Exploring Inquiry-Based Approaches to Teaching and Learning: Educators’ Perspectives on the Implications of Inquiry Pedagogy in Ontario Elementary Classrooms

By

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Abstract

The purpose of this qualitative research study was to investigate and address the outcomes, benefits and challenges of inquiry-based teaching and learning in Ontario elementary classrooms. This study aimed to answer the following question: How is a small sample of elementary school teachers fostering an inquiry-based learning culture in their classroom, and how are they aligning assessment to this learning process? Data was collected through face-to-face semi-structured interviews with two elementary school teachers, working in Peel District School Board schools. The overarching themes that emerged as a result include the establishment of diverse and equitable education through inquiry-based teaching practices. This instructional approach has been identified as supporting student curiosity, life-long learning, and embracing a Universal Design for Learning model as well as principles of culturally relevant and responsive pedagogy that ensures success for all students. The implications of these findings for the educational community suggest a need for school boards and school administrators to create policies, offer strategies and resources to support teachers in developing effective opportunities for inquiry programming.

Key Words: Inquiry-Based, Culture, Assessment, Universal Design for Learning, Culturally Relevant and Responsive Pedagogy
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1.0 Research Context and Research Problem

Every day individuals are driven by their own curiosity, passion and self-inquiry to develop understanding and create new knowledge. In this cyclical process of learning the individual learns to question, learns to interact with others, makes observation, and reflects on experiences to make meaning. These lifelong learning skills create enriching opportunities for individuals to thrive in a changing world. It is then established that children from young ages enter the classrooms with this instinct already developed. For this reason, educators believe students should be provided with opportunities to investigate content in different areas to construct their own understanding, promote critical thinking and problem solving skills. The Ontario Ministry of Education encourages educators to use inquiry-based learning, a pedagogy that gives students an opportunity to experience learning through inquiry, to set context for problem-solving worldly issues and challenge ideas (Ontario Ministry of Education, 2013). Through this approach educators and students co-construct the content and assessment to meet the needs of the child (Ontario, 2013). According to scholars such as Dewey, Vygotsky, Freire, students are more likely to be engaged and self-directed in these classrooms (Ontario, 2011).

This paper will examine how the Canadian education system promotes these skills and knowledge to create lifelong learners. Acknowledging the need for free-exploration and for students to develop critical thinking skills recently, Ontario educators adopted a play-based learning program for kindergartens (Ontario, 2010). In this program the inquiry process comes into play when students engage in exploration of a particular wondering; they investigate in collaboration and discuss their findings with peers. Through this process, students develop problem-solving skills in literacy, numeracy, and social skills (Ikpeze, 2006; Kong & Song,
2014; Ontario, 2010; Wadden, 2003). Teachers are regulated by administrators to enforce this instructional approach in the classrooms. While FDK policy makes it mandatory for teachers to use this self-directed approach to learning, teachers from grades 1-12 are not help accountable to any policy or monitored for this implementation even though the curriculum stresses the importance of it.

One of the mandatory requirements and standards of the elementary and secondary curriculum is for instructors to use inquiry. An example of a curriculum document that expands on this notion states the following, “Inquiry is at the heart of learning in all subject areas. Students are encouraged from a very early age to develop their ability to ask questions, and to explore a variety of possible answers. The ability to locate, question and validate information allows a student to become an independent, lifelong learner” (Ontario, 2006, p.29). In each document of the Ontario high school curriculum these overarching goals have been reinforced.

The observable outcomes of learning through inquiry are powerful for the learners’ development. Research has found when students participate in IBL they learn to self-regulate their thinking through various stages which helps them monitor their progress and set goals for success (Wadden, 2003). They develop self-confidence and motivation as they work in a class community to investigate and evaluate ideas of their choice and interest (Wadden, 2003). Through the organization and structure of the class students engage in meaningful dialogue where each student’s voice is valued (Wadden, 2003). Teachers who value students’ efforts use this approach to assess students’ learning experience individually so that there is opportunity for all students to succeed (Wadden, 2003). This experience is particularly valuable for a diversity of students because IBL can be used as a culturally relevant pedagogy that bridges the gap between
a student’s knowledge and socio-cultural experience (Ikpeze, 2006; Wadden 2003; Weiland, 2012). This approach can be used as a tool to create an equitable learning environment for many students by establishing a positive classroom climate where each student’s voice and cultural background is valued and voiced. Instruction and curriculum is then tailored and build together by students and teachers to meet the interests and needs of their classroom community. Even though the policy documents and the Ontario curriculum have mandated teachers to use inquiry instruction in classrooms and it is clear that the approach has many benefits, research shows very few teachers implement this pedagogy. Puk and Haines (1998), for example, conducted a research study to explore the teaching practices of associate teachers from grades 4-12 in Ontario. Their findings suggest that only 28% teachers, from a sample of 127 participant, taught inquiry, and of those 11% felt they were not successful or confident when teaching. This gap is very important to address. Lack of teachers using inquiry may have negative outcomes on students thinking, their ability to process and evaluate information. In order for teachers to see progress and change in a child’s learning experience they must first become agents of change themselves.

Some barriers research has found in the implementation of inquiry include many teachers lack of training, and motivation to teach inquiry. Some teachers do not have a good understanding of how to implement this process nor do they take initiative to gain support to learn this approach (Ikpeze, 2006; Keys & Byran, 2001; Puk & Haines, 1998; Stipek, Givvin, Salmon, & MacGyvers, 2001). They lack commitment to bringing flexibility into the classroom and to consistently use this approach across different subjects (Ikpeze, 2006; Keys & Bryan, 2001). But if teachers have high self-efficacy they will be motivated to try new strategies, even
when confronted by challenges (Marshall, Horton, Igo, & Switzer, 2007). Keys & Bryan (2001) found that some teachers are influenced by their interests, personal beliefs and knowledge of when and how to use inquiry. For instance, if a teacher believes that students do not have the ability to participate in IBL, or they believe that it is chaotic and comes with many challenges, that teacher is less likely to use this approach (Keys & Bryan 2001). Furthermore, some teachers argue that this approach to teaching is not applicable to all subjects and that it is more appropriate for learning science however, this is arguable (Keys & Bryan 2001). Research suggests that when teachers do not receive support for instruction of inquiry from school administrators and peers, or they observe that the school culture does not embrace this pedagogy, they are less likely to implement it in their own classroom (Marshall et al., 2007; Puk & Haines 1998; Ikpeze 2006).

When teachers and school administrators do not value inquiry-based learning and uphold the values and mandate of the Ontario curriculum, children may suffer the consequences of not developing the critical skills needed to survive in a constant thriving society. The development of these skills is particularly vital in the digital era, where information is readily available.

1.1 Purpose of the Study

It has become apparent from my review, very few teachers in Ontario implement inquiry instruction in classrooms regardless of the outcomes because of the barriers associated to implementing this approach to teaching and learning. In view of this problem, the purpose of this qualitative study is to learn how a sample of elementary school teachers are fostering an inquiry–based learning culture into classrooms. Since inquiry instruction begins from an early age (Ontario, 2010) and is important throughout a child’s educational experience (Ontario, 2013) this study explores how elementary school teachers conduct this process differently. Given this
process offers opportunities for deeper knowledge and understanding of concepts, a further purpose is to explore how teachers are aligning assessment to this learning process and what observable outcomes it has on student achievement.

I aim to share these findings with the broader educational community and to engage the significance of the findings for my own teaching practice. I hope these recommendations support teachers in implementing inquiry-based learning across curriculum subjects and that these help overcome preconceived challenges.

1.2 Research Questions

The overarching question guiding this study is: How a small sample of elementary school teachers are fostering an inquiry-based learning culture in their classroom, and how are they aligning assessment to this learning process?

Sub-questions include:

- What experiences prepared these teachers for enacting their commitment to inquiry-based learning?
- What factors and resources support these teachers in this work?
- What challenges do these teachers encounter with aligning assessment and how do they respond to the challenges?
- What learning outcomes do these teachers observe from their students?

1.3 Background of the Researcher/Reflexive Positioning Statement

The topic of inquiry is significant to me for several reasons. Throughout my educational experience, from elementary to high school, only 20% instruction was guided through inquiry. Yet again, research confirms these digits. As I recall it is not a surprise that most teachers tended
to limit this approach to the science curriculum. I believe many teachers have developed misconceptions of its use in particular subjects. It was not until my undergraduate years that I began to learn the importance of inquiry through the Law and Society course. Part of the assignment involved critically observing trials at a court, as an ethnographer, and through this process I recognized the value of inquiry and its role in assisting students to achieve their highest potential. To me the inquiry approach is valuable because it invokes a child to do his best, to ask questions, and to develop critical thinking, decision making skills, and engage in creativity and reflective practices.

Further this learning experience expanded my vision of what constitutes “learning”. Does learning involve regurgitating facts as the teacher speaks or investigating ideas, exploring different perspectives, assessing and evaluating them? As the passionate learner I am, I began to volunteer in different classrooms for two years to learn if and how teachers were using inquiry-based learning. It turns out that only 1 out of the 5 teachers implemented inquiry, and did so in the subject of science. I observed that inquiry was not scaffold enough in this classroom to meet the learners’ capacity and was conducted at surface level. This makes me question why teachers are not implementing inquiry-based learning regardless of its proven benefits. Why are school administrators not promoting this form of teaching in their schools? I hope to raise awareness of this valuable pedagogy through my research study and encourage teachers to use strategies to combat challenges faced with the implementation of inquiry for the betterment of our students. If these students are able to develop critical thinking and reflective skills at a young age they will learn to adapt to challenges and opportunities in a changing world.
1.4 Overview

Using the research questions listed above I will be conducting a qualitative research study by using purposeful sampling to interview two Canadian elementary school teachers, to determine how a small sample of these teachers are fostering an inquiry-based learning culture in their classroom, and how they are aligning assessment to this learning process? In Chapter 2, I review the literature in the areas of inquiry policy, the Ontario curriculum, the different structures of inquiry-based learning, how an inquiry culture is implemented, and I also review assessment in relation to inquiry. I examine the impact inquiry-based learning has on all sorts of learners. Next, in Chapter 3, I elaborate on the research design. In Chapter 4 I report my research findings and discuss their significance in light of the existing research literature, and in Chapter 5 I identify the implications of the research findings for my own teacher identity and practice, and for the educational research community more broadly. I also articulate a series of questions raised by the research findings, and point to areas for future research.
Chapter Two: Literature Review

2.0 Introduction

In this chapter I review the literature in the areas pertaining to inquiry-based learning, the culture of this pedagogy in different grades from K-6, and assessment aligned to this practice. More specifically, I review the varying definitions of inquiry-based learning in different subjects, and consider social constructivist theories, curriculum documents and ministry initiatives that support this practice. Next I examine the responsibilities of teachers in delivering this mandate by reviewing the culture of inquiry fostered in classroom settings using cases studies. Further, this section discusses the benefits of this instructional approach through the lens of culturally relevant and responsive pedagogy. The next section reviews the relationship between teacher’s beliefs and practices, and the challenges teachers and students face using this practice. Then I explore the concept of assessment, how it is created using inquiry approach to support student learning experience and review results of students who participated in inquiry learning. Finally, the last section discusses the overall findings of the literature review.

2.1 Social Constructivism in relation to Inquiry-based Learning

Research shows that social constructivism can lead to effective teaching methods because it allows students to work in collaboration to construct knowledge and understand it through a critical lens, with support of peers (Powell & Kalina, 2009). Social constructivist theorist John Dewey, Lev Vygotsky, and Paulo Freire played a vital role in the development of inquiry (Powell & Kalina, 2009). John Dewey, an Educational Philosopher and social constructivist theorist, presented a progressive approach to education in the 19th century. In this view he strongly opposed rote learning because it does not allow students to develop critical skills or encourage curiosity. In order to prepare students for success Dewey suggested that
students actively make meaning of knowledge through social interaction with others to experience, understand and reflect on the process of learning (Dewey, 1938). He argued learning is a social process whereby students learn all the time in their environment without “external control by authority (teacher)” (Dewey, 1938; p. 20-21). He described the role of students as active participants in the process of acquiring knowledge, while the teacher acts as a facilitator (Barrow, 2006). In 1944, he presented a scientific method to engage students in reflective thinking process by “presentation of problem, formation of a hypothesis, collecting data during the experiment, and formulation of a conclusion” (Barrow, 2006; p.266). His views were built on by many theorists who questioned the educational standards of the time and the role of teachers.

