

INSTRUCTOR PERSPECTIVES OF INQUIRY-BASED LEARNING

CULTIVATING A CULTURE OF INQUIRY-BASED LEARNING AT MCMASTER
UNIVERSITY – UNDERSTANDING INSTRUCTOR PERSPECTIVES

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Abstract

The Boyer Commission report (1998) argued that normative educational approaches to higher education deprive undergraduates of opportunities for substantial intellectual engagement and rely too heavily on ‘knowledge transfer’ as the principal mode of teaching. In response, they advocated for the use of inquiry-based methods to foster intellectual stimulation and excitement for learning and discovery, and remove barriers to interdisciplinarity (1998). A central challenge in the development of interdisciplinary educational enterprises, such as the adoption of an inquiry-based approach, is the cultivation of a shared vision across disciplines with different norms of discourse, epistemology, and pedagogy (Mahony, 2003). Using semi-structured interviews and qualitative thematic analysis, we examined how inquiry-based pedagogy is understood by faculty members from established undergraduate programs at McMaster University as well as those involved in the development of a new interdisciplinary program employing inquiry-based approaches. The key questions addressed in this study are: How do faculty members from different disciplines understand inquiry-based pedagogy, and what factors are associated with long-term sustainability of inquiry-based curricula in higher education? Four key themes were identified in this analysis including 1) guiding tenets of inquiry-based learning, 2) inquiry environment, 3) inquiry as a programmatic ethos, and 4) inquiry as subversion/resistance. From this analysis, this research was able to articulate instructors’ understanding of inquiry-based pedagogy, discussing common themes and challenges, highlighting the connections to critical pedagogy, and identifying factors such as curricular design, collaboration among staff and

support from administration that have contributed to the sustainability of this approach at
McMaster University

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Table 1. Summary of thematic analysis

List of Abbreviations

IBL: Inquiry-Based Learning, Inquiry

PBL: Problem-Based Learning

BHSc: Bachelor of Health Sciences (Honours) Program

iSci: Honours Integrated Science Program

IRH: Integrated Rehabilitation & Humanities Program

Artsci: Arts & Science Program

SocSci: Faculty of Social Sciences

Declaration of Academic Achievement

This document acknowledges that the research presented herein is the work of Michelle Fattori, with recognition given to the contributions of Dr. Stacey Ritz, Dr. Dina Brooks, Dr. Sean Park, and Dr. Michael Wong. Michelle Fattori contributed to the study design and was responsible for completing data collection, data analysis, and writing the content presented in this dissertation. Dr. Ritz was instrumental in refining the study's design, completing the ethics application process, and providing continuous support during data collection and analysis. Dr. Brooks, Dr. Park, and Dr. Wong offered comments and critiques on the sections of this thesis, and offered support throughout the research process.

Chapter 1: Introduction

1.1 Paradox of Inquiry-Based Learning

Grappling with the paradoxical nature of inquiry is a brain teaser that has occupied my thoughts since I first experienced this style of education. This curiosity has subsequently prompted the work you are now reading. My MSc research explores instructor perspectives on inquiry-based learning at McMaster University, looking into how instructors from various programs understand the pedagogy. In documenting and interpreting these perspectives, this thesis aims to comprehensively examine inquiry-based learning and its manifestations within the context of McMaster University, identify factors associated with enduring sustainability of inquiry and provide a resource to help address faculty hesitancy about inquiry-based learning.

In higher education, the pursuit of innovation and effective pedagogical approaches has long been a central focus. One such approach that has garnered significant attention and recognition is inquiry-based learning (IBL). Although definitions of inquiry vary widely, they typically share a broad emphasis on student engagement, critical thinking, asking questions, and positioning the learners as active participants in their own education (Aditomo et al., 2013; Justice et al., 2007; Levy et al., 2010).

For many educators, there is a consensus that the principles just listed are beneficial attributes of a pedagogical approach; however, the broad nature of these ideas has left inquiry as something of an enigma to many educators (Mahony et al., 2003): a useful approach, critiqued for its ambiguity. Although, if it were to entail more concrete direction, it would cease to be based on the very principles that make it inquiry-based

education, and thus the pedagogy falls into a catch-22. In order to help demystify IBL, it's first important to contextualize how it has developed into what it is today.

1.2 Theoretical Foundations of Inquiry-Based Learning

The historical trajectory of inquiry-based learning has been influenced by a great number of philosophers, psychologists, and educators, and reflects a combination of age-old discourses along with contemporary educational theories.

The Socratic method is a form of dialectic education based on probing questions between the teacher and student; Socrates would pose thought provoking questions to his students, aiming to draw out their understanding of various subjects (Gogus, 2012). This approach was used not only to encourage active engagement but to foster critical thinking and problem-solving skills (Gogus, 2012). Given their shared emphasis on questioning, critical thinking, and active engagement, the Socratic method is often credited for laying the foundation for inquiry-based learning.

Moving forward to more contemporary dialogues, the late 19th century and early 20th centuries saw the emergence of the progressive educational movement, a transformative wave in educational philosophy which further influenced inquiry-based pedagogy (Glassman, 2001). Educator John Dewey was a notably influential voice in this pedagogical movement, championing a shift towards a more student-centered approach to learning (Dewey, 1899). Dewey (1899, 1916, 1938) also emphasized the importance of experiential education, problem solving, and student's active engagement in their learning process. This movement sought to break away from traditional rote memorization

methods, which dominated traditional educational practices at the time, and placed a strong emphasis on cultivating critical thinking skills (Dewey, 1910).

In the mid-20th Century, the educational theory of constructivism further contributed to the evolution of inquiry-based pedagogy. Pioneered by theorists Jean Piaget, constructivism is a learning theory and educational philosophy which asserts that optimal learning occurs when individuals actively construct their own knowledge through active engagement with the real world (Duffy, 1996; Lee, 2007). This perspective is grounded in the notion that learning is a dynamic process shaped by personal experiences, interactions, and interpretations which are unique to each learner and stands in contrast to more traditional views of learning, such as those grounded in behaviourism which view learning as the result of conditioned responses to stimuli and believe that acquisition of knowledge and skills is best achieved through repetitive practice, reinforcement of desired behaviours, and the establishment of clear, externally imposed objectives (Duffy, 1996; Lee, 2007).

Just prior to the turn of the 21st century, inquiry-based pedagogy was further influenced by the emergence of a pivotal shift in educational philosophy. In 1995, Robert Barr and John Tagg called for a departure from what they called the “Instructional Paradigm” to embrace the transformative “Learning Paradigm” (Barr & Tagg, 1995), particularly in the context of science education. Critically examining the shortcomings of the Instructional Paradigm, Barr and Tagg (1995) called for a holistic shift towards an approach that emphasized the importance of mastery of “functional, knowledge-based intellectual frameworks”, over the memorization of contextual cues. Within the Learning

Paradigm, instructional methods gain flexibility, breaking away from fixed time-based models. This paradigm encouraged a dynamic approach to education where faculty played the role of “designers of learning environments” (Barr & Tagg, 1995, p. 24) and students are positioned as “active discoverers and constructors of their own knowledge” (1995, p. 21). In this new paradigm, hierarchical structures would give way to teamwork and shared governance, promoting a cooperative and supportive learning environment.

Around the same time, in the pursuit of addressing concerns surrounding the quality of undergraduate education within U.S research-focused universities, the Boyer Commission—comprising individuals with expertise in higher education and research—aimed to redefine the landscape of undergraduate learning. The culmination of their efforts were encapsulated in the Boyer Commission Report titled “Reinventing Undergraduate Education: A Blueprint for America’s Research Universities” (Boyer Commission, 1998). This report argued that normative educational approaches to higher education deprive undergraduates of opportunities for substantial intellectual engagement and rely too heavily on ‘knowledge transfer’ as the principal mode of teaching, advocating for a transformative shift in educational paradigms. Among its recommendations, the commission explicitly encouraged the use of inquiry-based teaching and learning in undergraduate education as means to foster intellectual stimulation and excitement for learning and discovery, remove barriers to interdisciplinarity, and prepare students with the skills necessary to ensure “employability in the twenty-first century”, including “the ability to think, communicate, adapt and organize” (Luke, 1998, as cited in Madill, 2001).

1.3 What is Inquiry?

Catalyzed by both the aforementioned paradigm shift and the recommendations put forth by the Boyer Commission Report, there has been a growing acknowledgement within the academic community of the conceptual and practical benefits associated with inquiry-based learning in higher education. This pedagogical approach, centered around students' active investigation and synthesis of knowledge, holds promise for cultivating critical thinking skills, and fostering a deep understanding of subject matter. However, aside from being theoretically grounded in the principles that were previously outlined, you may still be asking - *okay, but what is inquiry?* As the literature reveals, the term 'inquiry' remains enigmatic, both conceptually and practically (St. Clair, 2007). This lack of clarity has emerged as a significant barrier to the advancement of scholarship in this area, as instructors and researchers grapple with the myriad of interpretations, values, frameworks, and activities associated with the term 'inquiry' (Aditomo et al., 2013; Friedman et al., 2010; Healey & Jenkins, 2009; Levy, 2009; Levy & Petrusis, 2012; Mahony et al., 2003; Spronken-Smith & Walker, 2010).

The multifaceted nature of inquiry-based learning is evident in the diverse approaches employed under this label. Some argue for an intensively scaffolded approach emphasizing structured guidance throughout the learning process (Aparicio-Ting et al., 2019). In contrast, others propose more open-ended approaches that grant students greater autonomy from the outset (Bloemhof, 2015). Aditomo et al. (2013) further outline the spectrum of inquiry tasks utilized by university instructors which can vary in their focus on content/practice and use-orientation. These tasks include role playing, simulated

applied research, discussion-based inquiry, and literature-based inquiry among others. This range of approaches highlights the inherent complexity in integrating inquiry-based learning into higher education and suggests that the implementation of this pedagogical strategy is context-dependent. Furthermore, divergent views on the connection between the inquiry process and research contribute additional nuance to this discourse. While some formulations assert a strong and forceful link between the inquiry process and highly academic forms of research (Wozniak et al., 2005), others adopt a broader interpretation, leaving space for ‘investigation’ and knowledge building that aren’t necessarily ‘research’ *per se* (Madill et al., 2001). The diversity of perspectives reflects an ongoing dialogue regarding the role of inquiry in the broader context of academic inquiry and scholarship. In an effort to provide structure to the inquiry process, inquiry-based learning is often broken down into phases that collectively form the inquiry cycle. As a reflection of the ambiguity presented above, there exists significant variation among inquiry-based frameworks as well. For example, the 5E learning cycle outlines five phases: Engage, Exploration, Explanation, Elaboration, and Evaluation (Bybee et al., 2006). In addition, White and Frederiksen (1998) offer another five-phase model which is divided into the following stages: Question, Predict, Experiment, Model, and Apply. Expanding the conversation, Justice et al., (2002) have proposed a circular model which uniquely emphasizes the importance of self-reflection and self-evaluation in each phase. Additionally, St.Clair (2007) suggests a ‘simplified’ learning conception that merges Kolb’s (1984) experiential learning cycle and Zull’s (2002) biological approach to learning. However, it should be noted that amidst the diverse interpretations and

frameworks used to conceptualize inquiry processes, a common thread tying together most frameworks is the recognition that while some may present as linear models, the inquiry process is fundamentally iterative. Lastly, amongst these vast interpretations, notable efforts have been made to synthesize perspectives. Following a thorough systematic literature review of existing inquiry-based learning frameworks, Pedaste et al. (2015) have proposed a comprehensive framework that consolidates core elements of inquiry-based learning into the following phases: Orientation, Conceptualization, Investigation, Conclusion, Discussion.

While these efforts help to synthesize the conversation, there still exists a great deal of ambiguity around what constitutes “inquiry”. Consequently, the implications of this lack of consensus extend beyond theoretical debates as it “poses a dilemma for curriculum management and for collegial discourse about the suite of strategies identified as supporting inquiry-based teaching and learning” (Mahony et al., 2003, p. 1).

Amidst this diversity, certain elements emerge as relatively common in the discourse on inquiry-based learning. Central to these elements is the emphasis on giving students a central role in their own investigative work and learning, challenging the traditional knowledge transfer model through direct instruction (Aditomo et al., 2013; Aparicio-Ting et al., 2019; Levy & Petrulis, 2012; Spronken-Smith & Walker, 2010). Additionally, there is a consensus on the importance of framing inquiry as problem- or question driven, aligning with constructivist epistemologies of learning (Friedman et al., 2010; Spronken-Smith & Walker, 2010). Lastly, the evolving role of the professor as a facilitator or “guide on the side” rather than a lecturer or “sage on the stage” is a shared

characteristic across perspectives (Aparicio-Ting et al., 2019; Friedman et al., 2010; Spronken-Smith & Walker, 2010).

1.4 Effectiveness of Inquiry-Based Learning

Critiques of inquiry-based learning in STEM education have been prominent in educational debates, with scholars arguing for the superiority of direct instruction over inquiry-based approaches. These arguments assert that in order to be effective, teaching should prioritize direct instruction, claiming that inquiry-based approaches may be less productive (Kirschner et al., 2006). This topic has sparked recent debate after a publication suggested that policy recommendations favouring inquiry-based instruction are based on flawed evidence, questioning its effectiveness in education (Zhang et al., 2022). This publication posits that conceptual knowledge is best acquired through direct instruction, emphasizing the necessity for students to grasp foundational concepts and procedures before engaging in scientific inquiry (Zhang et al., 2022). This perspective reflects a common concern that inquiry-based approaches do not adequately support learning, stemming from the misconceptions that students may struggle to grasp concepts through such methods. Despite these critiques, several studies provide evidence to support the effectiveness of inquiry-based learning. In a meta-analysis comparing student performance in undergraduate STEM courses that use traditional lecturing versus active learning, it was found that active learning methods, such as those employed in IBL, are more effective at improving student performance in examination scores and reduced the likelihood of course failure (Freeman et al., 2014). Trim (2006) highlighted similar results, finding that when compared with traditional lecture-based interventions, IBL

interventions showed “consistent student improvement in science achievement, attitude, and process skills” (2006, p. 39). Moreover, inquiry-based approaches are known to promote broad exploration and discovery, fostering creativity and critical thinking skills (Bonawitz et al., 2011). Deslauriers et al., (2019) findings also suggest that when students actively participate in classrooms utilizing active-learning strategies like IBL, they tend to learn more than when passively receiving information through traditional lectures. Lastly, a meta-analysis conducted by Minner, Levy, and Century (2010) found that IBL related teaching strategies emphasizing active student engagement were more effective in increasing conceptual understanding compared to more passive techniques. These findings suggest that inquiry-based instruction leads to better learning outcomes.

