeat the labs that had happened before and went through the same steps. They were not required to bring their own thinking to the process.

Teachers said that, in the inquiry model, support for students extended beyond a single teacher, involving a broader network that could help them navigate their education. Olivia found her relationship with her students to be a primary motivator for staying in an inquiry model. She said, “I would never have the opportunity to know them if we were in a public school setting.” Emily added that inquiry-based learning design allowed her to challenge students' learning. She said she would not be a teacher if she did not teach in this model and described her motivation as, "I cannot create reciprocal relationships of trust with learners in a system where I am not centring their agency, and my goals are more important than their goals for their learning.” She added that she was disheartened after seeing that her peers, who believed in student autonomy and agency, might not have the freedom and flexibility to apply these values and would be adapted to authoritarian teaching styles in a public school system.

Emily found that students decided to come to inquiry schools when the public system does not work for them; they do not have enough time with their teachers and miss those opportunities or might not be sufficiently challenged in the public system. James added that students from a “standardized model of education” who had been told by the traditional system that they could not do academically well and needed special support could have a better experience in this system. Educating in a more flexible environment with appropriate scaffolding allowed them to explore topics through their own lens with the support and guidance of a trusted adult. He described the role of the inquiry model as “the port that ships come into to get repaired.” He further commented,

> For so many of these kids, either they are coming from too much rigour and need to take a second to breathe, or they do not have the skills, tools, and rigging they need to sail this ship of education; the inquiry model could be beneficial.

Katherine suggested that although an inquiry was a supportive model for students "who do need to come into port for repairs" and might seem like a "lower demand environment," it still prepared students better for post-secondary setting rather than educating in an environment where focus is merely on rote and rigour. Thomas further commented that this model was the most rigorous teaching method as it challenged students' understanding of subjects, and they came to a much deeper way of thinking "as opposed to memorizing something."

Participants reflected on the influence of the number of students on their teaching practices in an inquiry setting. Many found that having a small number of students provided an opportunity to work individually with them, have one-on-one conversations, and plan the learning with students. Ava described her practices: "I usually do not give an assignment or test to a whole group of students at once. It is very individual. It would be tough to implement the same level of individual attention and co-construction with more students." She added that the level of relationship with students was highly impactful in this design. Spending time with students to get to know them and learn how they work and what they need to be successful was extremely challenging in a bigger class.

In the inquiry model, students worked in diverse areas, and teaching at scale means managing much diversity. Teachers could engage with students and work on their learning at a different depth with smaller groups. James mentioned, "once you get into these huge numbers of students, everything becomes infinitely harder. They are still learning, but are they learning how to learn? Are they learning to focus on learning? No!" Nora further commented that inquiry-based learning and formative assessment should address diversity. Teachers needed to be flexible and take care of individual needs. If we taught in large classes, students would have less time to converse and receive meaningful feedback on their work.

Interviewees reflected on the importance of school and district values toward education and believed that the school and district's philosophy significantly impacted students' perceptions of education and teachers' practices. Robert believed that schools should have a clear vision of what students should gain from their education, and teachers' practices should align with these goals. He further commented that sometimes there was a mismatch between teachers' values and their teaching practices and explained the reason as

> Teachers teach how they are taught. When I was a student in the 80s and 90s. The values were academic success, rigor, and getting the highest mark. The agency, curiosity, and collaboration were not valued. We collaborated on the basketball team, not in the classroom.

Alice highlighted the impactful work with Indigenous communities around embracing the First Peoples' learning principles. She believed this broader perspective could deepen understanding and support within education and help teachers authentically engage with students and communities.

Teachers further commented that implementing inquiry-based learning would be easier if teachers had the support of school administrators and districts. Alice found it beneficial to have a "progressive and supportive administrator" who valued developing and supporting student-led education while aligning it with the curriculum. Their support empowered teachers to design and implement personalized and student-centred learning experiences. Ava added that the school's educational philosophy and support enormously impacted her teaching. She added, "It is hugely impactful; it would be difficult to imagine learning all this in a different environment." Thomas echoed the idea and said it was less challenging when everybody was on board and the inquiry-

based learning principles were applied school-wide rather than having an inquiry-based classroom. Olivia also agreed with the idea and said,

> I am not going against the grain by implementing inquiry in my classroom. The entire school structure, from our policies to the support systems, is built to foster inquiry-based learning. This alignment is incredibly helpful in creating an environment to support this approach.

Following this idea, Emily shared an experience from their teacher education program highlighting traditional education models' rigidity. During a class on reading and writing skills, a peer raised a concern about how teachers were expected to follow strict plans from the start of the year while they prefer to spend the first few months getting to know their students. Emily questioned the assumption that students should switch teachers each year, suggesting that "you were going under the assumption that the only way to do school is that kids go to a different teacher every year. If you had a structure where you knew those kids many years over time, that would not be a problem." Another student voiced concern about their child's negative experience with a teacher, reinforcing the assumption that a single teacher managed a large group of students. Emily emphasized,

> You assume one teacher has to be with thirty students. You have all these assumptions about how education has to happen. You do not have to have a model where you have one teacher with thirty students every day. Lots of different things happen when you have a different model.

Similarly, James believed that inquiry does not fit the traditional system, where one teacher is responsible for thirty students. In that setting, the desired level of assistance and management is

impossible. He added that re-structuring schools and not having all the divisions of small classes offered more time to focus on individualized assessment.