Lev Vygotsky further expanded this thinking by suggesting that effective learning in the classroom occurs in a socio-cultural context, through social interaction and cooperation with peers and teachers (Powell & Kalina, 2009; p.243). Vygotsky emphasized the role of zone of proximal development, the more knowledgeable other and language development, which is a cultural artifact to discuss its significance in the classroom. He suggested learning in this zone occurs voluntarily. However with support of an experienced teacher or with qualified peers, through a dialogic process, students’ ability to comprehend knowledge increases (Lantolf & Appel, 1994; p.10). He states language and inner speech are used to mediate interaction in this zone where “the child talks about the things he sees or hears at a given moment” (Lantolf & Appel, 1994; p.11,14). This contextualized conversation is an important function that helps a child reach higher levels of cognitive development in inquiry-based learning. According to Vygotsky “language enhances learning and it precedes knowledge or thinking” (Powell & Kalina, 2009; p.245). Vygotsky says cooperative learning that is rooted in socio-cultural context
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is highly diverse and inclusive of the different types of learners in a classroom setting (Powell & Kalina, 2009).

Paulo Freire (1970) argued against the oppressed traditional teaching methods, which he described as the banking concept of education. He says, through this method knowledge is transferred by the privileged that is the teachers to students, who in return have no right to criticize knowledge (Durakoglu, 2013). He described this process of learning as hierarchical in that teachers fill empty heads and in return expect students to memorize, and passively receive information without questioning it (Durakoglu, 2013). Furthermore, through this oppressed pedagogy students’ culture is invaded as the authority figure imposes their central views in order to dominate their values and beliefs (Freire 1970; Macedo 2000). He suggested that educators reject this model and replace it with problem posing education, which is very much reflective of the inquiry-based learning model (Durakoglu, 2013). Freire described this approach as more liberating from the oppressed pedagogy in that it encourages students to develop curiosity, and to think critically of ideas, concepts and the world they live in (Durakoglu, 2013; Freire 1970; Macedo 2000). In this model both the teachers and students have equal power, the teacher does not have “absolute knowledge” they both engage in dialogue to construct knowledge together (Durakoglu, 2013; p.104). Both the teacher and student learn from the dialogic process of inquiry.

2.2 Curriculum Expectations: Critical Thinking

Throughout the years, formal education in Canada has changed immensely. The role of critical thinking has expanded in the current curriculum of Ontario (Barrett, Baker, Hallman-Chong, Morgan & Walker 2001; Ontario, 2009). Critical thinking is a process whereby a child learns to draw connections, analyze, ask questions and evaluate different ideas.
Educators can use inquiry-based learning as a tool to teach critical thinking. Through this process of learning students learn to gather, evaluate information from multiple perspectives and advance their own thinking, to make reasoned analysis. Today “critical thinking is an expectation in the Arts curriculum, Science and Technology, Math, Social Studies, History, and Geography” (Barrett et al., 2001; p. 9). The ministry expects teachers to teach their students skills needed to develop critical thinking which ultimately leads to higher order thinking by exposing them to a variety of ideas and engaging them in a process of transferring thinking skills and making critical judgements of the underlying content. According to Pike and Selby (1988), students can participate in the process of critical thinking by exercising “perspective consciousness”. This view holds that each individual has their own lens of imagination, a view of the world that is shaped by their social location which influences their thinking and appreciation for the world apart from others. We each explore concepts differently, challenge them and determine answers from our worldview (Barrett et al., 2001; p. 10). Apart from the old traditional teaching methods, inquiry learning encourages students to use their perspective consciousness to develop critical thinking.

2.2.1. Learning through inquiry

Ministry initiatives

The Ontario Ministry of Education develops curriculum and policy documents for public boards in this province. This institution has provided guidelines for educators on how to provide opportunities for students to develop the critical and analytical skills needed to function in society (Ontario, 2013). These documents suggest that these skills can be achieved effectively using inquiry (Barrett et al., 2001; Ontario, 2013). According to the Ministry, inquiry-based learning is an engaging pedagogical approach that offers students an opportunity to engage in
critical thinking through collaborative learning (Ontario, 2013). In this process students are able to participate in a culture where they investigate questions or problems together by analyzing and evaluating different theories to better understand the problem (Ontario, 2013). This exploration teaches students to be critical, to be reflective of their learning, and to use social interaction as a means to learn from one another. While educators facilitate the investigations, they can integrate different areas of the curriculum in this process of inquiry (Ontario, 2013). Inquiry-based classrooms have been found to develop the most “engaged, and self-directed learners” according to research conducted by the ministry (Ontario, 2011). It is therefore the responsibility of the teacher to practice this approach in order to create an inclusive classroom.

2.2.2 Historical perspective of inquiry in Ontario

Dewey’s views transformed Ontario educational policies in 1937 (Puk & Haines, 1998). The Programme of Studies for Grades 1-6 of the Public and Separate School policy promoted learning through inquiry where students would engage in “their social experiences and actively involved in their own learning” (Puk & Haines, 1998; p.190). In 1970’s the Ontario Ministry of Education created programs to train educators on teaching/learning strategies thereby making it mandatory to teach inquiry in schools (Puk & Haines, 1998). At the same time, documents such as New Dimensions (1973) and Education in the Primary and Junior Divisions (1975) were being published that endorsed the use of inquiry (Puk & Haines, 1998). By 1979, inquiry models were being created to assist teachers in different subjects (Puk & Haines, 1998). In the creation of the Common Curriculum document of 1995, the ministry clearly states the need of inquiry and describes the methods of inquiry as follows: "[c]urriculum must enable students to develop inquiry skills and to use them to identify and explore connections .... (p 20)" (Puk & Haines,
1998; p. 192). The current curriculum of Ontario documents present goals for the use of inquiry skills in math, language, science and social studies & history. The last two documents, *Common Curriculum* and *Education in the Primary and Junior Divisions* offer educators different inquiry models that can be used to engage students in inquiry-based learning. In Ontario, throughout history, the Ministry of Education designed policy documents making it a requirement for educators to implement inquiry in the classrooms for the beneficial learning experiences it offers to students.

### 2.3 Inquiry-Based Learning

#### 2.3.1 Inquiry in literacy

While there is no universal definition of inquiry-based learning, this section examines recurring themes in different inquiry models, used in various subjects, to learn how educators foster an inquiry culture. Ikpeze (2006) suggests an inquiry process must consist of five elements: ask, investigate, create, discuss, and reflect for literacy development (Bruce & Bishop, 2002). Students should *ask* questions based on their experiences in order for them to make connection to their prior knowledge (Bruce & Bishop, 2002; Ikpeze, 2006). These questions should be genuine in that they can be applied to real life situations when investigating topics (Bruce & Bishop, 2002; Ikpeze, 2006). In the *Investigation* phase, the student is expected to research the topic, explore different resources to gather information (Bruce & Bishop, 2002; Ikpeze, 2006). In the third and fourth phase *create and discuss*, students should begin to interpret data, analyze it and discuss findings with others to gain different perspectives (Bruce & Bishop, 2002; Ikpeze, 2006). Students can engage in the dialogic conversation with classmates to discuss the topic to “reach new understandings on their learning” (Ikpeze, 2006, 28). In the final phase,
students should critically reflect on their experience as learners and on their investigation whether they were satisfied with the outcome or not (Bruce & Bishop, 2002; Ikpeze, 2006). This definition helps students engage in observations, dialogue and to develop critical thinking skills as they consolidate their learning to create new meaning from different types of literacies. Education through inquiry fosters active and informed citizens who are able to do more than just reading and writing. Through inquiry Ikpeze (2006) found an increase in literacy development, an advancement in writing and reflective abilities, more self directed learning, and connection between the home and school which facilitated effective and authentic communication. Brown (2004) supports this, through his inquiry project in literacy where he found bicultural students were actively participating in the process of writing their own personal histories, students were far more engaged, of the sixty-six students surveyed 91% had positive comments and only five displayed negative feelings because of their discomfort with web designs. Brown found that students developed critical thinking and gained confidence through this process as they learned to question the author’s point of view and engage in a dialogue with the text (2004).

2.3.2 Inquiry in science

The National Research Council (1996) defines scientific inquiry as:

a set of interrelated processes by which scientists and students pose questions about the natural world and investigate phenomenon: in doing so, students acquire knowledge and develop a rich understanding on concepts, principles, models and theories” ... “students acquire the reasoning and procedural skills of scientists, and understand the nature of science as a particular form of human endeavor (NRC, 1996; p 214).
This process provides students an opportunity to develop scientific literacy through the process of investigation, through which they learn to pose scientific questions, learn to use specific methods, and to evaluate data as they engage in experiments (Chang & Mao, 1998). Students learn how science is conducted and gain knowledge about its nature at the same time (Chang & Mao, 1998). In their study, Chang and Mao (1998) found students that gained first-hand experience in inquiry learning demonstrated an increased cognitive understanding of earth science concepts and better performance on the comprehensive test relating to earth science content.

Constructivists Keys and Bryan (2001) provide an alternative definition to scientific inquiry in that they claim that inquiry is constructed differently by each student through interaction with the “physical world and abstract ideas” without a structured inquiry process (Cuevas, Lee, Hart, Deaktor, 2005, p. 339). They argue knowledge of science and how it is constructed and the inquiry process differs for students because each student interprets this notion differently through the dialogic process (Cuevas et al., 2005). Either way, research shows positive outcomes of science inquiries on student retention and understanding of scientific concepts, and principals (Minner, Levy, & Century, 2009). Hands-on experiments and activities have an impact on the level of engagement and students’ ability to make meaning of theories in science (Minner, Levy, & Century, 2009). Research shows that teachers who use inquiry instruction help students in establishing positive attitudes towards science (Chang & Mao, 1998). This research also suggests that students who engage in inquiry-based learning score higher on achievement tests compared to students who learn from traditional methods of teaching (Chang & Mao, 1998). Gibson and Chase (2002) in their longitudinal study found that of the middle
school students who engaged in an inquiry-based summer science exploration program, 77% of students demonstrated increased interest in the subject of science. Gibson and Chase (2002) concluded that this overall increase in science amongst students was due to inquiry being structured around their personal interests and choice.

2.3.3 Mathematical inquiry

According to the National Council of Teachers of Mathematics (NCTM) Standards (1991), teachers are expected to instruct using inquiry approach (Stipek, Givvin, Salmon, MacGyvers, 2001). This is because inquiry provides students with opportunities to actively engage in the process of problem solving using their own strategies, gather information, use logic reasoning to evaluate concepts and communicate ideas to others (Stipek et al., 2001; Goos, 2004; Brown, Stein, & Forman, 1996). In this process, the instructor does not transmit information. Rather, he/she supports students in constructing their own understanding of the problem solving process (Stipek et al., 2001). For this reason, teachers are further advised to assess student understanding of the content as opposed to assessing for the right answer (Stipek et al., 2001). If emphasis is solely placed on the correct answer, teachers are not assessing student understanding of mathematical concepts, their ability to reason and communicate ideas in the process of achieving the answer (Stipel et al, 2001). Learning outcomes shift from obtaining correct answers to constructing mathematical understanding using various strategies to justify answers. By using this form of assessment, students are appreciated for their ideas and hard work, and hence assume more responsibility for their learning (Brown et al., 1996).

Padraig and McLoughlin (2009) expand on this thinking by suggesting an alternative model of mathematical inquiry. They argue authentic engagement in mathematical inquiry is
through the process of actively “doing” as opposed to “reading or seeing” material (p.7-8). Once a student has correctly understood a problem he should solve the problem by proving it correct using support of mathematical arguments (Padraig & McLoughlin, 2009). In this process, students are encouraged to present their work to classmates individually. If students have difficulty understanding an argument, they should collaborate with others after the presentation to discuss misconceptions (Padraig & McLoughlin, 2009). In this process the instructor should not enforce his view upon the student, or give importance to “presentation, expositions and recitations” rather he should provide guidance by providing feedback and monitoring child progress (Padraig & McLoughlin, 2009; p. 10). Both models encourage students to use a process to develop understanding of mathematical concepts. They are provided with strategies to problem solve however the onus is on the student to demonstrate thinking and provide proof through an approach they find satisfying. Goos (2016) found that a community of inquiry not only positively changed students’ level of participation in the classroom but also enhanced mathematical literacy and a deeper understanding of concepts, where students developed reasoning skills when proving a relationship between variables.