Despite compelling evidence supporting the effectiveness of IBL, resistance to the implementation of inquiry-based education persists among university administrators, often stemming from the aforementioned limited understanding of what inquiry entails as a pedagogy (Justice et al., 2009) and critiques of the approaches discussed above. To address this resistance, it has become imperative to publicize and explain the principles and benefits of inquiry-based education (Justice et al., 2009). In light of these challenges, this study aims to contribute to the broader discourse by undertaking a comprehensive exploration into the diverse perspectives and approaches to inquiry-based learning.

1.5 Assessment of Inquiry-Based Learning

The assessment of learning in IBL or other active learning environments requires instructors and course developers to break away from conventional assessment practices which often prioritize rote memorization and regurgitation of information in summative

assessments. Unlike passive learning methods, IBL presents a challenge in assessment as it often emphasizes broader learning outcomes such as critical thinking. In response to this challenge, IBL practices typically incorporate a blended approach of formative and summative evaluation methods (Adkins, 2018). Formative assessment strategies, often referred to as assessment for learning, may include peer-assessment, self-assessment, and ongoing instructor feedback to promote reflection and improvement through the learning process (Lehtinen et al., 2022). Additionally, summative assessments, sometimes referred to as assessment of learning, may involve project-based assignments, presentations, or portfolios to demonstrate students' learning (Lehtinen et al., 2022). While individual assessment strategies may vary, assessment in IBL classes typically include some form of formative assessment to promote rather than evaluate performance.

1.6 Pedagogical Innovation at McMaster University

Since the current study is situated at McMaster University, it is important to understand the educational context of the institution. McMaster University has earned a reputation for its pioneering role in educational innovation, with a notable example being the adoption and refinement of problem-based learning (PBL) for health professional education (De Graaff & Kolmos, 2007). While problem-based learning originated in medical education in the mid-1950s at Case Western University, PBL was further refined and gained wider recognition at McMaster University's medical school in the 1960s (C. M. Baker, 2000; O'Kelly et al., 2005; Pijl-Zieber, 2006). This groundbreaking approach aimed to revolutionize the traditional medical school experience by shifting away from passive lectures towards a more integrated, student-centered approach that “actively

engages students in a self-directed manner” (p.1), fostering skills in “problem solving, information retrieval, critical appraisal, and self assessment” (p.1), enabling them to deal with advancement in medical knowledge (McMaster University, 2022). PBL, as defined by McMaster University, is a “hands-on approach where the problem drives the learning,” and where “the problem is used to help the students identify their own learning needs as they attempt to solve the problem, and pull together, synthesize and apply information to the problem, and work effectively to learn from group members” (McMaster University, 2024b). The success of PBL in the medical school prompted its integration into other programs within the Faculty of Health Sciences, including Nursing, Physician Assistants’ and Midwifery Education Programs. PBL is also used in small group settings in the Speech Language Pathology, Physiotherapy, and Occupational Therapy Programs.

Building upon McMaster University’s reputation for educational innovation through the adoption of PBL, the institution has continued to champion progressive pedagogical approaches. Notably, since the 1980s, McMaster has emphasized the use of inquiry-based approaches within a variety of Programs and Faculties including the Arts & Science (Artsci), Bachelor of Health Sciences (Honours) (BHSc), and Integrated Science (iSci) programs, as well as the faculty of Social Sciences (SocSci), with a limited number of inquiry courses offered in other departments and undergraduate programs.

Arts & Science Program

Inquiry took its roots at McMaster University in the early 1980s as an integral component of the Artsci program which was designed to impart broadly applicable intellectual skills upon its students (Jenkins, 2007). The program’s unique core

curriculum was designed with three main objectives in mind: 1) to enable substantial work in both the arts and the sciences 2) to develop skills in writing, speaking, and critical reasoning, and 3) to foster the art of scholarly inquiry into issues of public concern (McMaster University, 2024c). While reflecting on the origins of the program, Dr. Herb Jenkins, the chair for the Arts & Science Planning Council and founding director of the program highlighted the uniqueness of incorporating inquiry into the curriculum at such a time when there was limited discourse on the use of inquiry-based learning in undergraduate education; keep in mind that the Boyer Commission Report, which later fueled the discussion around inquiry in higher education, was nearly two decades away at the time of the program's development (Boyer Commission, 1998; Jenkins, 2007). From its inception, the program set out with the goal to prepare students to lead intellectual lives in society, with the “art of inquiry- of self directed, question driven research” (Jenkins, 2007, p. 7) seen as essential in achieving this goal. In the first year of the program, students are required to take the Global Challenges Inquiry course, which spans the full academic year. Additionally, in their third and fourth year of study, students have access to a wide range of inquiry courses and are provided elective space to explore the variety of offered courses. Notably, while not all courses may be explicitly labeled as inquiry-based, the program’s focus on fostering the art of scholarly inquiry has resulted in an active learning approach being integrated throughout the program, even when not explicitly stated. During its implementation, the program’s emphasis on IBL faced many critiques. Some accused the program of being “naively optimistic of the power of learning,” (Jenkins, 2007, p. 9) while others argued that the “proposals showed a

misplaced faith in technology, positivism, and pragmatism” (2007, p. 9). Despite these critiques, the adoption of inquiry-based pedagogy in Artsci has been regarded as central in realizing the program’s ambitious goals of encouraging life-long learning, making disciplines accessible to non-specialists, and creating a dynamic intellectual atmosphere.

Bachelor of Health Sciences (Honours) Program

Prompted by McMaster’s increasing focus on research innovation in the 1990s, each faculty was tasked with proposing a new undergraduate program, leading the Faculty of Health Sciences to develop and implement the BHSc (Hons) program (Ai et al., 2008). Welcoming its inaugural class in the fall of 2000, the BHSc program was designed to promote and embrace an inquiry-based approach to undergraduate education (Ai et al., 2008). This approach, in line with McMaster’s dedication to interdisciplinary education, allowed for flexibility and innovation within the program, and the founding Assistant Dean of the program drew inspiration from Postman and Weingartner’s *Teaching as a Subversive Activity* (Postman & Weingartner, 1971). The BHSc program rests on an innovative and distinctive educational philosophy which emphasizes an interdisciplinary approach, lifelong learning, collaboration, student empowerment, and a strong sense of community. Often using the IREC (Inquire, Research/Reflect, Evaluate, Construct) model of inquiry-based learning (appendix A), and focusing on a fundamental set of skills which evolved to be known as the “7Ps” (appendix B), inquiry-based learning has remained a pillar of the undergraduate BHSc program for the past 24 years (McKinnell et al., 2005). Required inquiry courses in the BHSc program include Inquiry I: Introduction, Inquiry II: Biochemistry, and Inquiry III: Advanced Inquiry in Health Sciences, which is offered in a

range of topics. Additionally, in fourth year, students must take a project course to apply their acquired knowledge and skills in a practical setting. While most BHSc elective courses do not include the word ‘inquiry’ in their titles, many instructors still incorporate inquiry-based pedagogy into their teaching practices.

Integrated Science Program

The Honours Integrated Science (iSci) program is a unique four-year program launched in 2009 and designed to cultivate a broad interdisciplinary foundation in science. With a focus on addressing global challenges, the iSci program aims to offer students a blend of cutting-edge scientific knowledge and understanding of how science functions “in and for society” (McMaster University, 2024a). The iSci program encourages collaborative and experiential learning, fostering critical thinking and creative problem-solving skills. Notably, the iSci curriculum integrates scientific concepts with lab, fieldwork, and mathematical approaches, with an aim to prepare students for independent research through group and individual projects (McMaster University, 2024a). While the program does not use the term “inquiry” or “inquiry-based learning” to describe its pedagogical foundations, valued principles of the program such as student-directed learning, interdisciplinary, and the development of critical thinking skills are congruent with the core elements that underpin inquiry-based approaches.

Faculty of Social Sciences

The faculty of Social Sciences at McMaster is made up of a diverse array of disciplines which explore human behaviour, societies, and the various factors that shape them. Structurally, this faculty consists of several departments/programs, each

concentrating on a specific area within the social sciences. The level I social science curriculum is intentionally structured to encourage exploration across disciplines by providing students with a range of foundational courses and ample flexibility. This design allows students to select courses based on their interests and anticipated area of specialization for level II, which students must choose by their second year. One of the level I courses offered to students is called SOCSCI 1SS3 - Inquiry in the Social Sciences. Developed by a team of social science faculty members through a series of “new direction” workshops and launched in 1998-99, SOCSCI 1SS3 was designed to offer a small class environment covering various topics within the social sciences. This optional course provides students with opportunities to develop critical thinking, effective communication, collaborative skills, and an openness to challenging preconceptions while actively directing their own learning (Justice et al., 2002).

Integrated Rehabilitation & Humanities Program

The Faculty of Health Sciences is currently in the process of creating a new undergraduate Integrated Rehabilitation & Humanities (IRH) program, which will place a strong emphasis on integrating inquiry-based learning into its curriculum. The current study began as the new program was in its planning stage, and over the course of the study, the new program has achieved several milestones including obtaining senate approval, appointing an associate dean and building its inquiry-based curriculum. To support the incorporation of inquiry-based learning into the curriculum, faculty members actively engaged in designing the IRH program have been attending inquiry-based classes and participating in a McMaster-based Community of Practice (CoP) on the topic of

inquiry. At the time of writing, the IRH program is still in development, and is set to launch in fall of 2024.

IBL vs. PBL

The distinction between IBL and PBL can often be blurry, leading to confusion in educational settings. Distinguishing between the two is challenging due to their intertwined nature and overlapping characteristics. For example, both PBL and IBL represent constructivist, student-centered approaches that emphasize active student engagement, and encourage self-direction (Aditomo et al., 2013; Friedman et al., 2010; Hmelo-Silver, 2004; Hung, 2011). There are numerous perspectives on the distinction between IBL and PBL; however, the present study aligns with the conceptualization discussed by Spronken-Smith & Walker (2010) in which inquiry-based learning is considered an umbrella term, with PBL being a subset. This conceptualization allows for the recognition of both the similarities between these approaches, and the ways in which they diverge.

Firstly, while both approaches share philosophical underpinnings, IBL and PBL diverge in their initiation. In IBL, the initial topic of investigation is not dictated by the facilitator or instructor; rather, it can be initiated by the environment, the instructor, or defined by the learner (Pedaste et al., 2015). Conversely, while both approaches foster exploration of a topic, PBL starts with a specific problem or real-world scenario provided to students by the instructor, which they must then work through and solve (Hung, 2011).

Moreover, in terms of the learning goals, the broad aim of IBL is to develop the skills necessary to ask questions and investigate to build new understandings (Spronken-Smith & Walker, 2010). IBL also aims to develop skills related to conducting

research/investigation and connecting this research to a central topic (Jenkins, 2007). Notably, the questions generated in IBL are not necessarily stated in the form of a problem to be solved, providing a more exploratory approach (Jenkins, 2007). In contrast, while PBL also aims to actively engage students through investigation, its primary goal is to guide students through solving real-world problems and scenarios (Hmelo-Silver, 2004), focusing more on the learning of central bodies of knowledge (Jenkins, 2007), with the intent of better understanding and acquiring the skills to solve such problems.

1.5 Situating the Researcher

Reflecting on my experience as an undergraduate student in the BHSc program, my relationship with inquiry has been a rollercoaster of sorts. Initially skeptical of the approach, I struggled with the self-directed nature of inquiry during my undergraduate career. Like many first-year students, I found myself frustrated by the ambiguity and the lack of clear direction that I experienced during my first encounter with an inquiry course. Having grown accustomed to traditional educational approaches which emphasized memorization and structured learning outcomes, the open-ended nature of inquiry challenged my preconceptions and forced me to confront my fear of uncertainty; however, through personal growth and reflection, I grew to appreciate the value of inquiry-based approaches. Working collaboratively with peers in a second-year course, I experienced a transformative “aha” moment which allowed me to realize the ability of self-directed learning to foster deep understanding and curiosity. This newfound appreciation for inquiry led me to take on the role of peer tutor for the first year BHSc inquiry class in which I witnessed firsthand the positive impact that inquiry can have on

group process and skill development. All of this is to illustrate that my evolving relationship with inquiry has undoubtedly shaped my perspective as a researcher. While I approach this research with a supportive stance and acknowledge the significant value of inquiry, it's important to recognize that I didn't always hold this perspective. My journey with inquiry, including moments of doubt and frustration, has provided me with a nuanced understanding of both the benefits and challenges of this approach, and by grounding my insights in personal experience and critical reflection, I aim to bring credibility to this research. For a more detailed account of my relationship with inquiry and its impact on my perspective as a researcher, readers are encouraged to refer to appendix C.

1.6 The Present Study

In this study, we aimed to examine the evolution and maintenance of inquiry-based approaches in four existing undergraduate programs and a new interdisciplinary undergraduate program at McMaster University. Interviews were conducted with instructors who have experience using inquiry-based practices and those who have recently adopted this approach in their teaching. The primary goal of this study was to identify important features in the development and maintenance of instructor cultures of inquiry in the 5 different programs under consideration. The key questions to be addressed in this study were: 1) How do instructors from different disciplines understand inquiry-based pedagogy? 2) What factors are associated with long-term sustainability of inquiry-based curricula in higher education? It is my hope that insights gleaned from this work will help to address faculty hesitancy about inquiry, foster a

shared vision, and identify factors associated with durability of inquiry-based pedagogies in higher education.

Chapter 2: Methods

2.1 Research Design

For this study, I used Interpretive Description (ID) as the qualitative methodology to gain insights into the viewpoints and perspectives of faculty and staff who have been involved in inquiry-based teaching at McMaster University.

Interpretive description is a non-categorical qualitative research methodology developed by nursing scholars in the 1990s (Thorne et al., 1997). The approach emerged in response to the limitations of existing social science methods such as ethnography, grounded theory, and phenomenology as none of these methods align well with the practical requirements of the applied fields (Thorne, 2016, p. 35). In contrast to historical applied health discipline methods, which took numerical quantitative approaches (Hunt, 2009), ID aims to identify themes and patterns from subjective perspectives that are relevant and useful in applied practice (Hunt, 2009; Thorne et al., 1997). Since its inception, ID has evolved beyond its origins in nursing to address broader goals in various applied disciplines such as community development, human geography, and medical education (Thompson Burdine et al., 2021; Thorne, 2016).