Several teachers believed that it could be helpful for students to receive differentiating instruction based on their needs, ensuring that they received support tailored to their pace and goals. However, Thomas believed it is hard to differentiate instruction at some point if you have a large class. Therefore, he suggested changing the "school's structure, so the instruction was differentiated instead of teachers trying to adapt everything to individuals." He added that the looser structure in terms of classes gave teachers lots of room and freedom to move around, tailor time, and help people with whatever they needed. Some people needed more support, and some people needed very little support, and even it could change depending on the nature of what they are working on. Katherine noted that inquiry classrooms look different from the standard classroom, where the teacher was at the front of the classroom the whole day, "delivering knowledge to a group of students arranged in orderly rows." She found it more like a co-working space or an open-plan office where students worked on various tasks in different spaces, at their own paces, with "educators circulating around to check in on them and make sure that they are getting the support and the scaffolding they need and answering any questions.

Olivia found that stepping away from the course-based structure and assessing students through conversation, self-assessment, and peer assessment shows how meaningful the learning is. She believed that not separating students by age in this model created an excellent opportunity for students Their age did not directly affect the levels that students were working on. So, having mixed ages offered a chance to have a more authentic community than being siloed into one group.

Student Demographics and Readiness

Many participants highlighted the impacts of students' familiarity with inquiry-based learning design on their performance in inquiry settings. They believed new learners needed more direct instruction and scaffolding around asking rich questions. Teachers needed to equip them with the required skills to navigate their learning and highlight possible learning opportunities from their questions, which led to their inquiry projects. It causes problems when students bring their old values about grades and standardized tests into an inquiry system. Olivia found it helpful to have conversations with students to help them grasp the idea of working at different depths and how it would look when we did not offer judgment values.

Many teachers found that students' ages might have impacted their performance in the inquiry setting. The younger they were, the more uncertain they might be about their inquiries and how to navigate them. Katherine found that middle school students might need a more structured learning design, and as they get older, they can better navigate free inquiry. She added that as students gain more experience, they could spend an entire day self-directing their learning. Inquiry-based learning is inherently interest-driven and goal-oriented, requiring teachers to understand students' interests and educational objectives. For students, this often involves identifying their own goals, which can be challenging but ultimately a rewarding and essential part of the learning process. Emily believed that giving students a choice to be in an inquiry-based learning setting was the most critical indicator for successfully implementing inquiry-based learning design. She explained:

> When students want to be somewhere, regardless of age, they are way more capable of being regulated. When I say regulation, I do not mean calm. I mean that your nervous

system response is appropriate to what is happening and allows you to participate in what is happening.

Emily commented on the influence of students' past experiences on how they can make meaning around learning**.** It might be challenging for learners who have never been asked to express their opinions about their learning preferences to be exposed to an environment where they can co-create many aspects of their learning with their teachers without it being prescriptive. This is a learning curve for them to trust the process and realize that the meaning they make from their experience is valuable for them rather than something teachers have been asked for.

James brought up another aspect of students' backgrounds. He mentioned that students' socioeconomic backgrounds could influence the inquiry model. Nora further commented that those students with more life experience and background knowledge, such as those who have travelled or been exposed to enriching environments like museums, tended to do better in open inquiry projects. In contrast, students who lack these experiences, often due to family responsibilities or economic struggles, start at a disadvantage. Without sufficient scaffolding, these students found open inquiry too tricky, often choosing easier topics they were not passionate about, leading to a painful learning experience. This uneven starting point in life made the inquiry process challenging for them and kept that inequity moving forward.

Support Systems and Teacher Empowerment

Participants were asked to share their experiences of the support system in shaping their understanding and approach to inquiry-based learning. They highlighted the significant influence of teacher education programs in onboarding candidates with student-centred teaching approaches. They stated that even though some courses introduced the idea of inquiry and tried

to incorporate it into their training, having a practical demonstration of the inquiry model could help candidates gain a thorough understanding of the concepts. They believed that connecting with schools and teachers who implemented the inquiry-based approach could bring the abstract concept to life and provide a clear picture of the inquiry-based learning design. Ava found, "having an inquiry teacher as a guest speaker in one of our teacher training courses was inspiring. It sparks the desire to follow it up and teach from an inquiry stand." James echoed the idea and highlighted the importance of spreading the notion of student-centred approaches from teacher education programs, which could fundamentally impact candidates' perception of education. He provided an example of STEM education programs and how they connected with schools and colleges to create real-world learning experiences, fostering collaboration between educators and giving them a practical understanding of the program.

Some teachers shared how individuals' educational backgrounds and past experiences could influence their practices. Teachers from diverse backgrounds sometimes find it challenging to foster students' agency, reciprocity, and trust in the inquiry process. Therefore, gaining more knowledge and understanding of how to be responsive and flexible in differentiating for students, along with proper training, could help them put their understanding into practice.

Participants highlighted the ambiguity around terminology and the importance of offering a practical demonstration of how inquiry-based learning might look in practice. Thomas, highlighted a lack of understanding regarding inquiry design due to teachers' limited experience with inquiry-based education. Therefore, offering a demonstration of what an inquiry-based system looked like and allowing them to experiment with it could help them understand that this approach goes far beyond just passing tests. It focuses more on helping students to grow as a person. He added, "we help people do something completely different from that idealistic,

abstract thing we talk about." Ava echoed the notion and added that although some teacher education programs encourage student-centred pedagogy and offer courses around the requisite assessment practices, training around learner-focused approaches in practicum and continued support early in teachers' careers could better equip teachers to create responsive and individualized learning environments.