2.3.4 Types of inquiries

Three types of inquiries have been identified by researchers and these include open inquiry, structured inquiry, and guided inquiry (Banchi & Bell, 2008; Ikpeze, 2006; Sadeh & Zion, 2009). In open inquiry, students choose to investigate problems or topics on their own (Banchi & Bell, 2008; Ikpeze, 2006; Sadeh & Zion, 2009). They individually create questions and take risks to select methods to conduct the process without teacher intervention. However, if necessary, teachers can provide assistance to students at different stages of this process (Ikpeze,
At this stage, students will be required to provide the most reasoning for the entire procedure (Banchi & Bell, 2008). This is because of the various opportunities this approach provides students to carry out the procedure (Banchi & Bell, 2008). Students need to collect data, assess and evaluate it providing explicit reasoning (Banchi & Bell, 2008; Ikpeze, 2006; Sadeh & Zion, 2009). Most teachers in high school and middle school use this type of inquiry. In structured inquiry students are provided with a procedure, materials and questions by the teacher to investigate and observe potential outcomes (Banchi & Bell, 2008; Sadeh & Zion, 2009). Using this particular approach, students will need to provide an explanation with evidence to support findings (Banchi & Bell, 2008). This type of inquiry is common in elementary school. In guided inquiry the teacher provides students with a question or problem to investigate without a specific procedure (Banchi & Bell, 2008; Ikpeze, 2006; Sadeh & Zion, 2009). In this process students are expected to design a procedure to test questions, use data to make interpretations and generate explanations (Banchi & Bell, 2008; Ikpeze, 2006; Sadeh & Zion, 2009). Students learn to create new knowledge through discovery (Ikpeze, 2006; Sadeh & Zion, 2009). They find solutions to the problems under guidance of an instructor where students are encouraged to reflect on the different stages of inquiry (Ikpeze, 2006; Sadeh & Zion, 2009). Regardless of what ‘type’ of inquiry is used the aim of an inquiry is to “guide students to construct their own knowledge” (Sadeh & Zion, 2009; p. 1138). All three types of inquiries can be used from grades K-12, in different subjects.

2.4 Culture of Inquiry

A culture of inquiry is created by establishing a classroom climate, recognizing and establishing the roles of each member involved in the process. This includes the roles of students
towards their peers, and teacher towards students. Inquiry is organized and structured in ways that students feel valued, respected and trusted for their presence. The classroom norms and assessment is co-constructed with students to support them in achieving success and well-being.

2.4.1 Benefits: Role of teachers and students

A culture of inquiry is fostered by changing classroom dynamics. Teachers and students no longer play traditional roles; instead, the role of teachers has shifted to either that of a facilitator or guider in an inquiry, while students take the lead as active instructors (Walker, 2013). In this process, teachers guide students by creating a respectful and supportive structure for collaborative learning where students share ideas in meaningful ways (Turkmen, 2009). The teacher also acts as a facilitator throughout the learning process and works with the student to provide constant feedback in their investigations (Walker, 2013). Research shows the shift in roles has ample benefits for students as they learn to question arguments; they develop critical thinking, decision making skills, develop meta-cognition and learn to take responsibility for their own learning (Prevost, 2010; Goos 2004; Gibson & Chase 2002; Ikpeze, 2006). Students and teachers are both partners, seekers of knowledge, who work together, in this power relation as researchers to develop strategies to problem solve (Walker, 2013). Hence both share responsibilities in setting up an evaluation criterion together to prepare for student success (Walker, 2013).

2.4.2 Benefits: Organization of inquiry

The culture of inquiry in classroom settings is also dependent on organization. This section will use organization of inquiry to discuss the positive outcomes it has on students learning experience. Wadden’s (2003) case studies suggest that by organizing open-ended,
collaborative thinking activities throughout the year teachers enable students to participate based on their choice, comfort level, interests and in a setting that allows them to reflect on the experiences of others. This atmosphere encourages students to grow their critical thinking and creativity skills (Wadden, 2003). Such a structure encourages students to take responsibility of their learning and grow together as a group “emotionally, socially, and physically” (Wadden, 2003; p. 39). She found this structure rebalances power issues because the role of the teacher is that of a facilitator, not of an authority. Students are encouraged to work closely and connect with teachers to discuss their findings and share ideas informally without having to be under pressure of always being assessed (Wadden, 2003). This is depicted in the case study *The Power of Portfolios in Inquiry-Based Classroom* where Emily very confidently initiated conversation with Ms. Stiles about her selected special pieces; in fact, she questioned teacher’s understanding of her thinking (Wadden, 2003). This example demonstrates the depth of relationship a teacher and student can have in an inquiry culture. Further Wadden (2003) also found this form of organization permitted students to design the curriculum of their classroom as opposed to having the teacher create plans beginning of the school year. Students took control over their learning process based on their interests (Wadden, 2003). In addition, research suggests teacher-student and, parent-teacher-student conferences are authentic approaches to assessing and concluding inquiry learning (Buxton &Whatley, 2002; Wadden, 2003). This organization provides the student, ‘the expert’ with an opportunity to explain his learning process, and critically reflect on thoughts about the specific inquiry confidently.

In Kong and Song’s (2014) research, they found gains in student learning through the organization of inquiry-based learning through use of Edmodo, a social network. They found that
“students showed improvement in their domain knowledge learning and inquiry skills, especially in questioning and explanation” (p.138). Students learned to take collective responsibility in this project, developed skills needed to assess their own work, monitor progress and enjoyed taking control of their own learning. In his study Chu (2009) found similar results, on a scale of 5 enjoyment rate of inquiry process was scored 4. Students reported high feeling of positive enjoyment, and motivation because they were able to control their learning and outcomes in such a structure.

2.4.3 Benefits: Dialogue in inquiry

Through social interactions in an inquiry classroom students are able to participate in a dialogic process whereby they are able to reflect on their experiences and voice their opinions on ideas and critical issues in the world (Aalst & Truong, 2011; Brown et al., 1996; Walker, 2013; Wadden, 2003). When a safe collaborative community is created within the classroom, students are more engaged and feel comfortable building on their peers opinions, they use this platform of trust to voice their own opinions (Walker, 2013; Wadden, 2003). Wadden (2003) suggests the teacher must play an unbiased role in this circle, as a facilitator to support authentic conversations and critical discussions to flow. Using dialogue in inquiry students are able to discuss the hidden curriculum which refers to issues and voices that have been silenced in the curriculum (Wadden, 2003). In her study Wadden found this form of organization particularly useful because it allowed students in a literacy and social studies classroom to use dialogue to connect to others, to reflect on social justice issues, to value and respect diversity and to empower the female gender (2003). For instance, in an IBL session, Wadden watched students discuss sexism in a “dialogue circle” after the teacher used the following statement “I don’t want
to stand by a girl” to create conversation on this topic (Wadden, 2003; p. 62). In this process she found students questioning beliefs critically and opening up to their peers perspectives to reflect on their own views (Wadden, 2003).

Meanwhile Cuevas and his colleagues (2004) claim through the process of social interaction and the use of language, students from diverse backgrounds who do not have knowledge of certain topics or investigations in science classrooms are able to benefit from this process the most. Such an environment that supports collaborative learning makes these students feel safer when they have support from their peers (Cuevas et al., 2004).

2.4.4 Benefits: Culturally relevant & responsive pedagogy

Research suggests inquiry-based learning can help foster culturally relevant and responsive pedagogy (Gay 2000; Ikpeze, 2006; Matson, 2015; Weiland, 2012). This is because inquiries permits teachers to integrate student’s background knowledge and experiences into teaching and facilitate discussions around critical consciousness through the dialogic process. Ladson-Billings (1994) argues that culturally relevant pedagogy “empowers students intellectually, socially, emotionally and politically through the use of cultural referent to impart knowledge, skills and attitudes” (p.20). The culture of inquiry is unique because it creates an inclusive environment in the classroom that values each student’s unique identity. In his report Matson (2015) found through classroom observations and interviews, two middle school teachers who participated in professional development and received training in inquiry-based learning were able to enact CRP in their classrooms. Through the inquiry instruction both teachers were able to deconstruct misconceptions of culture, and provide additional support to students facing challenges (Matson, 2015).
Gay (2000) argues that CRP is empowering because it acknowledges a student’s experiences, social location, and cultural knowledge in the process of teaching (Gay, 2000). Making connections to learner’s backgrounds enhances their learning experience and enables them to be successful learners (Gay, 2000). Research shows that inquiry-based learning supports this view as it provides opportunities for students to engage in a learning process that is relevant to their cultural experience; students are taught to respect different ethnic identities through social interactions and dialogic process (Gay 2000; Ikpeze, 2006). One of the most important elements of this theory is that “it builds bridges of meaningfulness between home and school experiences as well as between academic abstractions and lived socio-cultural realities” (Gay, 2000; p. 31). In her research study on inquiry-based literacy acquisition, in the fifth grade, Ikpeze (2006) found her participants Sasha, Jack, Wan and Brandon were able to use inquiry learning to connect the two institutions “the home and school” (p.224). Inquiry-based learning can help foster culturally relevant and responsive pedagogy that creates a climate that values principles of human dignity in the classroom.

2.5 Teachers’ Beliefs and Practices

Regardless of the many outcomes of inquiry research has found some limitations in the implementation of inquiry. Keys and Bryan’s (2001) study found that teacher’s beliefs, and their role as a teacher, their knowledge of the inquiry process, the subject and student learning process determines if and how well they will participate in the practice of inquiry. From their case studies Cronin-Jones (1991) found teachers who were influenced by their strong beliefs of the subject of science “as a body of factual content” were unable to sufficiently engage their students in autonomous learning (Keys & Bryan, 2001; p. 635). Even though these teachers implemented
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a “constructivist-based curriculum” (Cronin-Jones, 1991) their personal biases interfered with the intended goal of the curriculum (Keys & Bryan, 2001; p. 635). However, Brickhouse (1990) claims that teachers who have knowledge of inquiry-based learning and believe the subject of science to be “a body of knowledge created by rigid scientific method” tend to use inquiry as a process of learning in their classrooms (Keys & Bryan, 2001; p. 635). Keys and Kang’s (2000) findings show a correlation between teacher’s interests in inquiry and their personal and cultural beliefs about its use (Keys & Bryan, 2001).

Recent research also found associations between teacher’s beliefs in the subject of math and the teaching process used (Stipek et al., 2001). According to Carpenter, Fennema, Peterson, Chiang, and Loef (1989), teachers who hold positive views of the inquiry process in math tend to promote thinking in this area using word problems. Their study suggests strong relationship between students’ achievement and belief in connection to teacher’s knowledge and instruction (Carpenter et al., 1989). Teachers that focus on assisting students in developing strategies and critical thinking skills instead of focusing on obtaining the correct answer enhance student understanding and facilitate in construction of knowledge (Stipek et al., 2001). Meanwhile Stipek and his colleagues found that teachers who did not support IBL and held “traditional views” emphasized “student performance, speed in completing task, minimizing mistakes, and put less emphasis on autonomy in math activities” instead of focusing on teaching for understanding of mathematical concepts (2001; p. 223). Further it was found teachers who supported inquiry emphasized importance of creativity and exploration (Stipek et al., 2001).
2.6 Challenges of Inquiry-Based Learning

Although research suggests that inquiry based learning improves learning experiences for most students, some challenges have been reported in the implementation of this process in classrooms (Edelson, Gordin, & Pea 1999). Kraijcik and his colleagues (1998) found that some students find the “investigation, analysis and interpretation process” of an inquiry difficult (Edelson et al.,1999; p. 399). Inquiry requires higher order thinking and may not necessarily be for all students. Edelson and his colleagues (1999) address five challenges of IBL, of which the first is motivation. In order to motivate learners, they argue that teachers should include topics of interest that will foster a better focus in their investigations (Edelson et al., 1999). The second and third challenge they present are “accessibility of investigation techniques” and collection of “background knowledge” (Edelson et al.,1999; p. 399-400). In order to overcome this challenge, teachers should provide students with a variety of tools and tutorials to help them navigate through this process to gain a better understanding of the topic (Edelson et al.,1999; p. 400). “Management of extended activities” is the fourth challenge that can be resolved if students are provided with lessons on how to organize inquiry and manage time to achieve success (Edelson et al.,1999; p. 400). The final challenge to the inquiry process is the “practical constraints of the learning process” (Edelson et al.,1999; p. 400). Resources and technology should be used successfully in a manner that fits the design of investigation (Edelson et al.,1999). While it is true that this learning process does impose limitations, the outcome, and quality learning experience outweighs this challenge (Edelson et al.,1999).

In their findings Puk and Haines (1998) found that many teachers do not implement inquiry because they do not know how to teach it. They claim teachers are not trained well, and
do not understand the importance of this form of instruction (Puk & Haines, 1998). Further they suggest that teachers have “little incentive to understand how to teach it in the absence of externally applied systematic accountability” (Puk & Haines, 1998; p. 200).

One of the common concerns addressed in confronting concerns relating to inquiry assessment includes a disconnect between policy, which includes learning goals outlined in the curriculum, to the true value of educational experience students gain through an inquiry. Harlen (2013) argues that while inquiry-based education should “account for students’ achievement of the goals teachers do not always consider such factors when they are pushed by authorities for high stakes evaluation of the school” (2). Furthermore, Quigley and her colleagues (2011) highlight issues pertaining to time consumption, preparation for inquiry and effective approaches to measuring inquiry process to learning goals as legitimate challenges for beginning teachers. For instance, teachers with limited experiences with inquiry-based teaching and learning struggle to form a clear understanding of how to balance scaffolding that measures mastery of skills to the level of critical thinking skills a child has developed through an investigation (Quigley et al., 2011). Trautmann and her colleagues (2004) found that lack of resources and educational support in effectively establishing tools to support assessment caused frustration, concern and lack of motivation for some teachers to engage students in this form of learning.