Common critiques related to the implementation of non-categorical research methods such as ID include the risk of “method slurring” and the perceived absence of a solid foundation in both epistemology and methodology (C. Baker et al., 1992; Caelli et al., 2003). However, while the methods used for data collection and analysis can differ across studies utilizing Interpretive Description (Thorne et al., 2004), the philosophical basis for ID is in alignment with a constructivist and naturalistic approach to inquiry as

outlined by Lincoln and Guba (1985). Key principles that underline this approach address foundational assumptions related to the nature of being, what constitutes knowledge, and methodology. The first assumption is that multiple realities exist and require a holistic approach to encompass their complex, contextual, constructed, and subjective nature. The second assumption is that there exists a mutual influence between the researcher and the object of study, emphasizing the inseparable connection between the one seeking knowledge, and the subject under investigation. The final assumption asserts that *a priori* theories are insufficient to encompass the diverse realities that are anticipated. Instead, theories must evolve organically from the collected data during the research process (Thorne et al., 2004). These underpinnings are consistent with the assumptions I brought into this work as a researcher and were used to guide my approach to the current project.

In alignment with the theoretical underpinning of ID, findings produced with this approach do not aim to articulate absolute truths, but result in a co-constructed "tentative truth claim," (Thorne et al., 2004, p. 6) offering practically applicable insights presented as an interpretive narrative. The ultimate goal is to inform practice and provide a sense-making structure for the complexities of the real world of applied disciplines (Thorne et al., 2004).

ID was chosen as the guiding methodology for this study because it offers a theoretically flexible approach for qualitative data analysis which captures the subjective nature of the data being collected (Thompson Burdine et al., 2021). This approach was also valued for its recognition of the researcher as an active participant in the research process as well as the practical application of the findings that are fostered with this

approach (Hunt, 2009; Thorne et al., 1997). Using ID in this study allowed for the documentation and interpretation of how a shared vision of inquiry-based pedagogy emerges and develops over time, and how such understandings evolve, diverge, and persist in similar (local) post-secondary contexts. The orientation of ID towards practically applicable findings lends itself well to the purpose of this investigation, as it is our intention to use the insights gleaned from this study to produce an open education resource to help address faculty hesitancy about inquiry, foster a shared vision, and identify factors associated with the durability of inquiry-based pedagogy in higher education.

Using interpretive description as a research methodology begins with the process of scaffolding which involves two components 1) a review of the literature, and 2) locating the researcher (Thorne, 2016). The literature review serves to provide the researcher with insights into the significance of the research topic, identify previous investigations on the subject, and highlight any findings or challenges encountered during those studies. Chapter 1 encompasses a description of the literature review that was completed for this study. The second element focuses on locating oneself within the field being studied. In contrast to traditional qualitative methodologies that depict the research as a neutral participant, ID recognizes, values, and utilizes the researchers' influence (Thorne, 2016) . It is important to note, however, that this does not give the research unrestricted freedom to do as they please; instead, it highlights the importance of acknowledging and understanding the theoretical “baggage” carried by the researcher

(Thorne, 2016). This element of the scaffolding process is articulated in chapter 1.5 and expanded in appendix C.

2.2 Ethics Approval

The research presented in this work obtained approval from the Hamilton Integrated Research Ethics Board (project number: 15293), and adheres to the ethical standards outlined in the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* which governs human research practices in Canada. All participants gave their informed consent to be interviewed for the study.

2.3 Participants

Individuals invited to participate in this study included McMaster University instructors in the BHSc (Hons), Artsci, or iSci Programs who have been involved in inquiry-based teaching in the past 5 years; instructors in SocSci Inquiry Level I course; and McMaster University faculty who are involved in the development of the new IRH Program. There were no exclusion criteria included in recruitment for this study. These programs were selected for the focus of this study because of their use of inquiry-based approaches to education. Notably, while not all instructors in the iSci program explicitly term their approach as inquiry-based, discussion with high-level administrators prior to recruitment revealed that inquiry is central to the program's ethos, which is why they were included in this study.

2.4 Sampling & Recruitment

Purposive sampling was used for the recruitment of all participants from the initial programs of interest: BHSc, Artsci, iSci, and IRH. Prior to commencing the recruiting

process, program heads from BHSc, Artsci, iSci, and the new IRH programs were included in discussions about the study's development to seek their support and collaboration in facilitating the recruitment process. After obtaining their approval, the academic program directors for each of the four programs circulated an email invitation to all instructors in their programs and posted an invitation message in program-specific forums (such as Instructors' Microsoft Teams Channel, Avenue to Learn, or other comparable forums) (appendix D). In the case of the new IRH Program, invitations were sent to all those involved in the development of the program, as instructors had not yet been finalized for the new program at the time of recruitment. These invitation emails and announcements were sent out at the beginning of the recruitment period, with a follow up email sent eight weeks later.

In addition, I had been simultaneously facilitating an Inquiry Community of Practice at McMaster, bringing together individuals from across the university who were engaged with or were curious about inquiry-based pedagogical approaches. During these collaborative sessions, instructors from the Social Sciences shared their experiences with inquiry-based approaches and it quickly became apparent that the representation of their perspectives would add value to the study. These instructors were recruited using convenience sampling, through email invitations sent to those who participated in the CoP. Due to the inclusion of Social Science instructors late in the interview process, the study was only successful in recruiting instructors involved in the first-year social science inquiry course (SOCSCI 1SS3). Thus, this study does not claim to examine instructor

perspectives on inquiry across all social science departments/programs, but rather focuses on those involved with SOCSCI 1SS3.

2.5 Sample Size

With roots in grounded theory, the concept of data saturation implies that a study has reached a point at which further data collection ceases to yield additional insights (Morse, 1995). This concept is used to support a study's theoretical saturation, implying that the theoretical dimension, complexity, and variation of a given topic has been adequately documented (Sandelowski, 2008). While saturation has become recognized as the 'gold standard' for determining sample size in qualitative research, recent debate has shed light on the overreliance and inappropriate use of this term given that its meaning, and application varies among qualitative methods (O'reilly & Parker, 2013; Sandelowski, 2008; Sebele-Mpofu, 2020). In light of these critiques, ID does not aim to achieve data saturation as ID rests on the idea that the potential variations in experiences are theoretically boundless (Thompson Burdine et al., 2021). Thus, while it cannot be said that the current study has reached 'saturation', it is my opinion that the data analysis provides a sufficient range of perspectives on inquiry-based learning to address the research questions.

The projected sample size for this study was 20-25 total participants, with a likely distribution of 5-10 participants per program. A total of 26 participants were included in the final sample with the following breakdown per program: BHSc (n=17), Artsci (n=2), iSci (n=2), Soc Sci (n=2), IRH (n=3). While the distribution is dominated by participants from the BHSc (Hons) Program, I do not view this as a concern, as the data was not used

to draw distinctions between the interpretations of inquiry between programs, but rather to gain insight into the perspective of those who use inquiry-based teaching approaches across programs at McMaster.

2.6 Setting

Participants were given flexibility to opt for an in-person or virtual interview. Where participants opted for an in-person interview, they were offered the choice to conduct the session at a location of their choosing or in a private room on campus. Zoom video conferencing was used to enable virtual interviews

2.7 Data collection & Management

Data was collected using semi-structured interviews (Thorne, 2016). By using questions designed to elicit open responses and providing interviewers with the flexibility to explore emergent conversations, semi-structured interviews strike a balance between the rigidity of fully structured interviews and the spontaneous, free-flowing nature of unstructured conversation, eliciting complex and nuanced participant responses (Brown & Danaher, 2019). Prior to commencing the interview stage of the project, both interview guides were reviewed by the supervisory committee and incorporated feedback which suggested the use of questions that prompt participants to share stories and experiences related to the topic of inquiry. In taking this feedback and formatting interview questions this way, I aimed to elicit tacit knowledge which allowed me to not only tap into the participants' practical experiences, but also unveiled nuanced insights and contextual understanding that might otherwise have not been revealed (Ambrosini & Bowman, 2001).

Interviews were conducted between January 2023 and February 2024. Interview lengths varied between 32 minutes and 112 minutes. The interview questions were divided into three sections. The first section was aimed at exploring participants' academic backgrounds, teaching practices, and familiarity with inquiry-based learning. The second set of questions explored the participants' perspectives on and experiences with inquiry-based teaching. The final section of questions aimed to evaluate the presence and impact of an inquiry-based teaching culture within the participants' program, and the factors influencing its success and continuity. Since the new IRH Program has not yet been launched, the final section of questions was not included in the interview for faculty/staff recruited from this program.

All interviews were recorded using the built-in recording function of the Zoom video conferencing software, with audio-only recordings being used for in-person meetings. To maintain data-security, these recordings were stored on a password-protected laptop. The recordings were then transcribed verbatim and stored in a securely password-protected Google Drive for organization and security. To maintain participant confidentiality, initial de-identification of the data occurred during the transcription process to remove direct references to the participants' names. Instead, each participant was assigned an anonymized identifier such as [PARTICIPANT 1] using a unique number for each participant. Further de-identification of transcripts took place to eliminate any additional potential identifier, such as course names or specific details that could lead to participant identification.

Thematic analysis was conducted using nVivo 14 qualitative analysis software. Once transcripts were produced and de-identified, all files were imported into nVivo and this tool was used to facilitate the systematic organization, coding, and interpretation of interview data.

In several interviews, participants generously shared literature that they believed resonated with their views on inquiry-based teaching and learning. These contributions were treated as additional sources of data within the ID framework, which permits the incorporation of relevant collateral information to enrich a study's theoretical sample and provide support for the nuanced perspectives uncovered during the concurrent analysis of primary data (Thompson Burdine et al., 2021; Thorne et al., 1997).

2.8 Field Notes

While conducting interviews I maintained a journal which served as a repository for field notes written during each interview. During interviews, field notes enabled me to highlight recurring themes and make note of comments that could be used for further questioning. Field notes aided the process of active listening as they helped to organize and connect ideas and thoughts throughout the interviews. During in-person interviews where Zoom video was not captured, field notes were also used to describe elements of non-verbal communication such as facial features, air quotes, and body language which were used later in the data analysis.

2.9 Data Analysis

Interpretive description offers researchers flexibility in selecting an analytic approach tailored to their research objectives. In this study, thematic analysis was chosen

as the preferred method as it allows for the identification and exploration of patterns, themes and meaning within qualitative data, aligning well with the study's aim of exploring participant experiences with and perspectives on inquiry-based learning (Braun & Clarke, 2006). This approach enables a systematic yet flexible analysis of data, aiding the generation of themes through a structured process composed of six phases which are outlined and discussed below.

Phase one of thematic analysis asks the researcher to familiarize themselves with the data (Braun & Clarke, 2006). To achieve this, I listened to interview recordings and reviewed the written transcripts twice. A first review of the data was completed as I produced written transcripts from the interview audio recordings, while a second review of the data was completed after all transcripts were produced. Following the recommendation of Braun and Clarke (2006), I engaged actively with the data, making comments on the written transcripts; however, while ideas were recorded for use in later phases, no coding was done at this stage.

A range of transcription methods are available to researchers when analyzing data which can vary in their degree of fidelity to the audio source material. While the level of detail used for conversation, discourse, and narrative analysis is not needed in transcripts used for thematic analysis, Braun and Clarke (2006) recommend that the transcripts should, at a minimum, represent a verbatim account of all utterances. In accordance with this recommendation, I chose to use intelligent verbatim or 'naturalized' transcription which allows the researcher to capture the essence of the spoken content while omitting

unnecessary elements such as filler words (i.e. “um” or “uh”), and other non-essential verbalizations (Bucholtz, 2000).

Phase two begins once the researcher has become familiarized with the data and asks the researcher to generate a list of initial codes with the aim of categorizing the data into meaningful groups (Braun & Clarke, 2006; Tuckett, 2005). Adhering to Braun and Clark’s (2006) recommendations, all data was systematically coded, with an emphasis on capturing as many potential themes as possible. While the notes I made during phase one were used to inform the creation of codes in phase two, additional codes were generated as the transcripts were reviewed in greater detail. In an effort to ensure that the context of the data was not lost, I opted to code larger sections of data, encompassing text beyond that which was immediately relevant to the intended code. This often resulted in segments of data where multiple codes overlapped. Using nVivo 14 coding software I read and coded a total of 28 transcripts and produced a code book; some examples of codes generated at this point include “support from leadership & administration,” and “values student experiences.”

In phase three, the analysis broadened its scope to encompass the exploration of themes, transitioning from the narrower analysis used while coding. In this phase, I revisited the codebook developed in phase two, making connections between codes with the goal of generating overarching themes. At the beginning of this stage, I met with my supervisor to discuss the initial codes that had been generated and explore ways in which they could be grouped into various themes. To facilitate this, a table was made with candidate theme headings, with all initial codes categorized underneath as sub-themes. In

accordance with Braun and Clark's (2006) methodology, no codes were discarded at this time; rather, those that appeared disparate were grouped under a theme titled "miscellaneous". At this stage, my supervisor and I agreed to classify codes related to information that reiterated established knowledge about inquiry-based learning (i.e. being question driven, student-centered) into the miscellaneous group. This decision aimed to streamline the analysis, allowing the focus to remain on identifying novel insights within the data.

Phase four involves the refinement of candidate themes (Braun & Clarke, 2006). At this stage I reviewed the identified themes from phase three and cross checked them with the coded data to ensure that there was alignment between the two. This was an iterative process which resulted in the refinement and combination of candidate themes. At this point of the data analysis, I also collaborated with a peer to refine and reorganize the themes that were generated in phase three. Together, we examined the themes to ensure the complexities of the data were accurately captured with minimal overlap. These discussions culminated in the formation of the final set of themes presented in chapter three.

Phase five involves defining and naming the themes that were produced in phase four (Braun & Clarke, 2006). During this phase, I produced descriptions for each theme, ensuring that they accurately represented the associated sub-theme and codes. This process also included cross-referencing the definitions with the collected data for each theme/sub-theme to maintain consistency and coherence in the narrative conveyed by these themes. Additionally, it was at this point that I changed the order of themes to align

with the overarching story being told. Lastly, while the theme definitions were finalized during this phase, the process of naming each theme and sub-theme extended beyond this point and remained iterative throughout the final write up.

Phase six represents the conclusion of the analytic process and involves the synthesis of all previous work into a final written report (Braun & Clarke, 2006). In this final phase, I read over the coded data once more, selecting quotes that best exemplified the themes and sub-themes produced in phase four. Once quotes were selected, they were then embedded into their respective themes, with contextual information being given for each quote.

2.10 Credibility Strategies

In describing the guidelines used to judge the credibility of studies using an ID framework, Thorne (2016) highlights four evaluation criteria: epistemological integrity, analytic logic, representative credibility, and interpretive authority. These criteria will be discussed below.

As Thorne (2016) discusses, to demonstrate epistemological integrity, the guiding research questions must align with the stated epistemological standpoint of interpretive description, alongside an interpretation of data sources and interpretive strategies that logically derive from those questions. As highlighted earlier, the study design adheres to the epistemological framework of ID in its focus on identifying themes in an applied discipline. Furthermore, the study findings will serve as the foundation for developing an open education resource tailored to educators within higher education, highlighting epistemological integrity within the framework of ID.