A mentor is significant for early-career teachers transitioning into an inquiry teaching model. Working as a team and sharing experiences ensures they are on the right path. Emily stated, "mentorship is valuable in this model. It would be best to have someone who can reassure you, give you strategies, and listen to your concerns." James added, "It is hard enough to be a teacher without having to go and change what education looks like. So, the communities out there should allow this to happen." He further noted that a network or support system to help teachers deal with their preconceived ideas about how the educational system should look is beneficial. He noted, "this system is very relationship-based, and it is not possible to do it in silo. So, having other relationships and community involved has been valuable."

Several interviewees highlighted the value of co-teaching and co-assessing in this model. It is helpful for teachers to learn from each other and support each other in assessment practices, as each of them may hold a piece of the student's inquiry. Thomas said, "we all try to help each other out as teachers because I know that most of us were taught to teach very differently from inquiry-based, and nobody was taught to do inquiry-based learning formally. Sometimes, when you are tired or stressed, you will return to this old-fashioned thinking." Ava added, "learning from experienced teachers at school by observing them, seeing how they interact with students, and assessing their learning is very important in my practice." Some participants highlighted the need for more resources and professional development to support teachers in implementing

student-centred learning experiences. James said, “I learned a lot by researching inquiry-based assessment in my graduate program. My colleagues supported me in the early years of my career. However, teachers need more support to implement inquiry-based learning.” Robbert approved the idea and added that,

> Teachers are under-resourced and need more support and professional development. However, I think the world and our access to information now provide opportunities to compensate for this. In many circumstances, teachers are becoming better at what they do because of the online professional learning networks that allow us to connect with teachers around the world.

Participants emphasized that while additional resources and formal professional development are essential for supporting student-centred practices, informal networks also play a valuable role. As access to global professional learning communities grows, teachers can increasingly connect, share, and enhance their practices through these virtual platforms.

Chapter Summary

In this chapter, I have presented the analysis and interpretation of the data. I focused on how teachers perceived inquiry-based learning and how this understanding guided their assessment practices. I also discussed participants’ interpretations of their assessment practices while teaching in a learning environment centering on students’ inquiry. Additionally, I explored the impacts of contextual factors on this process. The goal was to explore and synthesize their understanding and reflections on inquiry-based learning design and assessment practices.

Chapter Five: Discussion and Conclusion

Introduction

After presenting the study's findings in Chapter Four, I will discuss them in this chapter, focusing on understanding how participants perceive their assessment practices in an inquiry-based learning environment. This discussion will integrate insights from the research findings and the literature review to answer my research questions. Each section of this chapter aims to answer one of my research questions, although, at times, they overlap. The chapter concludes with the limitations of the study, recommendations for further research, and conclusions.

Transforming Educational Practices through Inquiry-Based Learning

In this section, I will discuss the findings regarding teachers' understanding of inquiry-based learning and its key principles, which are presented under the broad theme of *Reimagining Education* in chapter Four. This will address my first research question: How do teachers perceive inquiry-based learning, and how does this guide assessment practices?

I aimed to gain further insight into inquiry-based teaching practices and my analysis indicated that participants found transitioning to inquiry-based learning required a transformation in their approaches to teaching. Following a constructivist perspective, inquiry-based learning design provides more opportunities for students to construct their knowledge and learn through social interaction. The impact of the inquiry-based learning approach in fostering active and collaborative learning opportunities is well-documented in the literature (Saleh et al., 2021; Talampas, 2024; Wale & Bishaw, 2020). Constructivist theorists have shifted learning towards acquiring knowledge through ongoing and dynamic processes (Kritt & Budwig, 2022). Moving away from the static model of teaching and recognizing students' active role in knowledge construction through interactions could foster their learning.

The key findings of this study indicate that from teachers' perspective, an inquiry-based learning design could provide more authentic learning experiences for students. In inquiry classrooms, students have practical and meaningful learning opportunities by connecting their learning to the essential skills needed in their real lives. Participants believed the inquiry model could embody students' growth mindset and foster 21st-century skills, such as critical thinking, collaboration, and communication. My findings are consistent with previous research on the positive impacts of inquiry-based learning on student's 21st-century skills. In 2021, Abaniel found that inquiry-based learning improves senior high school student's 21st century skills, such as critical thinking, effective communication and leadership skills. Moreover, Rahimi et al. (2019) and Wale and Bishaw (2020) reported that students participating in their studies actively seek information and try to understand it through inquiry practices, and involvement in inquiry-learning activities helps them acquire higher thinking skills.

Participants in my study believed that the emergent curriculum and the interdisciplinary nature of inquiry-based learning design help students learn better by connecting different subjects naturally with their inquiry projects and applying their learning to real-life experiences. Collapsing curricular competency languages into global statements was a strong point of inquiry learning environments, allowing multiple subjects to come through each inquiry and every assessment conversation. These findings resonate with the insights from Isik-Ercan's (2020) case study research with twenty-one second-grade students, showing that interdisciplinary inquiry-based projects could improve student's learning and intellectual abilities. Furthermore, I found that teachers believe that adopting interdisciplinary approaches and connecting various disciplines naturally could enhance students' comprehension and the practicality of their

learning. Cross-curricular teaching fosters students' motivation, personalized learning, and autonomy by choosing their learning goals based on their interests (Li, 2023).