2.7 Assessment of the Learning Process in an Inquiry

Assessment in an inquiry classroom differs from that of a traditional classroom in that it is based on the child’s growth throughout the learning process as opposed to perceived outcomes (Wadden, 2003). Dumont, Instance and Benavides (2010) identify three elements of assessment: performance assessment, evaluation tools and formative assessments each of which play a
critical role in inquiry based learning. While the performance assessments are necessary to
determine what skills were used to achieve desired results such as through portfolios or projects,
evaluation tools are as important to guide student efforts whether it’s through by-weekly
conferencing, or through co-constructed learning goals with students (Dumont, Instance &
Benavides, 2010). Some teachers design the structure of assessment and discuss strategies with
the students so that students are aware of the goals they set to achieve success in learning
(Wadden, 2003). Through guidance at multiple stages not only does the quality of work improve
but students are able to develop capacity to become self-assessors, coaches as they learn from the
evaluation process to revise their own work (Dumont, Instance, & Benavides, 2010).

Teachers are stepping back from using “formal testing” and placing more emphasis on
using portfolio conferencing as a form of assessment that will hold students accountable for
learning in inquiry classrooms (Wadden, 2003, 19). In her research Wadden (2003) found a
grade one teacher Ms. Stiles successfully using portfolio conferencing as a way to assess her
students. In this process students were expected to responsibly include selected pieces in
portfolios and during teacher-student conference discuss and critically analyze their findings
using their voice, and emotions to express their learning. Toth and his colleagues (2002) used a
similar approach to assess high school students who participated in a scientific inquiry. They
found reflective assessment rubrics to be successful in guiding them throughout the inquiry, and
further supporting their students in developing and recognizing the social skills and reasoning
skills they developed through this form of assessment (Toth et al., 2002).

Moreover, research shows positive improvements in assessment, for both the high and
low achievers who participate in inquiry learning (Chu, 2009). In her study of inquiry, Chu
(2009) found that participants of IBL received higher grades in the following areas: knowledge of subject, information literacy, reading and writing ability, IT skills, presentation and research skills, and social and communication skills. This is because these students chose topics they were interested in, motivated by, and that they enjoyed (Chu, 2009). Further she found the ability to self control activities in this form of learning enabled students to work at their own pace to achieve success (Chu, 2009). Marx and his colleagues (2004) share similar findings in their case studies of student assessment through “inquiry based and technology infused curriculum” developed by school administrator and teacher over a period of three years (1063). With the development of curriculum units, teachers found an increase in students’ understanding of science content. Across the three years the effect size from pretest to protest increased by a range of 0.27-1.39 (Marx, et al., 2004). By redesigning curriculum to fit inquiry standards, teachers increased the chances for student success.

Another example of successful inquiry model comes from Aalst and Truong’s (2011) research on knowledge creation inquiry. In their study they explore student understanding of science content on specific topics using inquiry-based learning (2011). Teachers used a knowledge wall, quality circle time, online knowledge forums, to create a culture of inquiry (Aalst & Truong, 2011). In this process, they discovered that students who feared public speaking or feared face-to-face discussions developed social skills to overcome these issues (Aalst & Truong, 2011). After a science inquiry unit, researchers found an increase in acquisition of knowledge from 63.0% (pretest) to 87.9% (post test) (Aalst & Truong, 2011). In the inquiry cases discussed above, research shows a positive increase in the conceptual understanding of
student through assessment whether it involved recreating assessment strategies with students to meet their individual needs.

2.8 Conclusion

In this chapter, I reviewed literature in areas surrounding inquiry-based learning, how culture of inquiry is fostered in classrooms, and how assessment is aligned to this process. In particular, I explored social constructivist theories and used the Ontario Curriculum, Ontario policies and ministry initiatives to establish the importance of inquiry and critical discussions in a reforming education system. While research provides several benefits for the use of inquiry, many teachers fail to instruct using this approach, either because they have not been trained well enough to understand how to create a culture of inquiry or because they have been influenced by their personal beliefs. Either way, teachers will use inquiry only if they value its power. The different roles teachers and students adapt, the organization and structure of inquiry, and the dialogic process are very powerful tools teachers use to foster a culture of inquiry. This review looked at the role IBL plays in fostering culturally relevant and responsive pedagogy and the benefits it has on student’s learning experience, academic performance and in acquisition of strong social skills. An examination of this literature raises two critical questions: 1) what implications an inquiry culture in the classroom has on students learning experience? 2) and if teachers are aligning assessment with opportunities for inquiry-based learning, how does it impact student achievement?

It is my hope that this research will shed more light on how teachers align assessment with opportunities for inquiry-based learning and how the establishment of an inquiry classroom affects student performance and achievement levels.
Chapter Three: Research Methodology

3.0 Introduction

In this chapter I describe the research methodology that is qualitative approach and provide a rationale for why this is relevant for this particular research study. I begin with the research approach and produces, and then discuss the data collection instruments before elaborating more specifically on participant sampling and recruitment. I provide an explanation for the data analysis procedures and review the ethical considerations pertinent to my study. Further I identify a range of methodological limitations while also stressing the strengths of the methodology. Finally, I conclude the chapter with a summary of key methodological decisions and my rationale for these decisions given the research purpose and questions.

3.1 Research Approach & Procedure

This research study was conducted using a qualitative research approach involving a comprehensive review of literature in areas pertaining to inquiry-based learning and, semi-structured, face to face interviews with 2 Canadian teachers. Strauss and Corbin (1998) explain that qualitative research relies on the study of “lived experiences, behaviours, emotions, feelings, as well as from organizational functioning and social movements and interactions” (p.11); these are interpreted and conceptualized in their natural setting to make meaning. This is further supported by Merriam (2002), who describes qualitative research as meaning-making that is socially constructed through interaction. The researcher learns from the understanding of subjects experiences, how they construct reality in different context and time (Merriam, 2002). Researchers use these interpretations from different settings to develop concepts or theories to inform practice (Taylor, Bogdon, & DeVault 2016).
Qualitative research was relevant for this study because of the nature of the research problem and for the purpose of this study. This research explored teachers perspectives on students’ experiences with inquiry-based learning, learn how teachers are fostering a culture of inquiry in classrooms, and hear from them what impact this pedagogy had on the quality of students learning experiences. There are some factors that could not be quantified through this pedagogy these include constructive thinking, the thought process, social interactions, and feelings. Furthermore, this method provided an opportunity for the researcher to access individual case information to inform practice, and generate recommendations for the educational community at large.

3.2 Instrument of Data Collection

The principle instrument that was used for data collection is semi-structured interview protocol (see Appendix B). Qualitative research relies on three common sources of data collection: interviews, observations and documents (Merriam, 2002). For the purpose of this study, I conducted semi-structured, face-to-face interviews with individual participants. Semi-structured interviews provided the opportunity for participants to engage in a purposeful conversation with the researcher about the research problem and gain an understanding of the interviewees lived experiences in relation to the topic of study (Kvale, 1983). The participants’ perception of this topic was explored and weighed heavily in the process of meaning making (Meurer et al, 2007). Questions were used by the researcher to guide the conversation to cover the important themes and to gather purposeful data from the interviewee (Kvale, 1983). Depending on the type and order of questions, the interview can be highly structured or unstructured (Merriam, 2002). Since semi-structured interviews were conducted for this study,
my questions were more open-ended, predetermined and structured to a certain degree, therefore leaving space for new ideas to be explored in areas unforeseen by the interviewer.

Interviews were recorded and transcribed. The purpose of the interview was to determine the meaning of what was said and observed based on response in words, “facial expressions, and other body gestures” (Kvale, 1983,175). However some drawbacks of this method included the need for accommodating schedules, travelling distances, preparation prior to interviews and transcribing for each participant (Kvale, 1983). But these are outweighed by the positive and rich experience gained through the semi-structured interviews.

Semi-structured interviews were an appropriate method and the most effective for this research study. Since I was interested in seeking teachers who are currently using inquiry-based learning pedagogy in classrooms to enhance students learning experience, I interviewed only those teachers who consistently use this approach across subjects to provide resourceful information on this pedagogy. Interviews provided me an opportunity to engage in a deep conversation with participants whose interests and philosophy of education coincide; this helped me obtain rich observational data on my topic. Furthermore, semi-structured interview did not constrict my interviewee to follow a rigorous structure rather they had some freedom to elaborate on areas that had not been explored by the interviewer.

The interview protocol is included in (Appendix B) wherein I have organized question into four categories: background information on the teacher, teacher’s perspectives and beliefs of inquiry-based-learning, current practices of the teacher in that area, and then final questions in regards to challenges and next steps to support teachers. Some examples of questions have been provided below:
What does inquiry-based learning mean to you? Why is it important to use this tool in schools?

Does your school have any special programming focused or philosophy focused on inquiry-based learning?

What does inquiry based learning look like in your classroom?

3.3 Participants

The quality of research synthesis is dependent on the procedure being used to determine sampling (Suri, 2011). The sampling population is selected by keeping the aim of research in mind in that people are grouped according to requirements of the study (Coyne, 1997). Here, I review the sampling criteria I established for participant recruitment and I review range of possible avenues adapted for teacher recruitment. I have also included a section wherein I introduce each of the participants interviewed.

3.3.1 Sampling criteria

The following criteria were used to recruit participants:

1) Teachers will have a record of commitment and leadership in the areas of inquiring-based learning and teaching practice.

2) Teachers will have used inquiry-based learning consistently across different subject areas.

3) Teachers will have aligned assessment practices to inquiry-based learning.

4) Teachers will have been experienced teaching in Canada for 5 years.

5) Teachers are currently teaching or will have taught at elementary school level.
In order to answer the main research question it was critical that the participants being interviewed prioritized the use of inquiry-based learning to provide their understanding about the impact it has on students learning experience and how this pedagogy was used to foster a culture of inquiry. To some degree their philosophy of education was supported and prioritized by this pedagogy to be able to provide recommendations to new teachers and the educational community at large. By using inquiry instruction across different subject areas teachers spoke to the different structures of inquiry used in each subject, the benefits of each on students’ understanding and in particular what they observed as outcomes of each. Furthermore, research supports the understanding that IBL can be aligned to assessment practices that differ from traditional classrooms. In order to further learn the impact this form of assessment can have on student learning experience I interviewed teachers who identified as aligning assessment practices to their teaching. The amount of experience in using inquiry-based learning played a key role in developing accurate analysis and minimizing any misjudgements associated to inquiry-based learning.

3.3.2 Sampling procedures and recruitment

The sampling procedures for qualitative and quantitative study differ in that qualitative is based on non-probability, and it requires “good informants” who are willing to share their particular focus of knowledge to develop complex insights (Coyne, 1997, 623). The three approaches to selecting a sample for qualitative study include convenience, judgement and theoretical sample (Marshall, 1996). In convenience sampling selection is based on accessibility of subjects (Marshall, 1996). This means the researcher relies on existing contacts that have been established to conduct the study (Lynch, 2011). Judgement sample refers to purposeful sampling
in which the researcher selects “the most productive sample to answer the research question based on specific influential variable” (Marshall, 1996, 523). Some of these variables include age, gender, social class, public attitudes and beliefs towards the participant (Marshall, 1996). Lastly, theoretical sampling requires the samples to be selected for purpose of examining theories or developing new ones based on the data (Coyne, 1997).

Due to the small-scale nature of the study and the methodological parameters of my research study, I used purposeful, and convenience sampling. This is because as a teacher-researcher, I am immersed in a community of teacher colleagues and mentor teachers from practicum. I relied on existing contacts and networks to recruit participants who held a background of expertise of using inquiry-based learning in classrooms. Further this study was purposeful because I established criteria (described above) to identify the most productive participants who created rich data for this study.

3.3.3 Participant bios

Two participants were interviewed for this research study and in order to protect the anonymity of each, they will be referred to using a pseudonym.

Dean (Pseudonym)

The first participant, Dean, has been teaching for fifteen years and was working as a grade five inquiry-based learning educator in a high needs school, at the time of the research. He has vast experience of teaching students from primary to intermediate levels, and working with global educators to promote inquiry in Canadian classrooms. He possesses strong passion for inquiry-based teaching and learning and has devoted personal time to gain explicit understanding of this teaching practice to effectively enact in his practice, through workshops offered by the
board, by participating in conventions that host inquiry projects and working in collaboration with colleagues to promote such learning.