By employing analytic logic, researchers demonstrate the rigor and coherence of their analytic approach, ensuring that interpretations are grounded in the data and are supported by evidence of inductive reasoning (Thorne et al., 2004). In the present study, I demonstrated analytic logic by keeping a detailed audit trail of the data analysis process (appendix E). The audit trail included documentation of the steps taken in coding the interviews, such as creating initial codes, organizing codes into themes, and refining themes through iterative review. The audit trail also included annotations documenting my thought process, reflections, and decisions throughout the analysis. By maintaining this audit trail, I provided transparency throughout the analytical process, enabling readers to understand and evaluate the logic behind the interpretations drawn from the data.

Representative credibility emphasizes the alignment between theoretical claims derived from the study and the sampling strategy employed (Thorne, 2016). Representative credibility was demonstrated through purposive and snowball sampling strategies designed to capture a broad spectrum of participants across various academic disciplines and programs at McMaster University. As mentioned, the study included representation from several undergraduate programs including BHSc, Artsci, iSci, SocSci, and the new IRH program. Since the sample population represents those who use inquiry-informed approaches in their teaching practices, the sampling strategy aligns with the guiding study questions and the theoretical claims generated from the data. In order to increase representative credibility, Thorne (2016) also recommends using some form of triangulation. Data and investigator triangulation are two methods that can be used to

strengthen a study and involve cross-validating findings through multiple data sources and employing multiple investigators respectively (Patton, 2002). Data triangulation was accomplished by utilizing various sources of data, including semi-structured interviews and literature that was provided by participants, which corroborated their thoughts on the topic of inquiry. Investigator triangulation was performed by reviewing the data with my supervisor and supervisory committee.

Lastly, interpretive authority refers to the credibility and trustworthiness of the researcher's interpretations. That is to say, research findings should be grounded in the data being analyzed rather than stemming from the researchers own biases or perspectives (Thorne, 2016). In this study, interpretive authority was demonstrated through "validity-as-reflexive-accounting" (Altheide & Johnson, 1994, p. 489) as I maintained reflexive practices and transparency. Throughout the project, a reflexive journal was maintained, serving as a tool for documenting my motivations, biases, and reflections at various stages of the research process. As discussed in chapter 1.5 and appendix C, my motivations for entering this project were candidly explored, shedding light on my personal and academic background and how they may influence my perspective. Subsequently, reflexive entries were logged throughout the interview process, which provided me with space to critically reflect on my assumptions, biases, and the evolving nature of my interpretations.

Chapter 3 Findings

3.1 Summary of Thematic Analysis

Exploration of inquiry-based learning within the context of McMaster University reveals a multi-layered understanding among instructors, spanning from individual instructor attributes, to broader views on the social responsibility of education. This chapter presents the findings of this investigation, structured as a progression through the various levels at which instructors understand inquiry. At the core of instructors' approach to IBL are the guiding principles and tenets that shape their pedagogical approach, reflecting the fundamental beliefs and values that inform IBL practices. Moving outward, we examine how inquiry is perceived at the classroom level, diving into what it means to create an inquiry-based classroom environment. Expanding further, we explore instructors' understanding of IBL within the context of entire academic programs, exploring how this approach is integrated and sustained at a broader institutional level. Finally, we consider inquiry as a form of resistance or subversion to the status quo, highlighting how it is viewed as a means to challenge conventional educational paradigms and fosters critical engagement within established systems. A summary of the themes and sub-themes can be found in table 1.

Table 1.
Summary of thematic analysis

Themes	Sub-themes
Theme 1: Guiding Tenets of Inquiry-Based Teaching	1.1: Student freedom/latitude 1.2 Instructor consciousness 1.3 Devotion to student development and empowerment
Theme 2: Inquiry Class Environment	2.1 Physical environment 2.2 Community-centered environment
Theme 3: Inquiry as a Programmatic Ethos	3.1 Foundation of inquiry-based pedagogy 3.2 Culture of community and support
Theme 4: Inquiry as Subversion/Resistance	4.1 Prioritizing process over outcome 4.2 Challenging power dynamics

3.1 Theme 1: Guiding Tenets of Inquiry-Based Teaching

All facilitators interviewed indicated that they prioritize student-centered learning in their classrooms, and while the notion of creating a space that is student-centered is not new to the discourse around inquiry, data analysis revealed the following values, beliefs and characteristics as constant underpinnings of effective facilitation of student-centered learning. First, central to the principles that facilitators bring into their classrooms is providing students with the freedom to take ownership of their education and to draw on their interests and experiences. The importance of instructor consciousness was also made

salient as many participants articulated the importance of humility, adaptability, and an active awareness of the present. Lastly, instructors articulated a passionate commitment to fostering holistic growth and empowerment, aiming to ignite students' curiosity, nurture their independence, and foster confidence in their ability to guide the learning process.

Sub-theme 1: Student Freedom/Latitude. The first sub-theme explores the foundational significance of giving students latitude to pursue their own agendas, highlighting autonomy as a pivotal aspect of effective facilitation of inquiry-based learning. Illustrating this, participants articulated trust and confidence in students' capability to take ownership of their education by creating a space which encourages students to steer their learning according to their interests, as opposed to telling the students what they had to learn. While discussing the difference between IBL and PBL, participant 16 noted:

"I think what inquiry does is it backs up that process a few steps. Instead of saying, here's the problem, go learn about it, it asks students what's the question? What are you interested in? What's the problem you want to solve? [...] What's really important here? What's the priority? What in my world is the thing or the things that I want to contribute to? Or that I feel drawn to or that I feel resonates for me? [...] Where am I going to invest my time and my energy? And how am I going to scope this question or this problem in a way that's appropriate for my goals? Am I trying to understand this problem because there's a specific thing I want to do, or am I just curious and want to expand my knowledge?" (P16)

Further supporting the notion that inquiry should be guided by student interest, one participant noted the following while reflecting on what inquiry means to them:

"The process of inquiry is this idea of being immersed in a space where you can do whatever you're interested in while working with other people and learning how to be a good group member, and being able to contribute and being able to find out more about yourself." (P18)

In addition, facilitators encouraged students to draw upon their personal experiences to shape the direction of their learning, highlighting a belief in students' capacity to utilize their knowledge and lived experience to effectively guide learning that is personally meaningful. For example, participants 21 and 5 noted:

“And for me, what I think about inquiry-based education is, it is allowing the learners to make meaning of their own experience. I think that's the way I want to sum it up in a nice little sound bite. They get to make meaning of their own experience in terms of what they do, what they explore, and then how they understand what they explore and see the applications to their own lives, and to their other academic pursuits.” (P21)

”And with that I think it opens up opportunities for students to share their own approaches. I might come in with a bias, both because of who I am, my experiences and upbringing, my educational background, and students who have their own experiences can come forward with their own questions, their own ideas, and their own theoretical perspectives on a topic. I think that's really neat and powerful, especially in a group context.” (P5)

Many facilitators also acknowledged the importance of the bi-directionality of learning between students and facilitators which underscores a recognition of students as active participants as both learners and valued knowledge holders in the educational process. For example, participant 13 noted: *“The whole point of [inquiry] is that it's not just a unidirectional delivery of information. It's a lot of discussion, it's integration and pulling in other things” (P13)*. Building on this idea, participant 10 discussed their appreciation for the bi-directional nature of inquiry:

“When my students give me a brand new idea, the way that I give feedback is to say ‘actually, I don't actually know this.’ So for me, it's a constant process of inquiry, because I'm not always the expert on everything. So it will send me on my own inquiry journey of figuring out ‘does this make sense?’, and then following up and looking at it and actually getting really excited in the moment to see that they found something unique. So I'm almost doing my own inquiry with what they bring me. And it gets me excited because I haven't thought about it that way. So it's a give and take moment of inquiry. The students are doing their inquiry, and they bring me something, and I'm like, ‘Oh, my

goodness, this is fantastic, I could use this!’ Then I go and start doing my own digging, or my own stone unturned, looking at it through a fresh lens.” (P10)

Highlighted in these quotes is the value that instructors place on bi-directional learning, which aligns closely with the concept of freedom/latitude in education. Bi-directionality in this context refers to instructors’ openness to learning from students and recognition that students bring valuable perspectives, ideas, and questions to the educational setting. By acknowledging the importance of bi-directional learning in IBL, instructors highlight the importance of allowing students the space to drive the direction of their learning. This openness to student input and the willingness to follow students’ lead reflects a commitment to providing students with autonomy and freedom in their learning process and signifies that instructors trust in students’ capabilities to actively engage in their education and make meaningful contributions to their own learning. When viewed holistically, the highlighted responses indicate not only a dedication to student-centered learning, but reflect the importance of providing students with the freedom and latitude to explore their interests and take ownership of their learning.

Sub-theme 2: Instructor Consciousness. The second sub-theme reflects the participants emphasis on the need for instructor consciousness when facilitating inquiry. Instructor consciousness, in this context, refers to the awareness and attentiveness of the instructor in an educational setting. It involves being present, attentive, and responsive to the needs and dynamics of the learners, as well as being aware of one’s own thoughts, feelings, and behaviours in relation to the teaching process. In discussion with instructors, the key components of consciousness for effective facilitation of inquiry were identified as humility, self-awareness, reflection, active listening, flexibility, and adaptability. Many

participants emphasized the need to approach their role with a sense of humility, requiring them to let go of the ego that often comes with being the ‘expert’ in the room. This involves acknowledging the limits of their knowledge and embracing vulnerability as a pathway to mutual growth and collaboration with students.

“I think that in order to be effective in this approach, it requires so much humility on the part of folks who are typically seen as experts. So I'm talking about facilitators, I'm talking about administrative leadership. It requires so much humility, because it is all about what we don't know, and the questions that we can ask and how we can learn from our work in a collective, together. And that is so disruptive to our society, not just in how we position people with titles and ages - you know there's this idea that if you're older, you must know more things.” (P12)

“Having a genuine curiosity about things and basically understanding that you are not the expert and being okay with that. Sometimes the students will be the experts in the room or experts on topics that aren't expertise to you. Being willing to admit things like ‘I don't know’, which is something that I wasn't ready to do when I first started teaching. That was a harder thing to do: to say to a classroom, ‘I have no idea, let's look it up for next week,’ or ‘I will find that out for you.’ So I think there's some humility that comes along with that and a willingness to be vulnerable and to go on the journey with the students where you are invested and where you can fall in your face too. I've made mistakes in inquiry and in my other classes and part of that is letting them know, saying, ‘I tried this, it was a mistake, here's what I learned’. [...] So I think those are some of the skills that really serve facilitators well.” (P21)

This sense of humility is often intertwined with self-awareness as facilitators discuss the importance of continuously examining their motivations, which in turn fosters reflection that enhances their understanding of both themselves and their students.

“But I think you have to understand what your biases are, what your motivators are, what your triggers are, and keep those in check. Because you're not there to give your opinions about something, especially if they're not evidence-based. You are there to help facilitate their learning and integrate their lived experience with evidence and all of that stuff.” (P4)

“Humility in the sense that there has to be a level of checking myself and a bit of reflexivity as an instructor. Saying, ‘where are the students at?’ and not always looking through the lens of, ‘is this where I want the students to be at?’ Because, if we truly are

trying to be student-centered, I have to start with where the students are at. It's not always helpful to start with where I want them to be.” (P7)

Participants also emphasized the significance of active listening and flexibility in an inquiry-based class.

“Back to the point where I said I had to do some learning around being willing to relinquish some control without relinquishing the responsibility to set a context, I think is really important. And just the flexibility, I think– Maybe it's not even control, maybe it's just being willing to flexibly follow lines of discussion or thoughts or ideas that students bring in. I found one thing I had to work really, really hard on, and I think is very important, especially early in an inquiry-based course, is just my facilitation capacity. Because it's important to be able to connect things that students are bringing up and signal to them ways in which these ideas might compliment one another, and to bring others into the discussion in a way that doesn't feel chaotic or disconnected. So I think that kind of requires active listening to people. Which again, means throwing out your plan and requires actively listening and trying to think, ‘Okay, how does what this student is bringing to the discussion relate to where it came from?’ and ‘Where we might go?’ ‘What other questions are opened up from that?’ And that comes with having to be willing to screw up a lot. ” (P15)

Both active listening and flexibility are included in this sub-theme because they demonstrate the instructor's attentiveness and responsiveness to the needs and dynamics of the learning environment.

Sub-theme 3: Devotion to Student Development and Empowerment. The final sub-theme relating to the tenets guiding inquiry-based teaching reflects facilitators' commitment to nurturing student growth and autonomy. Many facilitators expressed a deep passion for teaching, driven by a desire to “*tap into innate curiosity*” and foster independence in their students. Participant 11 articulated this while discussing the importance of intrinsic motivation in acquiring knowledge.

“Honestly, one of the things that I would say is really important is not so much the knowledge, because I feel in today's world you can watch fabulous YouTube videos on any subject, they're amazing. There are so many resources out there that students can tap into and learn those nitty, gritty details, but what I think is really fundamentally essential is

that drive to acquire the knowledge for themselves. Because memorizing a whole lot of things without context is useless, and you forget it and it's easily left by the wayside. What I really think is essential is that students create the self fulfilling love of learning so that they want to go out and find those details and fill in those things for themselves. And to be able to have the research skills, the fundamental ability to find papers that are meaningful, to ask really good questions and to figure out how to answer those questions in an innovative and new way.” (P11)

While describing how the inquiry course offered in the first year of social science has evolved over the years, participant 24 echoed the same sentiment:

“The inquiry courses went back to more of what I would say is an authentic inquiry, where it's a little bit less focused on what you need to know to succeed at university and it's a little bit more about, well, what are you curious about in this topic? Like, how would you go about doing this? Let me guide and nurture your curiosity. And that to me is really what the whole inquiry-based learning process is, is to tap into curiosities and nurture them. For me that's it on a foundational level.” (P24)

Many facilitators also commented that in addition to fostering this sense of curiosity and independence in students, their aim is to instill in students a sense of self-efficacy and confidence in their abilities.