This research provides evidence that teachers perceive inquiry-based learning as a teaching method to help students learn meaningfully and honor their choice in designing the learning environment. They believe students can be motivated internally when they are empowered to choose the topics they want to learn about and generate genuine questions about them. The positive influence of inquiry-based learning on student's motivation is well grounded in literature (Cairns & Areepattamannil, 2019; Hwang et al., 2015; Johnson & Cuevas, 2016; Kane, 2013; Li & Ding, 2023; Moote, 2020; Wang et al., 2015). My findings resonate with Meulenbroeks et al. (2024) mixed-method research, which demonstrated that guided inquiry-based learning design could significantly generate secondary school students' motivation. In another study, Li and Ding (2023), through the quantitative research design, highlighted the positive effects of student-centred pedagogies, including inquiry-based learning, on students' non-academic achievements, such as their learning quality, personality and social adaptability. Their research shows that inquiry learning increases students' internal motivation by empowering them to identify their areas of interest and learn about them collaboratively (Li & Ding, 2023).

This study identified students' agency, ownership, engagement, and personalized learning opportunities as notable principles of inquiry-based learning. Teachers believed that honoring students' voices and supporting them to gain the required skills could gradually equip them to identify big ideas in the curriculum and brainstorm topics to meet those through their inquiry. Participants indicated that inquiry-based learning design empowers students to take ownership of their learning, honor their agency and autonomy, and nurtures their decision-making skills.

Participants found a competency-based curriculum as an opportunity to tailor students' inquiry projects and create personalized learning experiences for them. Moreover, adapting learning based on individual needs could promote an inclusive and accessible educational experience.

These findings are consistent with existing empirical research highlighting the role of students in inquiry-based learning design and its positive effect on their academic success (Jiang & McComas, 2015; Pilotti et al., 2024; Scott et al., 2018; Spronken-Smith et al., 2008). Empirical studies reported that supporting students' agency and decision-making helped them took ownership of their learning and developed their understanding (Jiang et al., 2022; Ford et al., 2023; Zhao et al., 2021; Vaughn, 2020). Following this idea, Kim (2022) investigated student agency in an inquiry-based classroom through qualitative ethnographic research. The findings highlighted the importance of honoring students' ideas, questions and curiosity, which led to giving them more responsibility and ownership of their thinking.

My findings further agreed with Buchanan (2016), Li & Zhu (2023), Talampas (2024), and Wheatley (2018), who revealed that inquiry-based classrooms could facilitate students' engagement in learning activities by becoming more curious and involved in the task. Participants of this study shared the importance of building strong relationships with students, which could foster trust and create a safe environment for their learning. The interest-based nature of an inquiry learning environment could foster and encourage open communication and assist teachers in getting to know their students and their interests.

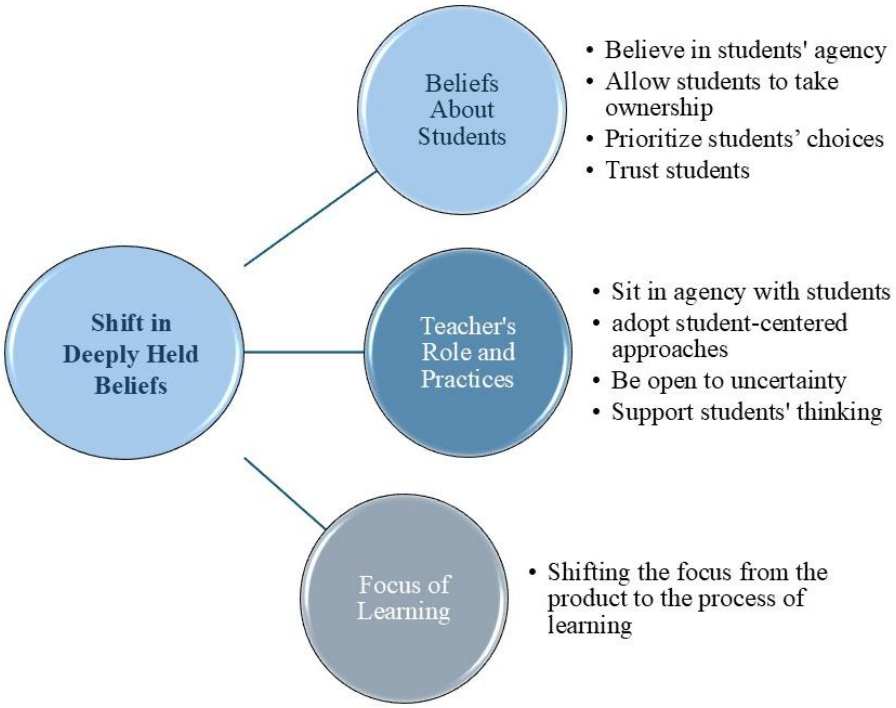
Shaping Inquiry Learning Through Teacher Beliefs

This research provides evidence that transitioning to an inquiry-based setting presents a significant learning curve for teachers who arrive at this pedagogical approach with traditional, product-focused experiences. Thus, adapting to inquiry-based teaching necessitates some

changes in their beliefs. Different perspectives were presented on this topic, as shown in Figure 3. Participants highlighted students' role in inquiry classrooms and found that believing in their agency, prioritizing their choices, trusting them and allowing them to take ownership of their learning was a substantial mindset shift for teachers. Moreover, teachers believed that adopting student-centred approaches, being open to uncertainty and supporting students' thinking is a learning process which may not be aligned with traditional teaching practices. Furthermore, inquiry-based teaching requires shifting focus from the product to the process of learning, which participants found to be a process that requires practices to be comfortable with it.