*Adam (Pseudonym)*

Adam, the second participant has been teaching for six years as an elementary school teacher. The past three years he has been working as a grade five inquiry-based learning educator. After obtaining a Bachelor of Education, he received his master’s in international education and took additional qualifications that support him in enacting special programming associated to inquiry-based learning. Board workshops and critical constructs resources used in the classroom played a key role in shaping his philosophy of education and commitment towards this approach.

**3.4 Data Analysis**

Using the theoretical approach, data was formally established from the interpretation of interview text. Meaning was made from the richness of the social experiences gained from interviews in this study (Kvale, 1983). It is recommended that one begins to analyze data simultaneously with data collection, after each interview, in order to make adjustments along the way such as when testing emerging concepts, and themes, and to gather valid and reliable data (Merriam, 2002). Throughout the transcribing and analysis process, data obtained from each interview was compared to the other to find patterns, and it is for this reason, researchers insist that data analysis in qualitative research is an inductive strategy (Merriam, 2002).

More specifically, thematic networks were used to organize and structure data (Stirling, 2001). In this process the researcher uses the themes discovered in text at different levels to represent data for purpose of interpretation and to summarize the main principals of concern.
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(Stirling, 2001). In the first stage a coding framework was devised to dissect text into appropriate categories (Stirling, 2001). From there, themes were explored; patterns were identified across data with help from the different networks (Stirling, 2001). In the last stage, patterns were interpreted in ways to address the main research question (Stirling, 2001). An analysis of my research data followed the procedure provided above. It was conducted after the interviews through coding for common themes and divergences in the data as relevant to the research questions. Consequently null data was acknowledged in this process to determine what teachers do not speak to and why this is important for the teaching profession.

3.5 Ethical Review Procedures

Since qualitative research was conducted to explain real life phenomenon, to understand “human and social problems” the methods used to obtain information required some form of social interaction (Fortune, Reid & Miller, 2013; p.35). This interaction is governed and guided by ethics. In the past, scientific research has been used to violate human rights and ethics, for example, by using untreated patients deliberately to study their illness (Orb, Eisenauer & Wynaden, 2000). Since then an ethical review and procedure has been implemented in research studies to minimize tension between both parties (the researcher and the participant), and to protect privacy and confidentiality rights of the participants (Orb et al., 2000). Participants willingly participate to share their experiences hence it is the responsibility of the researcher to reassure their ultimate responsibility of protection (Orb et al., 2000).

Some ethical issues identified from research include reducing the risk of unanticipated harm and distress, obtaining informed consent, protecting the interviewee’s information, effectively informing the interviewee about the nature of the study, researcher/participant
relationship, deception and coercion, reducing risk of exploitation and acknowledging credit (DiCicco-Bloom & Crabtree, 2006; Fortune et al., 2013; Orb et al., 2001). Prior to conducting semi-structured interviews I obtained informed consent from my participants where they were asked to sign a consent letter (See Appendix A) that addressed the ethical implications and specifies expectations of participation. I also reassured that the data collected will be stored in a password protected computer which will be destroyed after 5 years.

Given the nature of this research topic, there were no known risks involved with participation. I assured participants that data will remain confidential by assigning them a pseudonym and exclude any identifiable markers related to their schools or students. I also explained to them that they can withdraw from participation at any given stage of the research study and reminding them that they have the right to refrain from answering any question that they do not feel comfortable with. I also provided them with an opportunity to review the transcripts before I conducted data analysis.

3.6 Methodological Limitations and Strengths

Given the ethical parameters that I have approval for the MTRP I was only able to interview a small sample of teachers, and I consequently acknowledge that while the findings inform the topic at hand, they cannot generalize the experience of teachers more broadly speaking. Griffin (2004) suggests that while qualitative research usually involves a small sample of participants, even though findings are not generalizable, they are examined and validated through meaningful in-depth conversations with participants of their experiences and emotions. Interview data is obtained through a powerful source which allows interviewer and interviewee to engage in social interaction and through this they develop a trusting relationship based on
mutual interests which supports connection making on different levels of the topic (Griffin, 2004).

The interviewer bias was another limitation that may impact the study through unforeseeable ways in that personal feelings, such as impression and appreciations could have influenced the response of the interviewee by the way it was perceived or the researcher’s presence may have affected the response (Chenail, 2011). Subsequently, this could have led to procedural problems when analysing data. Nevertheless, as Merriam (2002) states, as researchers one cannot eliminate biases or subjectivities because they are a part of human personal qualities. Instead, it is important that researchers monitor and minimize their biases where possible.

3.7 Conclusion

In this chapter, I discussed why qualitative research is the most effective methodological approach to examine given my research study, which focuses on inquiry-based teaching and learning. First I established a rationale for using semi-structured interviews, sampling criteria and recruitment procedure, given the benefits of each in supporting my research. From there I provided a brief overview of the data analysis procedure which entails decoding data after interviews to construct a network of themes through an understanding of common patterns. This technique helped categorize ideas in themes and analyze for emerging concepts and for missing information. Subsequently I identified ethical issues, and provided avenues to minimize these by obtaining informed consent, addressing risks of participation, establishing right to withdraw, discussed member checks and the data storage procedure. I discussed methodological limitations such as generalizability and interview bias pertaining to the study. In the following chapter, I
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report my research findings in forms of themes and discuss the significance in relation to existing research.
Chapter Four: Research Findings

4.0 Introduction

In this chapter I present and discuss my findings based on two semi-structured, face-to-face interviews with educators in Peel District School Board on their understandings and experiences with inquiry-based programming. The inquiry approach is valuable to me for its empowering impact on student success and on sustaining an inclusive and equitable classroom. The purpose of this research was to explore how teachers are fostering an inquiry-based culture in their classrooms and how they are aligning assessment to this learning process. Within each of the four themes I voice participants’ beliefs and experiences with their inquiry practices and make connections to the Chapter 2 literature review. Findings in this section are organized into four main themes and sub-themes to further examine emerging ideas.

The main themes of this research include:

4.1 Inquiry-based educators assert that successful programming is a result of a strong support system and passion-driven commitment towards this pedagogy

4.2 Inquiry-based educators established that a resourceful stimulating classroom environment supports student curiosity and learning

4.3. Inquiry-based educators identified personal beliefs and curriculum and administrative constrains as obstacles to teaching and learning practices that can be managed through the use of Universal Design for Learning

4.4 Teaching strategies used by inquiry-based educators have positive impacts on students’ ability to attain diverse and equitable education

In each theme participants’ experiences with the implementation of inquiry practices will be reported and discussed in relation to the analysis of existing literature.
4.1 Inquiry-Based Educators Assert that Successful Programming is a Result of a Strong Support System and Passion-Driven Commitment Towards this Pedagogy

Both participants spoke to the need and presence of school resources and environmental factors, such as school-wide values in order to establish an effective inquiry-based learning climate in the classroom. Furthermore they highlighted the power of internal motivation as a means to supporting successful inquiry programming to meet the needs of diverse learners and in creating an equitable classroom. As supported by John Dewey (1933), the very nature and philosophy driving inquiry-based educators is through the use questioning, the means through which they “stimulate response or stultify inquiry” in students. Teachers’ beliefs and attitudes towards teaching and learning strategies define how successful their programming practices will be.

4.1.1. A teachers’ philosophy of education can significantly foster effective enactment of inquiry-based learning and teaching

Both participants acknowledged the significance of one’s educational philosophy in guiding student learning. Dean claimed philosophy of education is shaped by one’s lived experiences, beliefs and values. He expressed,

As a child growing up inquiry was in my backyard, we learned as we tracked around in our bicycles. We are in a kind of society now where we are not so much connected with the outside world, to nature and to things at least when I was growing up. Today we have students in grade four and five concerned about getting into college/university. I feel like we have lost the spark of originality just that play and learning through trying out and doing.
He believes the development of his educational vision is a result of his childhood experiences as a student where learning was conducted through exploration, through questioning, reflecting and connection-making to real world issues. To him, students were passionately engaged because learning revolved around their interests. Another factor that facilitated the growth of his philosophy is through his participation in the Invention Convention inquiry program. Through interactions with students’ he developed a better understanding of their different levels of readiness and learning. He recognized that certain ways of teaching and assessment don’t allow everyone in the classroom to show their potential. This is a common finding in research, according to Keys and Bryan (2001) teachers’ philosophy of education is formed by their beliefs, their knowledge of student learning process and their own role as an educator. The correlation between the two defines how effectively and efficiently they can achieve an inquiry climate.

Meanwhile Adam conveyed the importance of this outlook through undertaking professional Additional Qualification courses and workshops offered through school boards. He too affirmed the view of education as coaching vital for student success when he claimed that “students are taking part in learning that they create themselves while we as educators facilitate for purpose of scaffolding learning.” Therefore it appears that these participants who are more inclined to using the social-constructivist approach to teaching and learning also held meaningful experiences with inquiry as students themselves and that have participated in PD that supports this philosophy. These teachers promoted an inquiry culture in their classrooms to foster success and support their students’ growth. By programming these opportunities teachers are able to provide students with a platform to show what they know and what they want to learn.
4.1.2. Access to teaching resources can significantly foster successful enactment of inquiry-based learning and teaching

Both participants indicated a strong need for teaching resources to facilitate inquiry instruction, and lack of recourses was expressed as a limitation. Dean described that, through his participation in a collaborative inquiry project with school colleagues and board members he was able to gain access to abundant resources and a better pedagogical understanding of implementing this approach. He mentioned, “Through this learning experience, I purchased a number of books around this subject and working with a Swiss teacher on an inquiry model was a plus.” Further he mentioned that when a school’s vision aligns to the inquiry model and is embraced by school administration and staff members, resources become more available to each teacher.

Meanwhile Adam mentioned he gained access to resources through workshops offered by his principal on PD days and through voluntary participation in an array of courses offered by school boards to support this form of facilitation. Despite the belief that inquiry-based teaching and learning is the emerging phenomenon in the education system, it seems that very little support and resources are being offered in the Bachelor of Education teacher training programs. It is being implied that in order for teachers to practice inquiry in classroom they either need to be in a school environment that promotes the use of these resources or individually seek PD to effectively establish such an environment. Edelson and his colleagues (1999) confirm these findings when they outline resources and technology as some of the practical constraints to successfully organizing inquiry learning.
4.1.3. Environmental factors can significantly foster positive enactment of inquiry-based learning and school culture

One of the major influences that support performance of inquiry instruction is environmental factors. At Adam’s school critical thinking and knowledge construction are promoted by school administrators because of their high interest in inquiry teaching and learning. Similarly, Marshall and his colleagues (2007) found that administrators that set a school culture that embraces this form of pedagogy are more inclined to influence teachers in implementing inquiry in their classrooms. Meanwhile, at Dean’s school, inquiry instruction is applied specifically considering the demographics of the school. He stated,

I work in an area with high percentage of English language learners, and students with social challenges, while I understand this pedagogy benefits diversity of all learners, it definitely gauges attention of students with higher learning needs. It’s a challenging school and for this reason our school values promote this practice.

In their research, Ikpeze (2006) and Wadden (2003) identified inquiry-based learning as an equitable tool that fosters inclusion and establishes a positive classroom climate to empower students and help them voice their opinions on critical matters. Even though research confirms increased inclusivity through the use of this approach, very little has been spoken of for its benefits towards English language learners and students that require additional academic support. According to Dean and Adam, inquiry-based learning is a pedagogy that meets learning needs and varying levels of all students. This approach allows students to contemplate and mediate at their level, no one students is able to dominate over another. As Dean claimed, “you can achieve success for all and celebrate for what each of them can do in their own way.”
4.2 Inquiry-Based Educators Established that a Resourceful, Stimulating Classroom

Environment Supports Student Curiosity and Learning

In order to help foster curiosity, develop critical thinking and encourage ownership of learning both participants stated teachers need to engage students in active constructive learning. However they claimed this can only be conducted if a safe, stimulating environment is offered. Further, certain pedagogical tools and teaching strategies are recommended to promote the development of such skills. Both participants identified the need for a collaborative learning climate and access to school initiatives as a starting point for this form of facilitation.

4.2.1. A collaborative learning environment stimulates effective inquiry practices

Both participants spoke to the need of establishing a collaborative environment in classrooms among students, with parents and the school administration. Dean indicated that in order to organize and structure an inquiry environment, educators must have fluidity in what they do, in how they design units, and how they set parameters for students to see themselves being represented to meet the vision of this model. He suggested a need for programming the right opportunities for students to show what they know. Dean reasoned this by stating,

Initially I focus on building a community in the classroom through a balanced use of tribes and CPS strategies. We do some community circles to discuss how we want the class to run. We talk about growth mindset and brain development so we spend the first three weeks just talking about who we are as people and how we can be learning together. You can’t do inquiry if students don’t trust each other. Through this notion we start off with structured inquiries in groups and students are given choice to see how they
want to present their work, we discuss assessment and technology components along the way.