“To me, inquiry courses are actually about self-efficacy. And self-efficacy is having that community which gives you opportunities to evaluate your own skills and say, no, I have the confidence to approach a task. So that's the scaffolding that inquiry provides over the years. It's this community and this modeling and these setting the expectation and opportunities to go, ‘Hey wait, no– so-and-so did that and I'm as smart as them, so it can't be that hard, so I'm gonna go do it, right?’” (P8)

Moreover, facilitators expressed their intention to empower students through their teaching practices, aiming to ignite genuine enthusiasm for and engagement in the learning process. While reflecting on their motivation for teaching and the intention of inquiry, participant 10 and 21 noted the following:

“My passion is to instill passion and research and discovery and science in other people. That's what fulfills me.” (P10)

“I would say the pieces that are prioritised are the skill set building, so using inquiry to enhance skill sets and really developing a love of learning and a love of the process. It's really focused on that process piece of - how do you not focus on the inquiry model to get to a product, but how do you focus on that process piece of getting students to use their skills and be infused with the love of exploration and the love of inquiry-based learning and just to collaborate together to explore something and develop something. Focusing more on that on the journey rather than the outcome.” (P21)

Facilitators also discussed the importance of higher education in nurturing emotional mature, empathetic individuals with strong critical thinking, problem-solving, and communication skills, emphasizing the role of inquiry-based learning in fostering these qualities, alongside a broader goal of cultivating better citizens and human beings.

“I want them to break down their prejudices and maybe build up others that are not negative. That they have a passion for the arts, the sciences, that they have a love of music. And that they read because they really value it and they love it. And that they're better people for it. So I think it's paramount, it's so important. [...] But, I am charged with the responsibility of encouraging students to embrace wisdom and the value of that. And I hearken back to the phrase 'make good choices'. And I think, if we prepare our students well, if we've really done a good job, they'll be able to make good choices.” (P20)

“I'd say that one of the main goals is to give lasting transferable skills but also inclinations towards curiosity, investigation, due diligence, careful scrutiny of sources, all that stuff in a way that in the short term will help a student do better at their studies and just do better work in whatever they're chosen discipline is, but also across the life course just make them better citizens, parents, family members, partners, everything. Better humans.” (P25)

Ultimately, this sub-theme underscores instructors' dedication to nurturing holistic development, empowerment, and curiosity in their students, as foundational elements underpinning the facilitation of inquiry-based learning.

3.2 Theme 2: Inquiry Class Environment

There are diverse interpretations of inquiry at McMaster, varying between instructors. Consequently, there emerged no definitive list of methods which could be

used to define inquiry - that is, there is no “one way” to implement inquiry in a classroom. Rather than speaking to the “methods” or “approaches” that constitute inquiry, many instructors chose instead to speak about the environment in which inquiry takes place and its impact on the inquiry process with one instructor commenting that “[they] came to learn about inquiry-based learning as a space to do work rather than an approach to doing work” (P24). Thus, this theme reframes inquiry-based learning not as an assortment of methodologies for classroom application, but rather as an environment co-created with students. This environment is described as one which is designed to foster exploration, encourage open-ended questioning, promote collaboration, by fostering a sense of community and connection among those present in the classroom.

Sub-theme 1: Physical Environment. Analysis of the description of physical space highlighted that it plays an important role in shaping the collaboration and communication skills that were articulated as two central goals within the context of inquiry-based learning. In particular, participants emphasized the benefit of having a movable room set up. Participant 6 explains that “*If there's a unifying structure, it would be the lack of unifying structure and the ability for there to be freedom in that space*” (P6). Building on this idea, several facilitators noted that flexibility in the spatial arrangement made it easier for students to engage in a way that’s “*conducive to productive communication and collaboration*” (P26), suggesting that “*the reason people sit facing each other rather than the back of each other's heads is to facilitate a collaborative kind of process*” (P24). In doing so, the barriers to effective communication that are often present in traditional lecture style rooms are removed.

“And so the physical environment does matter, because I think to facilitate the inquiry learning process you need it – Also just in basic seminar style learning, you need to be able to see each other. So if you're all in lecture, you're turning your hands, you know you can't see everyone all at the same time, you're not physically engaged with each other. So I do think the physical environment does matter.” (7)

It was also noted that this setup also gives the instructors the flexibility to easily “*get up and move around the class*” (P11) among students, which fosters easier communication with students. In addition, facilitators discussed the benefits of small group and class sizes, which was facilitated by a small program size. While discussing their perspective on the inquiry environment, participant 14 shared that “*[they] have always envisioned a course designed around inquiry to be smaller, a smaller classroom setting, mainly because it just facilitates group discourse, and/or generation of smaller groups within the class*” (P14). Many participants also shared the notion that “*it might be easier to have that bidirectional, active engagement in a slightly smaller group*” (P15), and that “*a small course [...] lends itself better to inquiry-based courses because then you have that chance to really engage and students also have more proximity to gaining knowledge from smaller groups of learners*” (P11). However, it was acknowledged that while “*there are certain kinds of approaches to inquiry that really benefit from a small facilitator to student ratio, that doesn't mean that you can't employ principals and an ethos related to inquiry in much bigger classes*” (P16). In conclusion, this theme highlights the pivotal role of the physical environment in fostering inquiry-based learning, emphasizing the benefits of flexibility in physical space, and smaller class/group sizes on engagement and collaboration between students and facilitators.

Sub-theme 2: Community-Centered Environment. This sub-theme reflects the notion that facilitators not only consider the influence of physical elements of the classroom on the inquiry process, but also prioritize the emotional and social dynamics within the class, and put into practice many of the values that were highlighted in theme 1. Numerous facilitators emphasized the significance of fostering a supportive and respectful atmosphere to nurture inquiry-based learning. While reflecting on the atmosphere that they aim to foster in their classroom, participant 11 highlights this point by emphasizing the importance of *“being supportive, being encouraging and sharing that learning together.”* They also note that it is equally as important that the class have *“respect for each other. Because students are mostly working in groups, you have to have a sense that they mutually respect each other.”* Many facilitators also placed emphasis on creating a space where students feel emotionally and psychologically safe. It was highlighted by all participants that engaging in inquiry can be quite challenging for both the students and instructors, commenting often on the discomfort and uncertainty that comes with being immersed in this non-traditional style of learning. In recognizing that inquiry can often feel challenging and uncomfortable, many participants agreed that *“[students] need to have that sense of trust and belonging and connection in order for them to stick with it”* (P12). This discomfort arises from various factors such as the uncertainty of not having clear “answers”, the vulnerability of sharing ideas, collaborative peer interactions, and the shift in roles from passive recipient of knowledge to active participants in their own learning. Speaking to the significance of the learning environment, participant 4 commented on the discomfort mentioned above and further

highlighted the importance of fostering a sense of community in order to create a safe space where students can explore this discomfort.

“And I am trying to facilitate a sense of community and a sense of collaboration amongst the students in my class. So that means, you know, getting to know each other. That means respecting each other, creating a space where they can be safe but uncomfortable, and them understanding the difference between what it means to be uncomfortable and what it means to be unsafe and knowing, okay I'm gonna sit in this, even though I'm uncomfortable, I can recognize that I'm still safe, and I'm going to sit here and I'm gonna be challenged. Or my thinking, or my perspective on the world is going to be challenged for a bit.” (P4)

Building on this point, participant 12 also comments on the importance of emotional safety in helping students adjust to an unconventional learning process.

“And this is what I think Inquiry is all about, it's really about building a brave and safe, trusting space in order for students to step in in a completely different way than they have ever thought that they could. And once they have that, and once they trust you to be like, Okay, I can show up in this way, they're like, I don't wanna ever go back.” (P12)

Moreover, facilitation with the goal of promoting communication and collaboration skills were often identified as underlying learning objectives, contributing to the development of a sense of community within the classroom.

“In terms of the environment that you're creating, it's collaborative, it's very discussion oriented where the students and facilitators are talking and engaged in the discussion, either as large groups or small groups. It's conversational, it's experiential, it's reflective, it's playful. Those are some of the overarching adjectives that I'd used to describe it in the environment.” (P21)

“What are the elements that are really important in inquiry for me? Collectivity, community care - we all need to be in it together. Whether that is a relationship of 2 or a class of 20, whatever. There is a community of care, collectivity in it. There's something about that which is so powerful to me, because it's actually in our experiences of aloneness that things feel really hard. And yet, when we are collectively working through a question, a problem, whatever, we are all holding parts of it which feels easier. I don't know. Like, the possibility that we will get closer to getting through it. I'm not suggesting we'll get to an answer, but the idea that we'll get through it seems more realistic when we are in a collective. So I think that's a really important piece to me.” (P12)

Commenting still on the atmosphere they hope to create in inquiry, facilitators also highlighted the ability of IBL to foster a connection or “*special bond*” (P3) between students and instructors, emphasizing the importance of cultivating relationships with students and getting to know them as individuals. Participant 19 commented: “*what I think inquiry-based pedagogies allow one to do is to develop deeper relationships with students*” (P19). Speaking to this, participant 20 noted the following:

“And I try to create a welcoming environment. It's not lost on me the importance of perhaps a smile or a greeting, learning someone's name. And in creating that culture, I wanna model what I want the students to model. I want them to see how I interact. And the fact that students will say “I really felt safe in your class”. A safe and supportive environment is foundational.” (P20)

Finally, facilitators discussed their efforts to foster creativity and ignite intrinsic curiosity in students. Participant 10 expressed: “*I wish that everybody could have it as part of their curriculum. Because I think it deconstructs that formalness and it builds creativity*” (P10). Fostering creativity and curiosity were included in this sub-theme as they align with the goal of creating a supportive and respectful atmosphere. When students feel encouraged to explore their ideas and perspectives creatively, they are more likely to feel empowered within the classroom. This empowerment contributes to the sense and belonging that has been highlighted in this theme and underscores, along with the sentiments noted above, the emotional atmosphere and emphasis placed on community building within the context of inquiry-based learning.

3.3 Theme 3: Inquiry as a Programmatic Ethos

Theme three illustrates how inquiry extends beyond individual classes to define the ethos of the programs under study. With the exception of the Social Sciences, from

which this study was only able to collect data relevant to the first-year inquiry course, IBL was described as shaping the curricular structure, beliefs, norms, and culture of each program. Participants articulated how inquiry is not isolated to a single space, but permeates from the top down and is deeply ingrained in the educational framework and guiding principles of their programs.

Sub-theme 1: Foundation of Inquiry-Based Pedagogy: contributing to theme three, this analysis explores the pervasive nature of inquiry within the programs of interest, further illustrating the profound influence of inquiry in shaping the educational ethos. Firstly, inquiry is explicitly mentioned in the core values of the Artsci program, indicating its foundation significance and the programmatic dedication to this pedagogy.

For example, participant 15 noted:

“Arts & Science is pedagogically defined around inquiry-based learning; one of our 3 program objectives is to foster the art of scholarly inquiry into issues of public concern. Inquiry is a kind of guiding or structuring pedagogy in the program as a whole, and has been since its initiation 43 years ago.”(P15)

Many instructors from the BHSc program also spoke about the ubiquity of the pedagogy within the program, and spoke to the fact that inquiry-based learning has formed the foundation of the program since its inception. Speaking to the way in which inquiry-based practices manifest in the BHSc program, participant 8 commented that *“they've been in use, in practice, and a foundational part of the program for so long that they're accepted and they are the norm,”* with participant 26 noting that *“[inquiry]'s just embedded in the DNA now”*. As mentioned in chapter 1, although the iSci program doesn't explicitly label their approach as 'inquiry-based', participant responses indicated that facilitators from the iSci program understand their approach to structuring the learning environment and the

norms within their program to be in alignment with inquiry-based pedagogy. For example, when asked to describe an inquiry-based environment, participant 14 chose to speak about the project course for which they facilitate.

“Oftentimes the students will identify their own [REDACTED] in their proposal, and then I just support them through that inquiry process. So, in that context we're meeting on a weekly basis, we're discussing what they're finding, I'm supporting them through understanding some of the content that may be outside of what we would have touched upon in [REDACTED]. And it's iterative in the sense that I'm touching base with students on a regular basis and we're kind of checking in with each other. And they'll ask me questions, and I'll ask them questions, and then they produce a final product in the end which is a written report and a sales pitch. That is very much inquiry in my opinion.”
(P14)

Regardless of nomenclature, participants reflected a commitment to student-centered learning and innovative teaching that was intentionally woven into the program from its inception, influencing every aspect of its design and implementation, starting from the highest levels of leadership downwards. Influenced by the inquiry-based pedagogical foundations of these programs, inquiry is woven throughout the four years of each program, starting early in first-year and continuing throughout the curriculum. The pervasive nature of this approach within the programs is also highlighted by the fact that inquiry-based teaching extends beyond courses that are explicitly labelled as ‘inquiry-based.’ For instance, while the majority of participants ran courses that did not include ‘inquiry’ in their title, they perceived their courses as being inquiry-based, as is illustrated by both their involvement in the study and the fact that when asked whether they use inquiry informed approaches in their classrooms, all respondents responded in the affirmative. Supporting this, participant 15 noted: *“inquiry is still a defining approach or*

relevance to the kind of teaching and learning that happens in courses that aren't labeled 'inquiry' courses" (P15). Lastly, participants discussed how including elements of inquiry-based or non-traditional learning has come to be expected of those within their program due to the reputation of their program for inquiry-based learning and *"because it's the norm"* (P26). Participants 15 and 16 illustrate this point in the Artsci and BHSc programs respectively.

"And then, you know, the reality is this kind of ongoing culture [...]. I'm sure when the program first started there had to be active attention to building and growing that. That then starts to kind of grow and reproduce itself, combined with ongoing and active discussion. [...]. Most new instructors, when they come into the program [...] have pretty extensive discussions about the kind of approaches that people might expect, and what our expectations would be." (P15)

"I think partly it emerged out of the early days of the program's existence having an explicit commitment to [inquiry], and it tended to recruit and attract people who were attracted to that. And so, I mean, because the program draws faculty from all over the place, [...] the people who ended up being brought in to teach in the program are the people who felt a resonance for that in the first place and found that affirmed and encouraged by the leadership in the program - by the assistant Dean and others, but also by colleagues. Or, they weren't the only ones in this program doing this weird thing. So I think this is a combination of those 2 things. 1) Because we're known for that, we're very upfront and explicit about that and it tends to attract people who are attracted to that. 2) Once they're attached to the program or once they're involved with the program, it affirms and encourages that further. [...] At some point there's a critical mass that it's self-sustaining." (P16)

Further emphasizing the point that non-traditional learning has come to be expected of instructors, participant 13 discussed how instructors are welcomed into the iSci program.

"We set it up early in the summer before our term starts, and we have one-on-oneish meetings with folks who are new to explain "this is why we're doing what we're doing, there are going to be some things you don't understand, so ask questions. Here's the glossary of all our acronyms." (P13)

In these ways, it becomes clear that inquiry-based learning has become so entrenched in the foundations, curricular designs, and practices of these programs that this pedagogical approach has become the norm, and continues to shape the educational ethos.