Figure 3

Shifting Teachers' Beliefs in Inquiry-Based Learning



There is a large body of literature on the impact of teachers' beliefs on teaching practices (Devine et al., 2013; Fives & Gill, 2015; Bas, 2021; Nespor, 1987; Fang, 1996). The findings of

my study also underscored the influence of teacher's deeply rooted beliefs about education on their teaching philosophy and, ultimately, on their practices. This notion aligns with Koutsianou and Emvalotis's (2021) qualitative research, which identified a link between primary teachers' perceptions of knowledge, their understanding of the process of knowing, and their conceptualization of inquiry-based learning to engage students in knowledge construction. Moreover, in 2019, Voet and De Wever conducted qualitative research and found that teacher's beliefs about education, self and context could impact their implementation of inquiry-based learning.

The findings of my study emphasized the importance of students' roles and their active participation in inquiry-based learning design. However, designing teaching practices centred on students and their priorities can be challenging. Participants assumed that believing in and prioritizing students' choices is often against the prevailing ideas about their classroom roles. The findings resonate with Song and Looi's (2012) case study findings, which revealed that teachers' beliefs about the process of acquiring knowledge greatly impact their teaching practices, which gradually affect students' learning.

This study also provides evidence that moving away from a product-oriented mindset necessitates a significant adjustment in teachers' attitudes. Although participants recognized the value of empowering students, some found it difficult to trust the reciprocity process. They felt insecure in such educational environments, which required them to be adaptable and open to uncertainty. Moreover, they found fostering a collaborative learning environment and avoiding the role of being a decision-maker a philosophical shift in their teaching practices.

Rethinking Assessment Practices in Inquiry-Based Classrooms

In this section, I will discuss the findings regarding teachers' perceptions of assessment practices in an inquiry-based learning design and the possible challenges in the process, presented under the broad theme of *Assessing the Learning Process* in chapter Four. This will address my second research question: In what ways do teachers perceive their experiences of assessment practices in an inquiry-based learning environment?

There is a growing body of research on the effectiveness of inquiry-based learning in terms of students' success (Jiang & McComas, 2015; Bui & Khuu, 2020; Pilotti et al., 2024; Scott et al., 2018; Spronken-Smith et al., 2008), and various forms of assessment practices in inquiry setting (Cowie & Harrison, 2021; Zuiker & Whitaker, 2014). My research aimed to shed light on examining assessment practices in interdisciplinary inquiry classrooms from teachers' perspectives to contribute to a better understanding of their experiences and perceptions of assessment practices.

This research showed that assessment practices in inquiry-based classrooms are woven into students' learning processes. Assessments were recognized as ongoing practices that provided a chance for reflection on learning and possible collaborative discussions with teachers to define learning goals. The findings asserted that most people prioritize assessing the products of learning over the process. This study showed that teachers might need assistance shifting away from the product-oriented mindset and embracing learning-oriented viewpoints. This process is challenging for some teachers, who traditionally looked to products to indicate students' learning. Considering the learning process is important, where students self-regulate their learning, decide about different pathways to meet the learning outcomes, and learn how to engage with the feedback and interpret it to improve their learning (Dann, 2014). By breaking

down the project into pieces and assessing students in different steps, the assessment becomes part of learning and does not sit in isolation (Pratschke, 2024).

In inquiry classrooms, most of the time, and for many subject areas, assessment happens through conversations with students to help teachers accurately understand what students know, and inform their next steps. These conversations also help students engage deeply with the subjects and critically reflect on their learning. This notion is aligned with Nieminen et al. (2021) case study research, which reported on the role of formative assessment conversations in inquiry classrooms. Their results revealed that teachers could understand students' thinking through these conversations and redirect them if needed. Moreover, through an empirical study, Rached and Grangeat (2021) found that conversation assessment could improve students' thinking processes.

The findings highlighted a necessity to shift toward fostering more student-centred assessment practices, where students became active participants, and assessment served as a tool for personal growth, reflection, and deeper engagement with learning. Taking students' choices into account when designing assessments fosters their independence and enables them to progress in learning with the teacher's guidance. The findings showed that giving students more opportunities to reflect on the topic and providing meaningful feedback helps them to take ownership of their assessments. As students progressed toward self-directed learning, they developed the ability to identify when they needed support and to seek assistance proactively. These findings are supported by Wu and Hsieh's (2006) quantitative research, which highlighted the importance of developing students' inquiry skills to empower them to make scientific explanations. Moreover, Zlabkova et al. (2021) and Grangeat et al. (2021) empirical research elaborated further on the student's role as an assessor in an inquiry-based learning environment.

The essential role of teachers as facilitators of student-centred learning cannot be overlooked. The literature emphasized teachers' role in inquiry settings (Dobber et al., 2017). In this study, I discovered that the prevalent belief regarding inquiry that students must dive in and figure out the process is misaligned with participants' perceptions of their role. In an inquiry classroom, the teacher's role is to create meaningful learning opportunities and align student's inquiry projects with the curriculum learning outcomes. Teachers facilitate the learning process by helping students to come up with valuable ideas and strive to reach a depth of understanding about the topic. This notion is well supported by empirical research, which shows that the teacher as a facilitator plays a crucial role in inquiry settings (Goodyear & Dudley, 2015; Shanmugavelu et al., 2020; Wu & Hsieh, 2006). Navigating assessment in an inquiry setting is a learning process for students, as they are uncomfortable asking rich and deep questions, identifying their area of interest, and taking responsibility for their learning. I also realized that teaching in the inquiry model does not follow traditional teaching methods, and gaining more experience makes teachers more confident in their practices. The relationship between teacher's experience with inquiry and their adoption of inquiry-based teaching was emphasized in previous research (Chichekian & Shore, 2016; Rached & Grangeat, 2021; Talanquer et al., 2013; Zlabkova et al., 2021).