Through this team-building approach, students develop interpersonal skills, learn from each other, drive classroom conversation, and play the role of active learners and as trouble-shooters. The idea of shared learning and collaboration is also celebrated in Adam’s classroom. He too claimed the importance of building a safe classroom environment for students before starting off inquiry-based activities. In order to enhance social relations, Adam uses jigsaw and graffiti style activities to get students to discuss concepts. He explained,

these activities foster student group discussion, you see students questioning in their groups, looking for resources together, engaging in dialogue and reworking and revising work together which takes some responsibility off of the teacher because students take ownership of their own work.

Research confirms that the constructive and collaborative learning model has a positive impact on students’ ability to learn and it is through social interaction students develop critical and reflective skills as they learn from each other (Powell & Kalina, 2009; Lantolf & Appel, 1994).

While collaborative opportunities provide for deeper learning among students, this experience is as powerful for teachers. Dean asserted that when he implemented inquiry in a Grade 6 classroom last year he paired up with a global partner and school board experts to help students investigate how Canada responds to issues around the world. He stated,

You know, we could have done it old school style, so we’re going to look at poverty, war and other social issues but instead we were like if we want students to be critical thinkers
why don’t we give them choice to investigate world issues through their personal experiences whether it’s through the lens of immigration.

Dean voluntarily met with experts from the board to discuss how to approach the social studies unit and implement assessment in this process so that it is responsive to student learning needs.

One of the most important findings from this process he highlighted was to understand how one can make connections between students’ lived experiences and the curriculum expectations so that they feel excited about what they are learning as it holds relevance to their daily life practices. When students’ cultural experiences are validated and accepted in these transforming classrooms, their confidence level and engagement level increases (Brown, 2004). Meanwhile Adam expressed the importance of collaborating with parents to better facilitate inquiry instruction. He addressed this when he claimed

Parents are also kept in the loop as to what is going on. When I plan out the inquiry model with students, co-construct success criteria with them and establish learning goals parents receive a copy of the plan to facilitate this process at home. This helps to bridge the gap between school and the community.

4.2.2. Access to teaching and learning resources stimulates effective inquiry practices

Both Dean and Adam expressed a special interest in acquiring teaching resources that support implementation of the inquiry pedagogy. Dean suggested after working with experts from school boards and global partners he looked into purchasing additional resources to support his teaching method. Some of the educational scholars he mentioned include Jo Boaler who discusses use of inquiry-based learning to teach math, and Ron Ritchhart, who examines cultures of thinking and the importance of making thinking visible. Dean makes it clear that
educators cannot always rely on access to school resources to support implementation of effective inquiry practices in classrooms but rather must take personal responsibility for what they are passionate about to gain better and deeper understandings of learning through inquiry. While Adam received critical thinking and inquiry packages from school administration, he stated a need for developing his own resources along the way to effectively facilitate inquiry instruction. Further he noted that although the Ontario curriculum is a good guide, it does not offer appropriate instructions to engage students in inquiry learning. These limitations are supported by Edelson and his colleagues research (1999), who identified a need for teachers to acquire appropriate tools, techniques and background knowledge to successfully engage student in inquiry-based teaching and learning. Similar to Dean and Adam’s views they argued the quality of learning experience is highly dependent on teachers’ access to resources and through a thorough understanding of this form of instruction (Edelson et al., 1999).

4.3. Inquiry-Based Educators Identified Personal Beliefs and Curriculum and Administrative Constrains as Obstacles to Teaching and Learning Practices that can be Managed Through the Use of Universal Design for Learning

The Universal Design for Learning model embraces an inclusive approach to teaching that is guided by three fundamental principles:

1) multiple methods of representation that gives learners a variety of ways to acquire information and build knowledge, 2) multiple means of student action and expression that provides learners alternatives for demonstrating what they learned, and 3) multiple modes of student engagement that tap into learners’ interests, challenge them appropriately and motivate them to learn. (Access Project, 2011)
Both participants agreed that inquiry-based teaching and learning embraces the Universal Design for Learning model as it provides students opportunities to engage in learning through a variety of choice, interest, and flexibility thereby fostering unique opportunities for all students to succeed. Not only does this approach decrease chances for unfair teaching and assessment practices that are cultivated by personal beliefs and administrative and curriculum constrains, but it can promote student engagement and facilitates student ownership of learning. These constrains will be further explored in the sub-themes below.

4.3.1. Teachers’ personal beliefs can limit possibilities for adequately aligning assessment to teaching practices

Even though collaborative school initiatives can foster an inquiry model in classrooms, Dean described individual teachers’ personal beliefs as playing a significant role in both implementing inquiry practices and aligning it to assessment. He quoted, “some teachers just fear change, fear risk-taking and losing control, their lower expectations for student outcomes dictate their actions.” He also highlighted because some teachers believe inquiry lends itself to specific subjects such as science they are more likely to only use assessment practices to fit the learning process in the specific subjects. Only teachers that are committed to this work and value it are likely to use inquiry instruction across different subject areas. They both confirmed that personal biases can interfere in the interpretation of inquiry process and how to effectively manage and implement it so that it aligns well to assessment practices associated to this approach (Keys & Bryan, 2001; Kong & Song, 2014). Adam claimed, “Some individuals need more professional development and to take the time try something new even though it may be difficult; it’s a learning process for both teachers and students.”
Both Dean and Adam found it convenient to align assessment to inquiry teaching practices because they find it a useful way to plan and manage lessons. Dean asserted “because you are looking at the big picture, big ideas, key expectations and core skills it becomes easy to structure the unit and offer effective feedback.” He strongly points to the need of teachers re-evaluating their interpretation of the curriculum. He argued, “It’s when you get caught up in covering up every single expectation through the letter in the curriculum that it becomes impossible to align assessment to this learning process.” In addition, Adam iterated that assessment drives the instruction of inquiry, and if it is done well considering the process and final outcome, inquiry will effectively drive evaluation. He described this by adding that the inquiry process is based on learning goals and co-constructed success criteria that is connected to assessment. If his students do not understand information, they approach him, have one-on-one conference with him, dialogue with their peers to exchange ideas, and clarify concepts to enhance their thinking. By providing options, reducing barriers, challenging student thinking and using a transparent assessment system Adam and Dean demonstrate how they adapt the UDL model in their teaching practice. While very little research discusses the incorporation of UDL principles infused into inquiry-based teaching practices, Adam and Dean demonstrate how they implement these in their daily practice. Both participants create an understanding that assessment becomes an issue when teachers lack understanding of the inquiry process and when they fail to effectively establish it in the classroom to align with assessment practices. Puk and Haines(1998) categorize teacher lack of understanding and initiative-taking as a serious issue in the education system. With very little incentive and accountability from the system, teachers put less effort in gaining an understanding of the most effective pedagogical tools to support student learning.
4.3.2. Administrative and curriculum constraints can limit possibilities for adequately aligning assessment to teaching practices

Both Dean and Adam learned after working at different schools in the same school board that not all administrative leaders support inquiry practices. They claimed to be lucky to be currently working at schools that foster such practices; however, they do acknowledge that lack of initiative by school administration can be a push back for some teachers. Dean also challenged views surrounding the current curriculum expectations. That is some teachers believe they are expected to cover each specific expectation in a subject. He strongly opposed the idea of covering each curriculum expectations because it is very difficult to achieve and unnecessary given the ministry mandate. If teachers focus on covering each expectation they will not be able to effectively establish inquiry practices in their classrooms and align them to assessment more generally.

In terms of subject matter teachers argue science lends itself because it provides students opportunities to connect to the outside world to do things such as observations and ask questions to facilitate learning. However, students can delve into subjects by asking questions, by engaging in critical thinking, examining and reflecting even in math, language arts and social studies mentioned Dean. His view supports the understanding that teachers need to stop over structuring, simplifying and targeting material in subjects and instead provide students with a constructive role to engage in meaningful learning. He emphasized,

It is to some extent laziness and complacency to not wanting to develop our craft and using the same methods that worked for people when they were kids that they think will work forever. So I think there is a certain resistance simply based on the fact that people
also don’t want to ask for help. They don’t want to put themselves out there that they don’t know things and so instead they just do things the way they do it. Also in education because of the strength of unions and things of that nature people can be complacent and not improve themselves so that plays a big role.

Even though the Ontario curriculum is stranded and is outcome-based, it should not prevent teachers from adapting inquiry practices that support assessment. Its position, that “inquiry is in the heart of all learning subjects,” which comes from the Ontario curriculum reinforces this view (Ontario, 2006, p.29). Dean also encourages teachers to use the curriculum as a starting point for instance if there is enough content and ideas in a particular grade level use it to facilitate student-centred learning where students identify key concepts and ideas, begin to question them and eventually investigate through their lived experiences in a collaborative learning environment. It is critical that teachers view curriculum and instruction as dependable concepts that are interwoven together to facilitate and plan out student learning and assessment.

4.3.3. Inquiry-based learning and teaching supports a Universal Design for Learning which is an effective strategy against inadequate practices

Both Dean and Adam indicated that inquiry-based learning and teaching fosters a Universal Design for Learning if established effectively. UDL is a teaching approach that seeks to achieve success for all students by offering them a variety of ways to access material and use it to display their learning. Dean claimed,

In an inquiry if a student has ADHD or is working at a Grade 3 level they can achieve success above all their peers and celebrate for what they can do rather than being
stigmatized for having a learning disability. Inquiry-based learning allows the teacher to set up and support everyone so they can do the same thing in their own way.

Through this form of instruction Dean and Adam are able to work with ELL’s and students on ISSP. They argued this can be achieved by encouraging students to engage in inquiries on topics they are interested in doing and ones they can relate to the most. Both participants agreed that when students are passionate about their given topics they are more likely to be engaged and take ownership of their learning. Adam described the need of using graphic organizers, word walls and sentence starters to accommodate the learning needs of a diverse range of learners in the classroom. Further in this process, Dean expressed the importance of co-constructing success criteria and learning goals with students to help them identify the expectations and understand what they are being assessed for. During the process of conducting an inquiry, Dean suggested conferencing with students to have a casual conversation so they feel valued for their choices, and meanwhile perform an academic check to see how they are keeping up and in case of any misinterpretations get students to slow down at their own pace and bring their learning together. Inquiry-based learning not only provides a customizing learning experience but also is one that is inclusive and equitable to manage in particular when students choose to display their thinking and learning process a certain way.

The establishment of this safe environment mitigates possibilities for inauthentic assessment practices and disadvantaged teaching and learning opportunities for vulnerable students. Teaching and learning that is rooted in socio-cultural context is considered to be highly inclusive as it brings together diverse experience of learners and puts it to practice through social interactions (Powell & Kalina, 2009). This collaborative environment allows students who lack
understanding in a given subject area to benefit from the variety of perspectives in the classroom thereby fostering a safe and empowering climate in which students can freely ask questions and engage in authentic dialogue (Cuevas et al., 2005).

4.4 Teaching Strategies Used by Inquiry-Based Educators have Positive Impacts on Students’ Ability to Attain Diverse and Equitable Education

Both participants identified that by embracing inquiry practices they can foster an inclusive and collaborative learning environment. These environments provide students with opportunities to construct knowledge engage in higher order thinking and develop interest in learning as they conduct inquiries on topics they are most likely to associate with. Specifically they found an increase in student engagement, student confidence level and self-regulation. Both described this experience through their lessons, which integrate inquiry-based learning and culturally relevant and responsive pedagogy along with the formulaic triangulation of assessment which incites ownership for student learning and equitable and authentic assessment practices.

4.4.1. Participants identified that inquiry practices can promote increased opportunities for deeper understanding, student engagement, active and constructive learning

Adam and Dean both stressed the importance of creating student-centred, constructive and collaborative learning opportunities for students to engage in thoughtful questioning during their investigations in order to critically examine their own learning. They claim this process increases opportunities for engagement and deeper understandings as students are not forced to regurgitate facts, rather participate in the process of becoming critical thinkers as they explore concepts that are most relevant to them. Dean described this environment as being, “loud, exciting, and focused through exploration of different investigations.” Further he went on to add,
because inquiry-based learning is engaging he found, from experience, less behaviour management strategies are necessary in such a classroom. In agreement, Adam reiterated, “this environment to be a safe and inclusive learning opportunity for students to offer their opinion and share their ideas with others.”

As teachers both Adam and Dean agreed their roles shift to facilitators in IBL practices. Dean mentioned,

The teacher is not talking to them, students construct knowledge as they talk to each other, they internalize it better by talking about it. I might hit 30% by talking to them we should aim 100% of our audiences from day one, by getting them to talk.