Sub-theme 2: Culture of Community and Support. The second sub-theme reflects how the inquiry-based environment that was discussed in theme two extends beyond individual classrooms, permeating every level of the programs of interest. Listening to the participants' responses paints a picture of collaboration and community among staff as evidenced by their willingness to assist one another, share resources, and provide continuous support. When asked about their program culture within BHSc, participant 18 noted:

“I have never met a more supportive faculty in my entire life. The entire department, from the receptionist to the secretaries, everyone is like– you wanna know everyone, and they follow the pedagogy no matter what the role is in the department. Everyone is welcome, everyone knows everyone, and everyone supports everyone. And everyone celebrates accomplishments together and cries together when things are sad. And I think it is the most cohesive faculty I've ever been a part of or have seen. I wouldn't change a thing, I think everyone is amazing.” (P18)

This sense of camaraderie also extends to the student body as facilitators described a strong sense of community amongst students not just within a single class, but throughout their programs. While explaining the culture among students in the iSci program, participant 13 noted:

“It's community. The students have this thing called the “big sib” program. So second year students are paired up, so we have big family trees. We even have alumni that come back, like we still have the [REDACTED] family band. [REDACTED] who was from the first cohort, so he graduated in 2013, and there's a website with the whole genealogy. So there's this culture of: we're not fighting, we're not being competitive, we're collaborating. There's a community.” (P13)

Importantly, instructors noted that this culture is not merely incidental but is deeply ingrained and reinforced from the top down. Many facilitators commended the support they receive from program leadership, highlighting both the freedom they are given instructors and the trust bestowed upon them to run their courses.

“And so, and I really believe that a culture is created over time and supported by leadership, by facilitators, by students. And, I found that when I was there with [REDACTED] and [REDACTED] and some other facilitators, we were really able to nurture a space for this that permeated all levels of the program that we had control over.” (P12)

“Leadership really matters, because I don't think this program would be what it is if [leadership] weren't as open and receptive to new ideas. And I think a lot of the barriers that I've experienced at my other institutions is that people were trying to micromanage. And they had an idea of what teaching and learning could be and I think that really stunts the growth of the community and everyone in the community. The faculty were afraid, they were actually afraid. They were afraid of not teaching the way that the chair or the Dean expected. And I think that would be another reason I think leadership really is important for sustaining a culture of inquiry, because [leadership] has never told me I can't do something. You know, that's very rare in leadership. And it comes in place of support and curiosity.” (P19)

These testimonials illustrate that the ethos of these programs are steeped in a culture of inquiry, characterized by many facilitators by connection, community, support, and collaboration.

3.4 Theme 4: Inquiry as Subversion/Resistance

The final theme, inquiry as subversion/resistance refers to the various ways in which facilitators use their positions to actively challenge the status quo. Facilitators shared a deep frustration towards conventional educational norms and expectations. For many instructors, this frustration manifested in a desire to push against the boundaries of traditional educational structures in order to evoke change from within the system. While

reflecting on what they believed to be the most important core elements of inquiry-based learning, participants 12 noted:

“Knowing is actually informed by our systems of oppression like capitalism, colonization, patriarchy, all of these things deem what is knowable and what it is that we know. And so inquiry for me, is actually a form of resistance to systems of oppression. Because it’s de-stable. It’s deconstructing our ideas of what is knowable, Who is knowing, who is not knowing, those kinds of things. Which is very powerful for me.” (P12)

Like participant 12, all instructors expressed a desire and need to disrupt ingrained power dynamics, challenge authoritarian teaching approaches, and dismantle the unidirectional and hegemonic nature in which knowledge is traditionally disseminated. Central to this theme is facilitators’ emphasis on the moral imperative of education which highlighted a belief in the responsibility of educators to address systemic injustices and empower learners to critically engage with the world.

“Inquiry as a pedagogical approach and as an environment of learning, offers students a place to start building, deconstructing some of the baggage, and I would say some of the oppressive aspects of what the education model has done for learners.” (P7)

Building on this concept, participant 18 shared the following while reflecting on what they perceive to be the intentions of inquiry:

“Learning should be a subversive activity[...]. You should not be afraid to express your opinion, you should not be afraid to challenge established thoughts and ideas. And you should find out more about something before you just spout stuff out. So I really think [inquiry]’s about making people more educated and making people not afraid to be creative and innovative with their ideas. So if you have an idea, express it, even if it’s not what everyone else is thinking, because that’s the only way we’re going to generate real learning and real scholarship. It’s about making people bold.” (P18)

Thus, this theme highlights how facilitators see inquiry not only as means to foster intellectual growth, but to enact meaningful resistance against harmful educational norms,

with the overall aim of creating more equitable and socially conscious learning environments.

Sub-theme 1: Prioritizing Process over Outcome. Inquiry as subversion and resistance often manifests through a commitment to prioritizing process over outcome, a sentiment echoed by many participants frustrated with institutional norms of content delivery and grading. This perspective is reflected through the value and emphasis placed on skill development over content memorization. In contrast to traditional educational environments, facilitators view inquiry as *“a space for students to develop skills”*, and they regard the *“interpersonal”* and *“life-long learning skills”* that inquiry fosters as more important than reaching predefined academic benchmarks. For example, while discussing their view on traditional memorization based courses, participant 13 commented: *“I have this analogy of baby birds on a conveyor belt and you cram food down them and then they barf it back on the exam. I hate it! [...] I wanna break that down!”* (P13) In alignment with this sentiment, participant 16 noted:

“Some of the most important elements of [my] sensibility are relinquishing a hyper focus on content. That there’s a particular set of stuff that must be covered. And sort of rejecting this idea of “coverage” as the goal.[...]That’s probably one of the biggest barriers– that people have an unexamined assumption that there are certain things that students must know; content that students must know in order to warrant getting a degree in a particular area. And I think that’s a place where we really need to interrogate.” (P16)

This is not to say that content is not important, but rather to emphasize that the process of learning content is deserving of merit as well. Further nuancing this point, participant 15 shared the following:

“I’m not trying to say the content is irrelevant, it’s actually quite important. But to me, the fundamental things that I hope are coming out of this are capacities to ask

important questions in meaningful ways, to come up with useful evidence that you can kind of work with in critical and careful and nuanced ways, to think about responding to issues that matter in the world.” (P15)

In expressing their frustration with traditional models of content delivery and examination, many facilitators also recognized that knowledge isn't as static as traditional testing would imply, noting that the excessive emphasis on outcomes can hinder genuine inquiry and learning processes. This frustration caused many instructors to advocate for a cultural shift away from the pervasive focus on grades and content memorization within higher education. One participant even noted that if they were to go and start a new university, they would start a university where there's no grades. And while the aspiration of an institution for learning which is not driven by grades was recognized as a “*pipe dream*”, instructors discussed many active ways in which they choose to use non-traditional forms of assessment to reflect their commitment to prioritizing process over outcome. Instead of traditional assessment methods that measure outcomes such as test scores, participants discussed their use of assessment strategies that align with their emphasis on learning skills and the inquiry process. These assessments include qualitative feedback from instructors, self-assessment, peer-evaluation, and pass/fail grading. It was often noted that redesigning assessment in this way intentionally refocuses student's sense of worth on internal sources of motivation, as opposed to external sources such as grades. While discussing their choice to make several assessments pass/fail, participant 12 noted:

“When you actually think about it, you're still so limited within your current system to use the grade as the carrot, and that's an extrinsic motivator. What inquiry is is about intrinsically motivating students to be curious and work together, to get closer to some sort of understanding of whatever the question is. And that's an intrinsic motivator! Extrinsic motivators are so limited, and they have an expiry date, because then you're always looking for the next hit. The next A+.” (P12)

Elaborating on this point, participant 16 commented:

“Ideally [education] involves the student also defining learning on their own terms. Defining their success and their progress on their own terms. What's important to them? Have they achieved the things that are important to them? Not as opposed to what's important to me, but, at least in dialogue with support from me.” (P16)

While grades are still tied to the assessment strategies, participants’ emphasis on process-oriented assessment methods reflects an attempt to prioritize learning skills and intrinsic motivation over only focusing on grades as the ultimate measure of success. By implementing a process-oriented approach that encourages students to explore, question, and discover without being solely driven by extrinsic motivations such as grades, participants highlighted intentional efforts to challenge traditional norms within higher education, and this intentional shift towards supporting the process of learning over the end product, further strengthens the argument for a connection between IBL and subversion/resistance.

Sub-theme #2: Challenging Power Dynamics. Participants often discussed how they used their teaching practices as means to intentionally challenge existing power structures. Take, for example, the movable room set up that was discussed in theme two. In addition to facilitating communication, facilitators also viewed a movable open classroom as means to disrupt the power imbalance that exists between instructors and students. Participant 4 noted:

“And so I think you need to have that collaborative seating, because it physically sends a message to other students to say, okay I'm looking to you for questions and answers. And then it makes the facilitator an equal member of that conversation, right? There's still a power differential there, but it does something to disrupt that power differential.” (P4)

This point was further reinforced by participant 24 while discussing the features they associated with an inquiry classroom.

“Part of it is trying to dismantle pre-existing hierarchies in my framework. I do think that there are politics of space that we need to pay attention to. I think most of the inquiry-based learning courses that are happening in the social appliances happen in an active learning classroom and so they are already set up in these circle pods. And so it's less sort of a sage on the stage professing to you from a 3 foot high podium or whatever it is. So yeah, there are spatial considerations.” (P24)

By removing the physical manifestation of hierarchy that is usually reinforced by having the instructor stand at the front of the room, there is increased interaction and shared ownership of the learning space among both students and facilitators. In addition, facilitators's emphasis on fostering critical thinking, multi-perspective learning, and learning skills is intricately connected to their desire to challenge power dynamics within education where instructors usually hold all the answers.

“In traditional pedagogies, the instructor essentially determines or prescribes a course. Everything: readings, assignments, assessments. Students have very little, if any choice. And so it creates a hierarchy, a very strong hierarchy between instructor and students. [...] And I think what inquiry-based environments do is they really reduce that power difference. Even though that will always exist. Even if you change the title from ‘instructor’ or ‘professor’ to ‘facilitator’, it will still exist due to systems, due to hierarchies, due to histories. But, I think what we try to do is, we invite students into the learning process. [...] Even though there are parameters, the students can take the course wherever they want, I don't dictate it. I don't say you have to do this. You don't have to study this, you don't have to do a project based on the topics that I'm interested in. You work with your groups, you generate a question you're interested in, and then you run with it.” (P19)

By encouraging critical thinking, instructors empower students to question established knowledge and authority, thereby challenging traditional power structures that prioritize the authority of the instructor. Similarly, promoting multi-perspective learning allows students to recognize and question diverse viewpoints, undermining hegemonic narratives

and fostering a more equitable and inclusive discourse. Highlighting this point, participant 1, 5, and 24 shared the following.

“I think education is such an important aspect in [REDACTED] health because it is so stigmatized. It is very political, and it's a very uncomfortable subject to talk about. So if you put it in a structure in a curriculum, and you get students who are very interested in it, and you have them view things from maybe different perspectives they hadn't considered, I hope to kind of break down those barriers.” (P1)

“And with that I think [inquiry] opens up opportunities for students to share their own approaches. I might come in with a bias because of who I am, my experiences and upbringing, my educational background, and students who have their own experiences can come forward with their own questions, their own ideas, and their own theoretical perspectives on a topic. I think that's really neat and powerful, especially in a group context. I find that all too often - and maybe this is more of a Western philosophy of education - but, I think especially in STEM we focus a lot on that didactic learning experience. And one of the problems with that is, it doesn't allow for much of the student perspective or their theoretical underpinnings to be brought into the classroom. It's mainly just me, in my position of dominance, being like ‘this is how we're gonna learn.’” (P5)

“And I want to learn more and more about inquiry-based teaching and learning because I do see a lot of connections to decolonizing the university. So issues of equity, I see as directly connected to inquiry.” (P24)

Additionally, in decentralizing themselves as the holder of knowledge, instructors empower students to take ownership of their education, shifting the balance of power away from the instructors and towards the students.

“I think the unlearning came when I let go of the power a little bit, and I really started to embrace that I am a facilitator more than I am somebody throwing content at someone. I am not necessarily the knowledge reservoir. I am more helping them acquire that knowledge or find sources or ways to learn. [...] And the unlearning really came when I let go of the power. I need to be respected, but I don't need to hold all that power, and be that unending flood of knowledge, right? I am here to encourage, to build a passion and a fire in students so they want to do this, that this is fun, that this is meaningful, that is exciting, it's cutting edge.” (P10)

“In traditional pedagogies, the instructor essentially determines or prescribes a course. The readings, well actually everything, readings, assignments, assessments. Students have very little, if any choice. Right? And so it creates a hierarchy, a very strong

hierarchy between instructor and students. And this is actually quite related to what [REDACTED]. And I think what inquiry-based environments do is they really reduce that power difference. Right? Even though that will always exist. Even if you change the title from 'instructor' or 'professor' to 'facilitator', it will still exist due to systems, due to hierarchies, due to histories.” (P19)

Overall this theme reflects the subversive motivations to challenge existing structures of power that underpin the inquiry-based practices of many instructors.

Chapter 4 Discussion & Conclusion

4.1 Challenges of Inquiry-Based Learning

"Time was just one of the factors that prevented this class from becoming a learning community. For reasons I cannot explain it was also full of "resisting" students who did not want to learn new pedagogical processes, who did not want to be in a classroom that differed in any way from the norm. To these students, transgressing boundaries was frightening. And though they were not the majority, their spirit of rigid resistance seemed always to be more powerful than any will to intellectual openness and pleasure in learning." (hooks, 1994, p. 9)

While instructors expressed passionate support and appreciation for inquiry-based learning, they were candid about the numerous challenges they face in practice. For starters, a significant hurdle discussed by participants is the initial reluctance from students to embrace an approach which departs so drastically from traditional education. Illustrating this challenge, instructors observed that students often struggled to "buy in" or recognize the value of inquiry-based learning when they are new to this approach, as they are accustomed to being given information to memorize rather than actively engaging in the learning process. It was noted that this resistance can lead to frustration and discomfort among students, thus highlighting the need for patience and perseverance in fostering a culture of inquiry and emphasizing the importance of introducing inquiry-based learning early and maintaining this approach through students' undergraduate careers.

Moreover, while many instructors discussed engaging in preparatory reading of literature on inquiry-based pedagogy to prepare for their roles, it was often said that understanding inquiry-based learning and all that it entails often comes through hands-on experience and mentorship from peers. For instance, it's easy to read that you need to

come into a classroom with a student-centered mindset; however, participants often noted that it takes a lot of self-reflection, restraint, and unlearning to let go of one's ego and the perception that the instructor should fill an authoritarian role. Thus, the experiential nature of inquiry makes it difficult to provide formal training to those new to this approach. This underscores the importance of ongoing mentorship and collaborative learning experiences, echoing the findings of Spronken-Smith et al. (2011), who highlighted the valuable role of mentoring in supporting educators transitioning towards student-centered teaching philosophies.