The competency-based assessment framework, which uses a broader term, allows teachers to assess students' higher-level thinking skills and connect assessment practices with individualized learning experiences. In inquiry classrooms, the focus shifted to equipping students with transferable skills that they can use beyond the school context. Moreover, the competency-based assessment facilitates interdisciplinary assessment practices, as any element

of a student's inquiry project may connect to various subject areas and address different competencies.

The findings of this study further highlighted the role of formative assessment and ongoing feedback in inquiry-based learning. Participants described their assessment practices as iterative and continuous processes that employ a range of formative assessments, including self-assessment, peer assessment, and teacher assessment through observation and discussion with students. These findings are consistent with the research on formative assessment practices in an inquiry-based learning environment (Grangeat et al., 2021; Grob et al., 2021; Zuiker & Whitaker, 2014). In inquiry classrooms, teachers co-construct assessment criteria with students and believe that involving students in assessment processes helps them develop peer assessment skills. This process fostered trust between them, resulting in better peer assessment practices. These findings are aligned with Zlabkova et al. (2021) design-based research, which supports the implications of formative peer assessment.

Barriers to Effective Assessment in Inquiry-Based Learning

My findings identify possible challenges that inquiry teachers experience in assessment processes. There is a growing body of work that examines the challenges of assessment practices in an inquiry-based environment (Akuma & Callaghan, 2019; Cowie & Harrison, 2021; Grangeat et al., 2021; Talanquer et al., 2013; Zlabkova et al., 2021). This research emphasizes the influence of participants' perceptions of assessment and prior educational experiences on their practices. The connection between teachers' understanding of assessment and its influence on their classroom practices was investigated in previous empirical research (Barnes et al., 2017; Sulaiman et al., 2019). Many participants found it challenging to adjust their deeply rooted beliefs about assessment. Assessing inquiry-based learning requires a combination of formative

and summative assessments, and teachers use multiple data sources to assess students. Research suggests that formative assessment informs and enhances inquiry competencies and skills; however, such development needs pedagogical adjustment that honors students' agency and the impact of guided feedback on their success (Cowie & Harrison, 2021). Furthermore, Zlabkova et al.'s (2021) qualitative research highlighted the necessity of teachers' pedagogy adaptation to incorporate a formative assessment practice.

Participants found it challenging to assess individualized inquiry projects without following defined metrics. Grob et al.'s (2021) qualitative research supports this notion, in which primary school teachers struggle to identify indicators for abstract competencies that are not directly observable in students' hands-on activities. Moreover, meeting students' and parents' expectations is difficult as inquiry assessment follows success criteria that differ from common beliefs that society holds about assessment. Taking responsibility is a learning curve for students in an inquiry classroom that requires the support of teachers who believe in this approach and are confident in it. In quantitative research, Wu and Hsieh (2006) found that as students become more confident and gain more experience in inquiry, they could take more responsibility, and teachers' roles transformed into facilitators.

Participants in this study believed that although the redesigned curriculum did not mention inquiry, it aligned well with the inquiry-based learning design. However, there is a critical gap in the competency-based assessment framework, as teachers still need to apply a method to equate students' progress effectively. The findings revealed that translating students' learning into letter grades and aligning them with standardized tests is difficult, and teachers need to create other workarounds to address this challenge. Moreover, inquiry teachers sometimes struggle to balance their assessment practices with curricular expectations. In 2021,

Grob et al., by interviewing secondary school teachers, found that it is challenging to assess students' competencies in inquiry projects which are not based on written data. Furthermore, the findings of Zlabkova et al. (2021) research support my findings that teachers struggle to translate their formative assessments and use them in summative scores.

My research reports that student inquiry consists of various components related to different subject areas. Students are assessed for different areas through the same project, which is aligned with competency-based frameworks and interdisciplinary curricula. The challenging part was when they needed to pull students' projects apart and mark each subject separately, as the reporting platform introduced by the school district does not accept interdisciplinary assessments. Consequently, an accurate assessment in an inquiry-based learning design demands additional time, and participants identified that the workload was another concern for new teachers.

Navigating Contextual Complexities in Inquiry-Based Education

This section will discuss the study's findings about the influence of contextual factors on teachers' understanding and implementation of inquiry-based learning, which are presented under a broad theme of *Contextual Factors in Adoption and Assessment Practices* in chapter Four. This will address my third research question: How do contextual factors influence teachers' perceptions of inquiry-based learning and their assessment practices?

The BC redesigned curriculum and the introduction of core competencies and big ideas identified as a contextual factor to assist teachers in translating students' inquiry projects into the curriculum's required learning outcomes. Participants found that the BC's redesigned curriculum gives teachers more flexibility and supports inquiry-based learning design. They believed core competencies represent society's common values, and students will benefit from

learning them and applying these values to their inquiry projects. This concept is aligned with the BC curriculum goal of supporting individual student's needs and facilitating personalized learning experiences (BC Ministry of Education, n.d.-a).