He further exemplified this through an inquiry his students participated in, in which they examined how Canada responds to issues around the world and whether or not it is a good global partner. Dean introduced this unit by making references to the major earthquake at Nepal and chose this country because he knew his students could connect to this experience at an individual level. As a class, they proposed ways their community could contribute, from a national level. Through this inquiry project, Dean found that students chose issues that were most relevant some of which included poverty, sports and international competition and immigration. While the process of establishing steps to combat social issues was the focus, Dean offered students choice in representing the end product. Some of the options included character-based designs on walls, poster projects, and public message boards.

He found students to be extremely amazed, engaged, and empowered through this activity. He reasoned they were empowered because students felt passionate about their issues and felt proud to learn that they could teach other people around them and voice their opinions
through their own work. The freedom to investigate on their own terms placed more value to this learning experience. Dean expressed,

If I put on them what should be, I am automatically limiting them. There are cases where you do need a ready mark but perhaps it’s not needed in inquiry maybe you need it somewhere else. Inquiry is where students can justify to you how they are going to be able to show you what they know.

These findings are further acknowledged by Adam through his Social Studies inquiry where students investigated the role of the Canadian government by exploring social justice issues. The main question guiding the inquiry was to investigate how the prime minister or premier of Ontario would deal with social issues at their levels. Prior to conducting the actual inquiry, Adam conveyed the importance of facilitating collaborative inquiry building activities where students engage in discussions, group work to actively participate in the process of knowledge building and to develop their own inquiry skills in a smaller scale through the process of scaffolding. Adam found that “students were engaged in their research when they knew they had to plan out how to conduct a solution for their problem and select the most important pieces.” Walker (2013) speaks well to this benefit in his research, where he argued the shift in roles and responsibilities of both students and teachers not only helps students take responsibility for their learning, but also offer an in depth opportunity for students to construct knowledge and engage in deeper thinking through a dialogic process whereby students customize learning so that it is relevant and profound to their own lived experiences.

4.4.2. Participants identified that inquiry practices play a critical role in supporting culturally relevant and responsive pedagogy
According to Ladson-Billings (1994) culturally relevant pedagogy can effectively empower students to use their social-location and cultural understandings to communicate knowledge. Both Dean and Adam found both practices to have much in common, through the implementation of inquiry practices in their classrooms as they were able to easily integrate principals of CRRP. Dean reported,

Both practices teach to the students as a whole, you allow students to bring to the table, their prior knowledge and understandings. CRRP ensures that everyone is represented and that you are instilling in pieces of the entire person. In both cases one reinforces the other.

The route Adam adapted to approaching integration of inquiry practices and CRRP in a social studies unit was through critical examination of appropriation of cultural celebrations and ideas surrounding “black history month,” where he got students to investigate the impact of these concepts on different groups. An example Dean shared of this inquiry unit that demonstrates shared aims of both approaches is through Language Arts identity text writing. This piece of writing he claimed was purely based on student’s interests and their backgrounds in which the expectation was to investigate how they formed their identity through an exploration of how history, culture, society, economy, and class had on themselves. He initiated this through a critical examination of First Nation Métis Inuit history to discuss how their identity was taken away which led to social issues they are currently facing such as injustice and oppression. In addition, by inviting a Swiss teacher who is passionate for social justice issues, he was able to share his history and background to talk about identity. This approach not only helped the Swiss teacher connect to the students but also helped them identify their own stories instead of
providing them with content material that is ‘North Americanized’ to support them in narrative writing.

This inquiry process allowed students to tell their own stories and make real life connections about who they are and how conflict has affected them. Dean stated “students don’t need to be grown up in Canada to understand what injustice means I think they need to have grown up in Canada to know what it looks like to not have your culture represented.” Eventually these stories were published on a website created by him, in both English and students’ home language. Dean found this to be the most powerful use of inquiry because students ended up creating richer text; they engaged in in-depth analysis of their own story structures, and most importantly were provided a platform for their voice to be heard. The convergence of both CRRP and IBL has been identified by Gay (2010) and Ikpeze (2006), in their research where they argued, that the inquiry process acknowledges student’s identity and background knowledge and provides opportunity to draw from their critical consciousness as they engage in the collaborative and constructive learning.

4.4.3. Participants identified that inquiry practices promote opportunities for authentic assessment

Assessment for instruction and learning is vital for it provides teachers opportunities to determine whether they are accurately targeting the learning goals, equitably observing and evaluating for understanding, monitoring student progress and maximizing success for each learner. Inquiry-based educators use a unique model to assess the process and end product in hopes to maintain a balance between the two to effectively evaluate student learning. They engage in a process of authentic assessment that is defined by Mueller (2005) as “a form of
assessment in which students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills.” By encouraging authentic tasks which are direct measures of learning, capturing students in constructive modes of learning, and by providing multiple options to demonstrate learning teachers create well-designed opportunities for performance-based assessment and growth. In relation to Dean’s Social Studies inquiry on whether or not Canada is a good global partner, he claimed to use a triangulation of conversations, conferencing and an examination of the end product to determine whether student learning was aligned to learning goals and the co-constructed success criteria established by his students. Dean recognized the need for collaboratively creating and sharing learning goals and success criteria prior to conducting the inquiry with students so they recognize what is specified of them and that they actively participate in the assessment process. One of Dean’s favourite forms of assessment is one-on-one conferencing with students to ask them to share their story. He indicated,

For the most part, it’s through those conversations that you are understanding what students have gained and what they have learned. I say almost 70% verbal it’s the daily interactions. You may get a project and look at it for an hour but when you’re interacting with kids on a daily basis you’re in more depth from that form of communication. So for me it’s the conversation, sitting with the kids is where I am getting most of my assessment from.

This form of ongoing assessment encourages students to constantly refer back to learning goals and success criteria, to take responsibility of their own learning, to self—identify learning strategies and to set goals for better performance in the future. Adam reiterated the importance of
looking at the whole process to observe students’ thinking, engage in conversations to discuss how they got through the process, provide immediate feedback and monitor each step as well as examining the ultimate product in the inquiry. Adam asserted that in any inquiry, most of his observations came from initial inquiry activities. When students engaged in conversations he typed up comments as they spoke to refer back to during assessment, along with conferencing during and after the inquiry project to discuss the inquiry process and evaluate the end product. He identified that this procedure encouraged students to celebrate their accomplishment through their own efforts. Through her research Wadden (2003) found teacher-student conferencing to be extremely powerful as they encourage students to take ownership of their learning, where they, the experts, decide what they found most relevant through this learning experience, how they developed an understanding and why they chose to display their learning the way they did. Both Adam and Dean stated this form of assessment helped enhance their instruction practice along with providing authentic assessment opportunities for students that are reflective of the child as a whole.

4.5 Conclusion

In conclusion, this study found that philosophy of education, commitment, dedication and a resourceful environment guides inquiry-based educators to facilitate inclusive and equitable teaching practices to meet the diverse range of learners in the classroom and to achieve success for all students. Specifically the benefits they discussed include providing opportunities for students to engage in constructive and collaborative learning, through which students developed critical thinking and problem solving skills, and higher engagement in the process of learning as students’ response to content was culturally driven by their social location to foster an interest in
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topics of investigation. Finally it was found that inquiry practices allow educators to implement authentic assessment practices that view the efforts of the child as a whole, in particular considering the process of learning and the end product before establishing a grade. These findings, particularly on inquiry pedagogy, assessment and its impact on student performance in relation to the UDL model and its ability to support struggling students, makes significant contributions to the existing literature, and extends beyond the addressed benefits. In Chapter 5 I discuss the implications of my research and my recommendations for the educational community.
Chapter Five: Implications

5.0 Introduction

In this chapter I discuss the implications of my research study. I begin by reviewing my key findings on how teachers foster an inquiry culture in their classrooms and how they align assessment to this learning process. Then, I discuss the implications of these findings for the educational community as well as implications for my teaching practice as a teacher-researcher. I make recommendations for various stakeholders in the educational community (school boards, school administrators, teachers, parents and education faculties) to make improvement for inquiry policy and its enactment in practice. After, I suggest important areas of further research and finally, I conclude with a discussion.

5.1 Overview of Key Findings and their Significance

As discussed in the previous chapter, educators that work in school environments that foster inquiry whether supported by school wide-values, administrators or are provided resources are more likely to implement this pedagogy in their daily practices, and establish an inquiry climate in their classroom. Lack of access to resources such as workshops, and PDs has been expressed as a limitation to achieving an IBL experience for students. Moreover, participants recognized that if teachers’ philosophy of education, which is influenced by one’s lived experiences, beliefs, attitudes and knowledge, and passion-commitment, align with the inquiry-model they are more likely to effectively implement it in their classroom.

Participants noted a collaborative climate within the school amongst colleagues, the community outside the school and with teachers across the globe supports a collaborative learning model amongst students in facilitating inquiry practises in the classroom. Dean
programmed such opportunities for students through use of tribes and CPS strategies, and by bringing in Swiss partners into his classroom to engage students in deeper learning. Meanwhile Adam worked with school administrators to bring in critical thinking constructs and worked with parents to investigate issues through their personal experiences to bridge the gap between school and home.

Participants observed that IBL embraces principles of the Universal Design for Learning model as it meets the learning needs of students at varying levels and meets success for all students including English language learners and students with exceptionalities. Participants identified that the UDL model can be used as a tool to establish a positive climate in the classroom to foster inclusivity and equity. This approach allows students to best demonstrate their learning in their own flexible ways offered through choice and interest. In circumstances where teachers feel reluctant to implement inquiry instruction due to lack of administrative support and because their interpretation of the outcome-based curriculum is limited, participants suggested, UDL model can be used as a starting point to infuse elements of inquiry in teaching and learning practice. They also claimed, this to be an effective approach when authentically assessing for student learning. This finding is significant because very little research discusses the correlation between these two approaches in establishing an equitable inquiry-based learning classroom. As Puk and Haines (1998) reported, many teachers do not implement inquiry instruction in their classrooms because they lack training and a clear understanding of its benefits.

Inquiry-based classrooms have proven to have positive impacts on students’ ability to engage in equitable, constructive and deeper learning opportunities. Participants found an
increase in engagement levels, higher order thinking skills and self-regulation as students investigated in areas of interest and took ownership of their own learning. Participants found, much like the culturally relevant and responsive pedagogy, inquiry instruction teaches to the child as a whole, purely based on students’ socio-cultural background and interests. Through their teaching practice, participants identified both CRRP and IBL reinforce one another, and in the process of investigations, both approaches permit students to tell their own stories, and explore social justice and equity issues through their social lens. Last, participants established that inquiry practice allows teachers to engage students in authentic assessment, be it through one-on-one conferences, portfolios, interviews, or any form of self-assessment. In this process they found that when students were assessed for an end-product, and the learning process itself, students felt more confident and empowered for their accomplishments.

5.2 Implications

In this section I outline the implications of my research for the educational community which includes school boards, school administrators, teachers, parents and educational faculties. Also I discuss the implications this study will have on my own teaching practice, as a teacher-researcher.

5.2.1 The educational community

Both the research literature on inquiry-based learning and teaching and my participants’ experiences suggest a high need for this form of instruction in classrooms across Ontario. According to the Ministry of Ontario (2013), Capacity Building Series: Inquiry-based Learning and the Ontario Curriculum documents (Language Arts, Social Studies, Science, Math, etc.) schools should create opportunities for students to engage in knowledge building, enhance
critical thinking and gain deeper knowledge and understanding of content through exploration and investigations by means of inquiry instruction. However, based on research and participants recognition, very little of inquiry programming is currently being implemented in classrooms, despite the ministry mandate and several policies enacted acknowledging its benefits. The implications of my research study demonstrates school boards are creating policies and offering strategies and resources to support school administrators and teachers in implementing effective inquiry practices to promote academic success to foster this approach in today’s classrooms.

The literature discussed the power inquiry approach has in creating authentic learning opportunities for students that are reflective of their own socio-cultural background. In addition, Ikpeze (2006) found that IBL includes principles of culturally relevant and responsive pedagogy as in his study teachers not only integrated students’ self-identity and their lived experiences into this learning process but also engaged students in critical consciousness through the dialogic process, where they learned to deconstruct social justice issues through their inquiry investigations. When teachers resist using inquiry approaches in their classrooms they limit opportunities for diverse, equitable and inclusive learning. Dean recognized, the similarities between both pedagogies when he addressed, “in both cases, you’re ensuring that everyone is represented, you are instilling in pieces of the entire person.” School administrators and teachers should take an active role in developing an inclusive school climate by promoting this pedagogy so that students’ social well-being does not suffer, and that they feel represented and valued for who they are.

Similarly when selecting a form of instruction, to promote self-regulation, to empower students and to meet success for all students IBL, has been identified, by both participants, as a
vital approach. This is because it allows students to work at varying levels, based on their interests and choice to effectively demonstrate learning.