Finally, many instructors discussed the institutional hurdles facing inquiry-based learning. As highlighted in the final theme, instructors perceived inquiry as means to challenge established institutional norms and expectations. However, the reality persists that these programs operate within larger social and systemic structures in which traditional educational practices are the norm. Consequently, as was previously discussed, the importance of leadership and programmatic support emerged as a recurring topic of discussion with many instructors asserting that the sustained success of inquiry-based programs can be attributed, in part, to the backing they receive at an administrative and program level, which from their perspectives, serve to offset the educational expectations that are often influenced by institutional norms. Thus, the findings of this study highlights the importance of senior management support, as well as the integration of inquiry philosophy throughout entire programs, as emphasized by Spronken-Smith et al. (2011).

“I’m a visual person. So I’m thinking about a cartoon right now, and you know those cartoons where the walls are closing in, and the little cartoon character is like holding the walls apart to do whatever, that’s how I feel leadership in BHSc is, in order to support inquiry. The structures and systems across the university are not supportive of

inquiry, in the full realization of what we're talking about. Because the structures and systems are developed by capitalism and colonization, and the patriarchy and so they're about efficiency and productivity and the product, not the process. Like, it's all the systems, this isn't a judgment about a person, this is just what we're living in. And so what I feel like leadership does for facilitators is hold those systems, hold a space for those systems, so that inquiry approaches can flourish. And without that leadership holding the systems at bay, going to bat for facilitators, you know, being creative about time and resource allocation to support a really deep inquiry approach, it's gonna be limited. Because the systems are always going to want it to be efficient, product not process, you know? As limited resources as possible, because they want to make as much money as possible, it's a business, it's capitalism. And once again, not a judgment, these are just the systems that we're all in. And so, I feel like really strong leadership is really central to ensuring that inquiry becomes a part of the culture.”(P12)

4.2 Inquiry and Ungrading

“Agency, dialogue, self-actualization, and social justice are not possible (or at least unlikely) in a hierarchical system that pits teachers against students and encourages competition by ranking students against one another. Grades are currency for a capitalist system that reduces teaching and learning to a mere translation. They are an institutional instrument of compliance that works exactly because they have been so effectively naturalized.” (Stommel, 2020, pp. 27–28)

The practice of ungrading is a movement that has been embraced by a number of educators and represents a shift away from traditional grading systems towards methods that prioritize student- and learning-centered evaluation. Rather than relying exclusively on grades, it emphasizes collaborative goal setting between students and instructors, placing more emphasis on the learning process rather than a numerical assessment (Rapchak et al., 2023). There isn't a one-size fits all approach to ungrading, instead instructors have various methods they can use to implement the approach in higher education (Blum, 2020; Stommel, 2020). These methods include providing qualitative feedback in place of grades, self-evaluation, and contract grading. While inquiry-based learning and the ungrading movement are distinct concepts, the discussions highlighted in chapter 3.4 demonstrate that at McMaster, instructors employing IBL often share

sensibilities with the principles of ungrading and their opinions reflect a shared commitment to the deconstruction of traditional educational norms. This alignment is evident in instructors' emphasis on skill development over content memorization, their critiques of the pervasive focus on grading in higher education, as well as their rejection of traditional assessment methods in favour of qualitative feedback, self-assessment, and pass/fail grading. This suggests that although IBL and ungrading are not synonymous, elements of ungrading are deeply intertwined with the practice of inquiry-based pedagogy at McMaster University.

4.3 Inquiry and Critical Pedagogy

“Critical teachers, therefore, must admit that they are in a position of authority and then demonstrate that authority in their actions in support of students. One of the actions involves the ability to conduct research/produce knowledge. The authority of the critical teacher is dialectal; as teachers relinquish the authority of truth providers, they assume the mature authority of facilitators of student inquiry and problem posing. In relation to such teacher authority, students gain their freedom — they gain the ability to become self-directed human beings capable of producing their own knowledge.” (Kincheloe, 2008, p. 17)

Critical pedagogy is an educational approach that aims to empower learners to critically examine and challenge societal norms, power structures, and injustices, with the goal of promoting social justice and equity (Giroux, 2018; Tewel, 2015). Rooted in the work of Brazilian educator Paulo Freire, critical pedagogy emphasizes the importance of dialogue, critical thinking, and praxis – the integration of theory and practice – in education (Freire, 1970); it seeks to develop students' awareness of social, political, and economic inequalities, encouraging them to become active agents in their own learning and advocates for changes within their communities. Scholars like bell hooks (1994) have

further contributed to critical pedagogy by emphasizing the importance of creating inclusive and empowering learning environments that recognize the intersecting identities of students and promote dialogue and collaboration as central to the learning process.

Inquiry-based pedagogy and critical pedagogy share common ground in their emphasis on active learning and student engagement (Freire, 1970; Mahony et al., 2003). Inquiry-based pedagogy promotes curiosity and encourages learners to explore concepts through questioning and investigation to develop an understanding of the subject matter (Friedman et al., 2010; Spronken-Smith & Walker, 2010). Similarly, critical pedagogy encourages active inquiry, but it also integrates a broader examination of social issues such as race, class, gender, and privilege (Giroux, 1994, 2005, 2018). To summarize, while IBL and critical pedagogy both promote active learning, critical pedagogy expands this approach to include a focus on social justice and equity, challenging power structures and encouraging students to critically analyze societal norms and injustices. Thus, while inquiry-based pedagogy serves as a valuable component of critical pedagogy, the latter encompasses a wider scope, incorporating not only intellectual development, but also social consciousness and a commitment to social change.

While inquiry-based pedagogy does not necessarily have to contain elements of critical pedagogy, the data collected from this study highlight that at McMaster, instructor perceptions of inquiry-based learning are grounded in foundational principles of critical pedagogy. Literature on inquiry-based learning already emphasizes its focus on student-centered learning, active engagement, and critical thinking (Aditomo et al., 2013; Justice et al., 2007; Levy et al., 2010); however, the themes presented in chapter four

collectively portray a culture of inquiry in which instructors care deeply about fostering agency in students by providing them with freedom to explore and challenge the unidirectional and hegemonic nature of traditional education. The generated themes also demonstrate instructors' explicit efforts to dismantle existing power structures within higher education and to use IBL as means to encourage students to “break down their prejudices” and become “better citizens”. In this way, inquiry-based learning, as perceived by instructors at McMaster, aligns with the some of the fundamental goals of critical pedagogy, which broadly aim to empower students to question dominant narratives, critically analyze societal structures, and advocate for social justice (Giroux, 2018; Tewel, 2015).

As was discussed by participants, inquiry is also understood by many as not so much an approach, but as a collaborative learning environment where students are encouraged and feel safe to share perspectives, challenge assumptions, and engage in dialogue with each other and instructors. Such environments cultivate a sense of community and respect for diverse viewpoints, mirroring bell hook's vision for education as a space for democratic participation, critical thinking, and dialogue. In her book *Teaching Community*, hooks (2003) emphasizes the importance of creating inclusive and democratic learning spaces where marginalized voices are heard and where differences are respected and celebrated. Additionally, hooks highlights the significance of collaborative learning activities, such as group projects and peer-led discussion, which encourage students to work together towards common goals and learn from each other's experiences (2003). This echoes the perspective of inquiry instructors at McMaster, who

also highlighted the importance of collaboration, group-work, and learning from the experiences of others. Hence, these examples illustrate instructor perspectives of inquiry at McMaster align with critical pedagogy, as both emphasize the importance of fostering dialogue, and community in an educational environment.

Lastly, participants often demonstrated a mindful and praxis-oriented approach to their teaching practices, as reflected in their responses. As is illustrated in theme 1.2, participants emphasized the importance of being conscious of the perspectives they bring into the classroom and the role they play in the inquiry process. In addition, theme 1.2 highlights participant recognition of the importance of being able to adapt the direction of class, based on the interests and needs of their students. This consciousness aligns with the principles of critical pedagogy, as it encourages educators to be reflective and aware of the power dynamics in the learning environment and to use one's position of authority to support students (Kincheloe, 2008). Moreover, many participants discussed how critical pedagogy scholars such as Paulo Freire, bell hooks, and Henry Giroux have influenced their teaching practices, as well as their efforts to integrate these scholars' theories into their teaching methods. By putting theory into practice, participants describe their efforts to actively resist traditional education norms and power structures, as is illustrated in theme four. These efforts illustrate instructors' commitment to incorporating insights from educational scholarship into their teaching practices, echoing the praxis-oriented approach advocated by critical pedagogy (Freire, 1970).

To summarize, while inquiry and critical pedagogy are not synonymous, and while participants may not all explicitly identify their inquiry practices as 'critical pedagogy',

instructor values, practices, and goals highlighted in this research reflect a convergence with the broader goals of inquiry-based pedagogy at McMaster and critical pedagogy. More generally, this indicates that while inquiry-based pedagogy and critical pedagogy may exist as different different pedagogies, they often intersect in their underlying principles and aspirations.

4.4 Strengths and Limitations

The first strength of this study is the inclusion of participants from multiple programs at McMaster University. Including participants from five different programs helped to ensure a diverse sample which enriched the breadth of perspectives captured in this study and helped to provide a more comprehensive understanding of IBL at McMaster. Secondly, direct engagement with participants through the use of semi-structured interviews helped to foster strong rapport with participants, facilitating candid and detailed sharing of experiences and insights. Furthermore, the study employed multiple strategies to increase its credibility, including the documentation of an audit trail and the involvement of multiple researchers. These measures not only ensure the reliability of the data, but also provide transparency and rigor in the research process. Overall, these strengths contribute to the study's methodological rigour, and strengthen the validity of its findings.

The limitations of this study pertain primarily to the generalizability of the findings. Firstly, the participant demographic was unequally distributed among the included programs. Notably, instructors from the BHSc program represented the majority of the participant pool, with representation from the program accounting for 17 of the 26

interviews. While this may result in a lack of depth in understanding how inquiry varies across programs, this study does not aim to explore program-specific differences in how instructors understand IBL, but rather, to provide a holistic representation of how IBL is understood by instructors at McMaster. Furthermore, having been conducted only at McMaster University, the study's context specificity raises concerns about the transferability of results to other institutions. Additionally, time constraints during data collection also presented challenges. The timing of this study resulted in the majority of the interview timeline overlapping with the fall and winter academic terms, in which many of the potential participants were engaged in teaching responsibilities, which many have limited the availability of and responses from potential participants.

While this study has limitations related to generalizability, primarily due to the uneven distribution of participants among programs, and its context specificity to McMaster University, it nonetheless provides valuable insights into how instructors understand inquiry-based learning and factors associated with its sustainability. Further research addressing these limitations could enhance our understanding of inquiry-based pedagogy across diverse educational contexts.

4.5 Key Messages and Concluding Remarks

This thesis aimed to explore and articulate the ways in which instructors at McMaster University understand inquiry-based pedagogy and identify factors contributing to its sustainability. This study contributes to the literature by providing insights into effective IBL practices and enhancing our understanding of this approach in higher education. This investigation revealed that instructors at McMaster University

perceive inquiry-based learning as a pedagogy that should foster holistic development, grant students freedom to explore, and requires flexibility, humility and active engagement on the part of the instructor. Analysis also revealed the importance of both the physical and social environment in fostering IBL. In addition, many parallels were found between participant description of IB and critical pedagogy. Lastly, this research highlights the broader implication that systemic supports, such as curricular design, collaboration among staff, and support from administration are crucial for the long-term sustainability of IBL. These findings emphasize the pivotal role these elements play in fostering success not only at McMaster, but also in implementing and maintaining IBL across post-secondary educational institutions.

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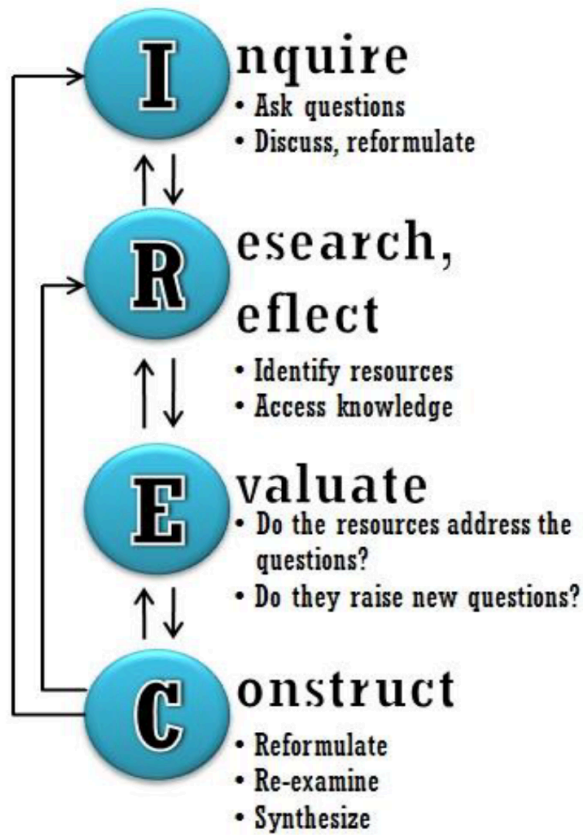
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Appendix A

IREC Method



Appendix B

Seven Ps

Note: The descriptors included for each P are only a few examples and not an extensive/comprehensive listing of all possible ways in which a skill can be demonstrated.

Personal Awareness

The ability to understand yourself and how your behaviour impacts others.

- Being emotionally present, fostering a sense of self
- Self-organization (managing your attention, priorities, tasks, and school/work/life balance)
- Understanding your experience of uncertainty - gaining comfort with it, meeting uncertainty with courage and compassion, for yourself and others.
- Understanding personal values and biases
- Developing personal insight
- Reflecting on your impact on others

Problem Identification

The ability to identify, ask and refine questions

- Recognizing what needs to be addressed and to whom it applies
- Learning how to ask meaningful questions
- Finding the factors that are contributing to the situation

Problem Solving

The ability to determine what needs to be learned in order to answer questions, identify appropriate resources for learning, and use them effectively.

- Information literacy skills (being conscious of the research process as it takes place)
 - Identifying sources of information, in the library, collection, on the web, from experts, etc.)
 - Evaluating information content and context
 - Using information appropriately to answer a question
 - Reflecting on and evaluating the research process
 - Constructing and deconstructing knowledge

Professional Communication

The ability to communicate effectively and appropriately including:

- With peers, faculty, staff, parents, community members, etc.
- Verbal, nonverbal, and written forms

Peer Collaboration

The ability to work effectively with others

- Working with another person and a group
 - Identifying individual and group strengths and potential areas of growth
 - Dividing responsibility
 - Following through
 - Teaching each other and learning from each other
 - Giving and receiving constructive feedback
 - Dealing with conflict

Personal/Peer Evaluation

The ability to evaluate strengths and potential areas of growth of self and others (formally, informally and often)

Promoting and Creating Community

The ability to foster community

- Appreciating diversity and inclusivity
- Supporting each other
- Recognizing, acknowledging and respecting perspectives of others.