My findings support the idea that as teachers develop inquiry-based teaching skills, they could better align students' inquiry projects with curriculum requirements. The impact of teacher's experiences on their performance is well supported in the empirical studies (Seneviratne et al., 2020; Rached & Grangeat, 2021; Luft, 2001; Talanquer et al., 2013; Zlabkova et al., 2021). Furthermore, this study found that teachers' backgrounds could impact their practices, implying that coming from diverse backgrounds and carrying over past experiences makes it challenging for some teachers to embrace students' active role in the inquiry process.

The findings also showed that participants believed students' backgrounds and familiarity with inquiry-based learning could influence their learning experiences. Therefore, students who join the inquiry-based classroom without previous experience and those who are at an earlier age need more direct instruction and support. Participants believed that students found it challenging to decide about and take responsibility for their learning, where they needed to focus on developing their thinking skills. Moreover, carrying over their old values about grades and standardized tests into an inquiry approach causes problems. This rationale is supported by Wu and Hsieh's (2006) quantitative research findings that highlighted the importance of timely and ongoing scaffolded support in the inquiry process and mentioned that as students gain more experience, they become more confident and can take more responsibility.

My findings support the idea that inquiry classrooms with a small number of students provide an opportunity for teachers to work with them individually, have conversations about

their learning, and build a reciprocal relationship of trust with them. Some participants find it challenging to create a personalized learning experience for them in large classrooms. The findings of DiBiase and McDonald's (2015) quantitative research also identified class size and time constraints as influential factors that impact teachers' decision to adopt inquiry-based learning. Some participants found that teaching at scale in an inquiry-based setting reduced the diversity of students' ideas and projects. It is difficult to allocate enough time to engage with students individually, understand them, and identify how to support them.

This study shared insights on possible barriers to the traditional teaching model and how restructuring schools could mitigate them. Many teachers found that separating subjects in public schools is unnatural and contrived. They believed that course-based structure does not reflect how we learn in real life. The findings showed that teaching in an educational environment with separate subjects and specific hours for each was challenging when teaching from an inquiry stand. Participants believed that implementing an inquiry-based learning design required a shift in perceptions of education and how schools should look and work. Participants found value in moving away from a one-size-fits-all method to foster more profound understanding and engagement and create more personalized learning experiences for students. This study also highlighted the impact of schools' and districts' value on teachers' performance. If school administrators and districts respected and supported the personalized and student-centred approach to education, teachers would feel confident in implementing inquiry-based learning design.

The findings of this study also highlighted the significant role of teacher education programs in empowering teacher candidates to embrace student-centred teaching approaches. Participants further emphasized the importance of practical demonstrations of inquiry-based

practices in teacher education training to help teacher candidates gain a thorough understanding of the concepts. Moreover, offering training around student-centred approaches, including inquiry-based learning in practicum and providing continuous support, could better prepare teacher candidates to create personalized learning opportunities. The influence of teacher education on teacher candidates' perceptions and implications of inquiry-based learning was discussed in Pike et al. (2024) quantitative research. The research emphasizes the need for explicit discussions on diverse types of inquiry approaches. Moreover, their findings showed that while student teachers are expected to teach using inquiry-based learning during their placements, they experience limited opportunities to engage in inquiry themselves during their teacher education programs. Moreover, Fitzgerald et al. (2021), in another qualitative study, found that preservice teachers engage with inquiry-based learning during their teacher education programs, often lack opportunities to practice. They believe that overemphasis on structured scientific inquiry in some subjects may narrow their understanding of inquiry-based learning. Bui and Khuu's (2020) findings also support the idea that implementing inquiry-based learning requires pedagogical knowledge and skills, and pre-service and in-service teachers need guidance and support to effectively apply this approach in their practices.

Participants also found that inquiry-based learning is very relationship-based; therefore, having a mentor and being a part of the community could positively impact teachers' performance, as supported by Rached and Grangeat's (2021) empirical findings. Moreover, providing additional support and professional development opportunities encourages teachers to enter the world of inquiry and adopt it as their teaching approach. This notion is aligned with Aidoo's (2024) qualitative research, which highlights the influence of continuous professional development programs to enable teachers to implement inquiry-based learning.

Limitations of the Study

The participants of this study represent a small sample of inquiry-based teachers in Victoria, BC. The sample size was deemed appropriate, given the limited number of teachers who self-identified as inquiry-based teachers in Victoria, BC. The sampling technique relies on the convenient sampling method, and participants were recruited for the study through referral. While there was significant diversity among the participants, they by no means represented a sampling of all inquiry-based teachers.

The qualitative nature of the study prevents making any general claims; rather, it aims to contribute to a better understanding of inquiry-based teachers' perceptions of their teaching and assessment practices in a specific context at this time. I also acknowledge that, as an immigrant who entered this field of research with a different educational background, my interpretations may be shaped by my experiences.

Throughout this phenomenology study, I aimed to bracket my beliefs and past experiences about this phenomenon and represent the participant's lived experiences as explained and presented in interviews. However, the results of this study present my interpretations of the data and my reading of the literature. People with Canadian teaching experience or educational background may interpret the data differently.

Lastly, the participants of this study were among the advocates of inquiry-based learning and shared their experiences with passion and excitement, which could result in them presenting their practices with a positive bias. Although they shared their lived experiences of inquiry-based learning and possible opportunities for the educational system, the various challenges they encountered during the process were discussed.