IBL supports the Universal Design for Learning model, if a student has ADHD or is working at a Grade 3 level they can achieve success above all their peers and celebrate for what they can do rather than being stigmatized for having a learning disability, stated Dean. With this in mind, it is beneficial for teachers to use a form of instruction that helps students engage in inclusive and authentic education and helps them advocate for their own rights.

For many parents, inquiry-based learning is a new phenomenon, a form of instruction they have little knowledge of due to lack of exposure growing up in a system that did not necessarily align with this mode of teaching and learning. This study offers parents essential strategies and curriculum documents they can use to establish a culture of inquiry at home to support student’s in their learning along with helping to bridge the gap between home and school.

5.2.2 My professional identity and practice

I always demonstrated passion and commitment for inquiry-based learning for the long-lasting valuable academic benefits it has students’ critical thinking and ability to problem-solve. However after conducting this study and gaining a deeper understanding of how that looks in practice, I have learned to value this pedagogy even more for the social benefits it has on students’ well-being. I am confident, that I can now use inquiry practices in my own classroom to promote an equitable and inclusive environment, where students feel valued and respected for what they bring into the classroom as they explore their areas of interest.

What I have learned from both Adam and Dean that I will implement in my own teaching
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practice is to take initiatives, even when school-wide values do not support inquiry practices, to cultivate opportunities for students to engage in authentic tasks that foster constructive and higher-order thinking. I will make it a priority and personal responsibility to gain access to resources, attend workshops and collaborate with colleagues to heighten my understanding to meet success for all my students. I understand that it is vital to provide students with flexibility and choice when demonstrating their learning. For these reasons I believe IBL will prove to be an inclusive and the predominant approach used in my classroom.

This study will have a profound impact on my research practice, in that I now feel more committed to continue researching strategies I can effectively use to improve my own teaching practice in using inquiry-based teaching and learning. For any teacher to feel strongly confident and determined about the efficacy of their teaching practice, they must continuously engage in research and reflect on their current practice to enhance their experience and develop mastery in skills.

5.3 Recommendations

In order to make improvements in the education system school boards, school administrators, teachers, curriculum designers and educational faculties will need to work together as a community in large to make changes and effectively create policies that support inquiry-based learning that can be put into practice. In particular a suggestion for school boards is to create policies that hold school administrators and teachers accountable through annual assessments to monitor how consistently; if at all inquiry instruction is being implemented in classrooms. Meanwhile, based on participants’ responses, school administrators should make an effort to offer more professional development to teachers, offer more resources and create school
wide-initiatives to facilitate an inquiry culture in schools so that it becomes a norm, a standard teachers can be held accountable to. Additionally, Dean found that by working with a Swiss teacher collaboratively on inquiry projects, he was able to bring in a diverse cultural-linguistic characteristic in education. For this reason, it is recommended that principals take an active approach to connect with global partners across national boundaries to actively engage students in constructing and exchanging diverse knowledge through the process of inquiry.

For current and future teachers it is critical that they take personal initiative to educate themselves on the use of inquiry in classrooms to support student learning, and collaborate with teachers who are currently using this approach in their classroom across subjects consistently to gain exposure on how to foster inquiry culture. Dean found, by participating in the Invention Convention and reading books by experts in this field such as by Jo Boaler and Ron Ritchhart that he gained a sustained and deeper understanding of inquiry, and how to build such a dynamic community in the classroom to foster critical thinking. Last, a suggestion for education faculties is to create mandatory courses on inquiry-based teaching and learning for teacher-candidates to help them better deliver content across subjects through this form of instruction. Moreover, if teacher-candidates are provided opportunities to do practicum in partnered schools that use inquiry-based teaching and learning, will put them to an advantage as they will learn to reflect on other teachers practise to better develop their own.

5.4 Areas for Further Research

While there is abundant and useful research on the impact the culture of inquiry has on students’ academic performance, very limited research has been conducted on the equitable and inclusive benefits it brings into the classroom community. Through this research study, I found
that IBL embraces principles of UDL model of learning and CRRP which builds an environment that designs learning for all, enabling students to make flexible choices involved in the learning process and how to best demonstrate learning. Through my exploration and analysis of literature on this topic, I found very little research discusses IBL in light of these concepts and as a basis to support students’ social-well being.

Both participants spoke to the need of using IBL as a tool to foster learning for all within the parameters they set for themselves to express creativity. Hence, a possible area for further research is to focus on the long term benefits of IBL on students with Individual Education Plans, and strategies teachers can use to better promote social-well being of these students. Similarly, further research can be investigated in how IBL and CRRP can be used simultaneously to engage all students in inclusive anti-discriminatory education and explore the effects it has on students socio-emotional well being in addition to their academic performance.

5.5 Concluding Comments

In this chapter I discussed the key findings of my research study, and outlined implications of inquiry-based teaching and learning for school boards, school administrators, teachers, parents and educational faculties. Further I provided recommendations to help bridge the gap between research and practice and offered areas for future research pertaining to UDL model of learning and IBL, and CRRP and IBL to support students’ socio-emotional well-being. My research found that inquiry instruction promotes an inclusive and equitable learning environment in which students engage in learning by bringing in their own socio-cultural backgrounds and lived experiences to investigate areas of interest. This approach not only fosters authentic and transparent assessment practices but places high value on collaborative and
constructive learning to facilitate the development of higher-order thinking and problem-solving skills. Through interviews with both participants, I learned how to overcome challenges associated with assessment and inquiry practices and developed a deeper understanding on how to establish this pedagogy in the classroom to promote success for all learners. This research study, has strengthened my vision and values to support equitable and inclusive education for all students, and has inspired me to continue pursuing research-based evidence as a means to strengthen my own teaching practice.
References


children’s mathematics thinking in classroom teaching: An experimental study. 


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https://www.kent.ac.uk/religionmethods/documents/Sampling.pdf


20.


Appendices

Appendix A: Letter of Consent

Date:

Dear ______________________________,

My Name is Afnan Arsha and I am a student in the Master of Teaching program at the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT). A component of this degree program involves conducting a small-scale qualitative research study. My research will focus on how a small sample of Canadian elementary teachers, are fostering a culture of inquiry-based learning in their classroom, and how are they aligning assessment to this learning process. I am interested in interviewing teachers 1) who will have a record of commitment and leadership in the area of inquiry-based learning teaching practice, 2) who will have used inquiry based-learning consistently across different subject areas, 3) who will have aligned assessment practices to inquiry-based learning, 4) who will have experienced teaching in Canada for 5 years, and 5) who are currently teaching or have taught at the elementary school level. I think that your knowledge and experience will provide insights into this topic.

Your participation in this research will involve one 45-60 minute interview, which will be transcribed and audio-recorded. I would be grateful if you would allow me to interview you at a place and time convenient for you, outside of school time. The contents of this interview will be used for my research project, which will include a final paper, as well as informal presentations to my classmates. I may also present my research findings via conference presentations and/or through publication. You will be assigned a pseudonym to maintain your anonymity and I will not use your name or any other content that might identify you in my written work, oral presentations, or publications. This information will remain confidential. Any information that identifies your school or students will also be excluded. The interview data will be stored on my password-protected computer and the only person who will have access to the research data will be my course instructor Dr. Angela MacDonald-Vemic. You are free to change your mind about your participation at any time, and to withdraw even after you have consented to participate. You may also choose to decline to answer any specific question during the interview. I will destroy the audio recording after the paper has been presented and/or published, which
may take up to a maximum of five years after the data has been collected. There are no known risks to participation, and I will share a copy of the transcript with you shortly after the interview to ensure accuracy.

Please sign this consent form, if you agree to be interviewed. The second copy is for your records. I am very grateful for your participation.

Sincerely,
Afnan Arshad

Phone Number: ____________________ Email: ____________________

Course Instructor’s Name: ____________________ Contact Info: ____________________

Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw from this research study at any time without penalty.

I have read the letter provided to me by ______________ and agree to participate in an interview for the purposes described. I agree to have the interview audio-recorded.

Signature: ________________________________

Name: (printed) ________________________________

Date: ________________________________
Appendix B: Interview Protocol

Thank you for agreeing to participate in this research study, and for making time to be interviewed today. This research study aims to learn how a small sample of Canadian elementary school teachers, are fostering an inquiry-based learning culture in their classrooms, and how they are aligning assessment to this learning process. This interview will last approximately 45-60 minutes, and I will ask you a series of questions focused on your professional background and experience, then your perspectives/beliefs, followed by current practice, subsequently any supports and challenges encountered, and what are next steps for teachers. I want to remind you that you may refrain from answering any question, and you have the right to withdraw your participation from the study at any time. As I explained in the consent letter, this interview will be audio-recorded. Do you have any questions before we begin?

Background Information

1) Can you please describe your educational background.
   a. How long have you been a teacher?
   b. What did you study in University?
   c. Where did you go to teachers’ college?

2) Can you tell me about your current position?
   a. What grades and subject areas do you currently teach?
   b. What grades and subject areas have you taught previously?
   c. Do you fulfill any other roles in your school? (e.g. coach, advisor, councillor)

3) Can you tell me more about the school that you work in? (e.g. size, demographics, program priorities)
   a. Does your school have any special programming focused or philosophy focused on inquiry-based learning?
4) What experiences have contributed to developing your commitment to inquiry-based learning, and which have contributed to preparing you to enact it in your teaching practice?

   a. Personal experiences? (e.g. own experience of schooling)
   b. Educational experiences? (e.g. university course work, teachers college, additional qualifications, professional development)
   c. Professional experiences? (e.g. teaching experience, employment positions)

Teacher Perspectives/Beliefs

1) What does inquiry-based learning mean to you?

   a. How do you understand this term?
   b. In your view, what are some of the core premises and/or priorities of this approach to teaching and learning?

2) Why do you believe that it is important to foster inquiry-based learning in schools?

   a. In your experience, what are the benefits of inquiry-based learning?

3) At what grades and subject areas do you think teachers should start using inquiry based learning and why?

   a. From your perspective, what grades and subjects do teachers typically enact inquiry-based approaches to teaching and learning?
   b. Why do you think that is?

4) Why do you think that inquiry based pedagogy is not being enacted more often in classrooms?

5) In your view, is it difficult to align assessment practices when enacting inquiry-based learning? Why/why not?

6) How, if at all, do you understand the relationship between inquiry-based learning and culturally responsive instruction?

   a. How, if at all, is your understanding of these similar and/or different?

Teacher Practices
1) What does inquiry based learning look like in your classroom? (e.g. organization & structure)
   
a. If I were to spend a day in your classroom, what would I see and hear to indicate that you enact an inquiry-based approach to teaching and learning?
   
b. Can you describe your overall approach to teaching through an inquiry-based learning approach?
      
      i. What instructional strategies do you use and why?
      
      ii. What is the role of students in this learning process?

2) Can you provide some specific examples of a lesson or unit you have designed and taught that focused on inquiry based learning?
   
a. What grade/subjects were you teaching?
   
b. What curriculum did you connect to?
   
c. What were your learning goals? How, if at all, do you set learning goals with students when using inquiry instruction?
   
d. What opportunities for learning did you create?
   
e. How did your students respond? What outcomes did you observe from them?
   
f. What, if anything, did you assess and why? How did you assess students’ learning?

3) Staying on the topic of assessment and inquiry-based learning, can you tell me more about the range of assessment practices that you use and that you consider to align with this approach to teaching and learning?
   
a. Why do you use the assessment and evaluation methods that you use when teaching inquiry-based lessons/units?
   
b. What range of outcomes do you typically assess and why?
   
c. What considerations do you make when assessing learning outcomes from inquiry-based approaches to teaching and learning?

4) If applicable, can you describe for a lesson that you have conducted through an inquiry-based approach whereby you also enacted culturally relevant pedagogy?
a. What were your learning goals?

b. What opportunities for learning did you create?

c. How did your students respond? What outcomes did you observe?

**Supports and Challenges:**

1) What kinds of resources support you in implementing inquiry-based learning in the classroom?

2) What kinds of challenges do you encounter when implementing inquiry-based approaches to teaching and learning?
   
   a. How do you respond to the challenges you face?

3) What range of challenges do you experience when aligning assessment practices with inquiry-based approaches to teaching and learning?
   
   a. How do you respond to the challenges you face?

4) How could the education system further support you in addressing the challenges you face with enacting an inquiry-based approach to teaching and learning?

**Next Steps:**

1) How do you see inquiry-based learning being used in classrooms in the future? (considering that FDK program has adopted a similar approach)

2) What are some of your personal goals for developing your inquiry-based approach to teaching and learning?

3) What advice, if any, would you give to beginning teachers who are committed to enacting an inquiry-based approach to teaching and learning in their practice?

Thank you for your participation in this research study.