Appendix C

Critical Autobiographical Narrative

Overview

Situating the researcher is an important step in fostering reflexivity and transparency. As is emphasized by Lincoln and Guba (1985), understanding the researcher's background, biases, and perspectives is an important step in contextualizing research findings. By openly discussing one's own positionality, researchers allow readers to assess the potential influences on the research process and findings, enhancing the credibility of the work. Moreover, situating the researcher also promotes reflexivity, encouraging critical self-examination to identify and mitigate potential sources of bias (Finlay & Gough, 2008).

In this section, I will detail my own background, experience, and perspectives as the researcher undertaking this qualitative study. In doing so I will discuss how my personal and academic background may influence the research process. Furthermore, I will reflect on my motivations for conducting this study, and any potential biases, or assumptions I may hold that may influence the results.

Situating the researcher

It's been interesting to reflect on the evolution of my relationship with inquiry over the years. Funnily enough, while I view this topic in a much different light now than I did when I was a first year BHSc student experiencing this pedagogy for the first time, the word I would use to describe my experience with inquiry remains the same – rollercoaster.

In order to properly contextualize my relationship with inquiry, allow me to take you back to my first week as an undergraduate student in the BHSc program. Like many first year students, I had carefully planned out my course syllabus - the result of daily visits to my enrollment page, hoping that free spaces had opened up in the electives I wanted. At this point I had tried my best to prepare for that first week of class, there was, however, one three hour block in the middle of my timetable which remained a mystery, that course was called “Inquiry 1E06”. I remember asking upper year friends and welcome week reps what I should expect from this class, but to my frustration, I was only ever met with the same answer, “*it is what you make of it*”. Hearing this over and over again throughout welcome week became a joke, but as a type A, overplanning eighteen-year-old who was already disoriented by the major life change that is moving away from home, this provoked a lot of frustration. *Don't worry, I thought once you start the class, the instructors will tell us everything we need to know.* I could not have been more wrong.

In that first class, my classmates and I - 16 of us in total - walked into a small tutorial room uncertain of what to expect. We arranged ourselves in a circular formation and waited patiently for the instructors to begin class, but to our disappointment, they didn't say anything, they simply took out their notebooks and looked around the circle. The silence persisted for what felt like hours, until one of my classmates broke the silence. I can't remember exactly how we spent the remaining class time, but I do remember that it involved brief moments of conversation book-ended by long,

uncomfortable silences. After this class I recall going back to my dorm room and ranting to my roommates about how much I hated the course. As the semester progressed, there would be good weeks in which I really enjoyed the conversations I had with peers, and other weeks that left me close to tears. Like I said - rollercoaster. During that first semester I would complain to my friends with the same arguments I often hear from students now: *“why can't they just teach us what we need to know?”*, *“why are we paying for a class that we run ourselves?”*, *“when are we going to actually learn something?”*, *“how am I supposed to do well in this course?”*

At that point it wasn't hard to tell that I was not a fan of this class. Of course, in hindsight I realize that we were never as lost as I felt we were. When I re-read the course outline now and look at the skills that inquiry was aiming to foster - known as the 7Ps - I can see that I had evolved substantially throughout that course; I was simply too caught up in my frustration about what I thought the course should be to see the value in what it was - a space for us to experiment, learn how to collaborate, work as a collective, and set our own learning objectives.

The gift of time and reflection since then has allowed me to realize that the frustration and anger I harboured toward this course and IBL in general was a response that stemmed from fear. Up until that point, I had spent 12+ years learning how to be a 'good student.' It was simple: academic success was achieved by memorizing as many things as possible, and in response to this rote memorization I would be rewarded with a good grade. Of course, not all my courses were set up in this way – aside from science and math I would fill my schedule in high school with music and French literature, both

of which provided plenty of opportunity to follow my own interests and ideas. But in my mind, science was different. Now that I had chosen to pursue a degree in Health Sciences, I thought I would have to lean on the skills that I had honed in my math and science courses - memorize and recite. But first year inquiry is not designed in such a way. While the course outline indicates the skills they hope you will develop, what you do in class and how you work on these skills in your daily life are completely up to you and your peers.

The key piece that left me frustrated was the fact that I had no idea how ‘well’ I was doing in the class. Of course, if I had taken the time to look at the 7ps and think about my evolution throughout the course, I would have seen that I was slowly progressing, but at the time, doing well for me meant getting good grades. I had built so much of my identity around achieving good grades and approval from instructors, and so in a course that didn’t offer tangible external validation, I felt lost. In every class I found myself looking to the facilitators for some sign that we were doing things ‘right’, seeking external validation that would never come.

At both the midpoint and end of this course, students were scheduled for individual interviews with our facilitators and tasked with creating an Evolving Skills Review in which we were to present evidence of how we had progressed in relation to the 7Ps, and how we aimed to work on them moving forward. Before my first interview I thought, *At last! We’ll present our evidence and they’ll finally tell us how we’re doing!* You will not be surprised to hear that this was not the case. Instead I talked through my portfolio, discussed my plan moving forward, and then *I* was asked how *I* felt I was doing

in the class. I was shocked! *How would I know? I don't have a pile of quizzes and tests to tell me how well I've done.* So I left both my midterm and final interviews feeling dissatisfied, however I didn't leave empty handed. After expressing my frustration in my initial interview, my facilitator gifted me two books, 1) *Pedagogy of the Oppressed* (Freire, 1970), and 2) *Teaching as a Subversive Activity* (Postman & Weingartner, 1971). Now the poetic way to end this passage would be to say that I went home, read these books, and suddenly had a newfound appreciation for inquiry-based learning. This was not the case. In fact, I didn't read those books until nearly 4 years later, when I was reminded of these books while conducting interviews for the present study.

Despite my feelings towards the course in first year, I decided to become a peer tutor for the course in my final year of undergrad. You may be asking, *wait, if you left the course hating it, why would you choose to go back as a peer tutor?* And to answer that briefly, I had an “aha” moment. In the numerous discussions I've had on the topic of inquiry over the years, I've often had the privilege of hearing from folks about their “aha” moments about inquiry -- that is, the moment when something finally clicks and you suddenly understand the value of inquiry-based approaches. For me, that moment came at the end of my second year in a course called Inquiry II - Cell Biology. In this course we were divided into tutorials and put into groups of five, and while the details are blurry, I recall that every two weeks we had to submit a report, outlining everything that we had learned about our topic, followed by a 30 minute presentation the following week. The facilitator never said *You have to learn this, or, We expect you to do X Y Z.* So my group and I set out to learn as much about our topic as possible. And so, week in and week out

my group would meet to discuss our findings, share our thoughts, teach each other, and get lost in the roles of osteoblasts and WNT pathways. Once the course was done, I realized not only how much I loved the freedom we were given to explore, but how much I loved working with my group. Everything seemed to click into place: our communication, our ability to give and receive feedback, our ability to delegate and collaborate. In this group I truly felt like we were there to support each other's learning, and I finally saw the skills we had been developing the year prior put into practice. No one was telling us what we had to learn; however, that was no longer a source of fear, but opportunity. Not only that, but I felt like I was more connected to my learning than ever.

My third year in the BHSc program is full of experiences just like the one I've highlighted above. It was this new-found appreciation for inquiry, and for the skills that I had learned in first year that prompted me to apply to become a peer tutor for the first year inquiry course. In this role I gained a deeper appreciation for the value of the skills being fostered, and the genuine care for students that was modelled by my facilitator. I felt incredibly fulfilled in this role, and in the process of learning about group process, I developed an even greater interest in learning about the pedagogical foundations of inquiry. This interest ultimately led me to apply to the HSED program; in my application, I wrote:

“The approach to health sciences education taken in the Faculty of Health Sciences at McMaster University asks students to identify what they would like to learn and puts the responsibility for seeking answers onto them. In this sense students are not confined by what they have to know but are free to explore what

they want and need to know, which, in my opinion, is an approach to education that fosters innovative and progressive thinking. Going through the BHSc program has changed who I am as a learner and a person, and I want to bring these skills that I've learned into my work as a MSc student in the HSED program so that I can contribute to a growing body of educational research which I believe will shape the future of health sciences.”

In situating myself as the researcher, I hope that the sharing of my experiences demonstrates that I do not approach this research with a neutral perspective on inquiry-based learning. As you have read, although I come into this research now with a supportive stance, recognizing the significant value inquiry holds based on personal growth and insights that I have gained through this approach, I did not start out as an appreciator of inquiry and in fact struggled to see its value when I first encountered it. However, my journey with inquiry-based learning, including those initial doubts and frustrations, gives me a depth of perspective on this topic as someone who is not approaching this research with a blind admiration for this approach. I have grappled with the challenges and limitations of inquiry-based learning firsthand, which allows me to bring a more nuanced and grounded understanding of its benefits and challenges. Lastly, by grounding my insights in both personal experience and critical reflection of the perspectives that I have held, I hope to add credibility to this research.

Appendix D

Recruitment Message

Dear colleagues:

I am circulating the invitation below to instructors in the BHSc program as part of a MacPherson Institute-funded study to examine the cultures of inquiry-based learning in different programs at McMaster on behalf of Michelle Fattori, an MSc student in the Health Sciences Education Graduate Program.

Your participation in the study is entirely voluntary, and your decision about whether or not to participate will have no impact on your employment or teaching assignments; the student investigator will not disclose the identity of participants to the program, and any identifying information will be removed from the data.

If you are interested in participating or would like more information about the study, please see the details of her invitation below. I hope you'll consider participating in the study and enjoy the opportunity to reflect on your teaching practice!

I am inviting McMaster University instructors teaching in the BHSc (Hons) Program, Arts & Science Program, or Integrated Science Program, or those who are involved in the development of the new Rehabilitation & Humanities Program to take part in an interview about their views about inquiry-based education. These interviews will form the basis of my Master's thesis for the Health Sciences Education Program at McMaster University.

Briefly, my study aims to examine how inquiry-based pedagogy is understood by faculty members, and how program cultures of inquiry emerge and persist in the university context. We are aiming to understand more about the diversity of perspectives on inquiry-based education and its implementation, and examine how shared visions of inquiry emerge and are sustained in a program. More detailed information is in the attached Letter of Information, and I am happy to address any questions you might have.

There are no significant risks in participating in this study. The interview questions pertain to your views and experiences in your professional role as an educator, and do not require disclosure of any personal or private information; we will provide these questions in advance of the interview for your consideration. Your participation is entirely voluntary and you may withdraw from the study at any time; your identity will not be known to anyone other than me, and identifying information will be removed from interview transcripts.

Please contact me by email (fattorim@mcmaster.ca) if you are interested in participating or would like any additional information.

Thanks in advance for your consideration!

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Appendix E


Excerpts from Audit Trail

1. Comments left on transcripts during phase one of thematic analysis.

[Participant 2] 11:57:30

Yeah, so those would be my reservations. But in terms of what I think of, I think it's the best way for, you know, adult learners actually. And it's well suited for adult learners who come, and it acknowledges what they come to, what they bring to the program, what they bring to the learning process. That they come not as a blank slate, but as people who know things and are ready to build on their knowledge.

[Michelle Fattori (she/her)] 11:58:00

 Michelle Fattori
Feb 3, 2023
acknowledges the student perspectives and knowledge

[Participant 4] 17:33:56


So obviously, obviously, I'm a fan! I think that it does a lot to disrupt- As a form of pedagogy in an institution, it does a lot to disrupt systems of oppression in the sense that institutions, as they have existed, have relied on a sense of power over learners in order to perpetuate their existence and justify their existence, right? We are the experts you need to come to us to learn something, right? "It is within 4 years that I will impart my knowledge on to you, my apprentice, and then you will leave as a fully formed human" right? And I find more traditional forms of pedagogy look at students as like "human becomings", not human beings themselves.


[Michelle Fattori (she/her)] 17:35:06

Mhmm!

[Participant 4] 17:35:08

Right. It's like you are not fully formed yet. You need to do, XYZ, in order to like quote unquote "be", right?

 Michelle Fattori
Feb 13, 2023
pedagogy of the oppressed

 Michelle Fattori
Feb 13, 2023
We are seeing the opposite here in BHSc. Look at interviewer C, who describes how they are only there because of the students. That profs only exist because of the students.

2. Reflective journal entries

a. Pre-interview notes P8

- *"I'm really nervous for this interview. I know I've had plenty of experience with the interview guides and all the interviews have gone well so far, but I think these nerves are stemming from the fact that I had [REDACTED] as a facilitator for [REDACTED]. Having had them as a facilitator I also feel like there's still a power imbalance. I know there isn't, but it feels like there is, which is making me uneasy. I still feel as though I have to "do well" in the interview to get a good grade."*

b. Post interview notes P8

- *"The interview went much better than I could have expected. Once I started getting into the groove of things I no longer felt nervous, and I found it easy to guide the conversation. Listening to this interviewer was really helpful in shedding light on the importance*

of leadership in building a rapport with instructors and a community among staff.”

c. Post interview notes P3

- *“After speaking with [REDACTED], it’s clear that there is a passion there that is not always present at the post-secondary level. At one point they compared the teacher-student relationship to that of a mother and child. In listening to them speak I could hear their dedication to education students, and I found this very heart warming. A few hours after the interview they sent me an email with a story about an elementary school teaching and the impact they had on a students life. There was an immense love for teaching and nurturing in this interviewee. I wonder whether this is something that I will see in other interviews. This interview also left me feeling validated in the work that I’m doing. The interviewer was very grateful for the opportunity to reflect on their teaching practices, and their appreciation in turn made me excited for my upcoming interviews.”*

3. Annotations left on transcripts while coding

And I went, hold up, if I was doing this because I needed to get an A plus, I would a hundred percent do the thing that was easier for me and felt like I'm more guaranteed good, excellent outcome that's going to get me an A+.

But because I don't have to worry about that, because it's pass/fail, I can do something that's more challenging that I'm not necessarily gonna get to that same level on, but I'm gonna learn more from it.

And I was like, *whoa*, like I really started to understand the ways that grades had distorted and shaped how I approached learning. And I could see that difference between the intrinsic motivation, the extrinsic motivation. That was a crucial moment.

Similarly, I was taking an inquiry driven perspective. He would let us know we needed to be. And by like, *look, I'm going for a good mark on a test*

So those two courses necessarily turned

Created: Feb 21, 2024 By: MF

Grading is antithetical to inquiry based learning. Because grades keep students fixed on external sources of validation.

Delete

is also a very fail course. And he thought we were motivated just here to get a

with moments that question the