Recommendations for Further Research

This research provides insight into the lived experiences and perceptions of nine inquiry-based teachers in Victoria, BC. To deepen our understanding of inquiry-based teaching and assessment practices, future studies could expand the participant pool through a larger, randomized sample and include educators from more diverse educational contexts. Longitudinal studies would be beneficial in examining how teachers' perceptions and assessment strategies evolve over time as they gain more experience. Additionally, research exploring students' experiences and perceptions of assessment in inquiry-based learning could provide a more holistic perspective on its effectiveness.

Comparative studies across different educational systems, regions, and school types - public vs. private, elementary vs. secondary - could further highlight contextual factors that shape inquiry-based teaching and assessment practices. Moreover, investigating the role of professional development programs and institutional support could offer valuable insights into how these factors influence teachers' confidence and effectiveness in implementing inquiry-based learning design. Finally, future research could explore the integration of digital tools and AI-driven assessments, assessing their potential to enhance or challenge inquiry-based assessment practices and contribute to innovative approaches in student-centred learning.

Conclusions

Through this qualitative phenomenological study, I aimed to get a better understanding of teachers' approaches to assessment in inquiry-based classrooms. I sought to understand middle and high school teachers' perceptions of inquiry-based learning design and how their perceptions of inquiry principles may have influenced their assessment practices. The findings revealed that an inquiry-based learning design was recognized as a student-centred approach that honors

students' choices and autonomy in designing the learning environment. Inquiry-based learning creates personalized learning experiences for students and engages them in the process of learning, which could motivate them to meet their learning goals through their interests. Moreover, by providing an authentic learning experience, students can connect their learning to essential skills and real-life experiences.

This research also highlights the influence of teachers' beliefs and past experiences on embarrassing inquiry learning. Adopting student-centred approaches, prioritizing students' choices, trusting them, believing in their agency, and being open to uncertainty are recognized as learning curves for teachers stepping into inquiry teaching. This transition may require a significant shift in the deeply rooted beliefs that they have held for many years around education and their teaching philosophy.

The findings showed that the emergent curriculum and the interdisciplinary nature of inquiry-based learning are well supported by the BC redesigned curriculum. In inquiry classrooms, assessment practices are recognized as an inseparable part of the learning process. The ongoing nature of assessment practices also allows students to think critically and reflect on their learning. Assessing inquiry-based learning necessitates formative and summative assessments, with teachers employing various data sources A competency-based assessment framework allows teachers to assess students' higher-level thinking skills and create individualized learning experiences. Participants described their assessment experiences as an ongoing process that informed them about students' learning and their next teaching steps. Students are active participants in the process, success criteria are co-designed, and the teacher's role turns to facilitator supporting students to self-direct their learning.

This research identified some challenges that teachers faced in assessing students. The influence of teachers' beliefs and their past experiences is recognized as a potential barrier to adopting student-centred assessment practices. Participants also highlighted a gap in competency-based assessment frameworks that required teachers to separate subject areas from students' interdisciplinary projects and translate their learning to letter grades.

This study also discussed some contextual factors that could impact teaching from inquiry stance. Traditional teaching models and course-based structures do not support the interdisciplinary nature of inquiry learning. Participants also found that small class sizes give more personalized learning opportunities. Moreover, the alignment between schools' and districts' values and teachers' teaching philosophy could facilitate their adoption of inquiry-based learning. Teacher education programs also play a crucial role in preparing teacher candidates and supporting them in their early years of teaching practices. Lastly, a supportive community and professional development opportunities can ensure that teachers receive assistance when needed.

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Appendix

Appendix A: Interview Questions

- **Introduction**

1. Could you please introduce yourself?

- Years of experience
- Are they teaching in public schools or private schools?
- Are they teaching in Inquiry-based schools, or do they apply inquiry-based principals in their classrooms?
- How long have they been teaching in an inquiry-based educational setting?

- **Inquiry-based Education**

Can you describe your understanding of inquiry-based learning and its key principles?

- What motivates you to incorporate inquiry-based learning into your teaching methods?
- How did you come to teach in the way you do, and has this always been your teaching approach?
- What was your experience as a learner?
- Can you share examples of how you have implemented inquiry-based learning in your classroom?

- **Assessment Practices**

1. What are the main goals or purposes of assessment within the context of inquiry-based learning, from your perspective?

- How do you design assessments for inquiry-based learning experiences? Can you provide specific examples?

- How do you ensure that assessment methods are aligned with the goals and outcomes of inquiry-based learning?
- What has been your experience assessing inquiry-based learning activities in relation to the BC curriculum, assessment framework, and reporting order?

2. What challenges have you encountered when designing or implementing assessments in an inquiry-based learning environment?
3. Have you noticed any changes in your assessment practices over time as you gained more experience with inquiry-based learning? If so, can you describe these changes?

- **Contextual Factors**

1. How do the school's or district's educational philosophy, policies and culture shape your implementation of inquiry-based learning and assessment methods?
2. In what ways do factors such as class size, student diversity, grade level, and individual student needs impact your implementation of inquiry-based learning and assessment strategies?
3. What resources support your inquiry-based learning and assessment practices? (professional development opportunities and training, your colleagues, online sources).

Focused group questions

1. How can we assist educators in better integrating inquiry-based learning and innovative assessment practices into their teaching?
2. What key challenges or obstacles do you see emerging in the adoption of inquiry-based learning and innovative assessment methods, and how might we address them?

3. In the context of inquiry-based learning, what are some collective strategies or best practices that we could explore further to enhance both teaching and assessment within our educational setting?
4. Reflecting on the impact of school culture, educational policies, and available resources on teachers' practices, how can we advocate for more supportive environments that encourage the implementation of inquiry-based learning and effective assessment methods?