PERCEPTIONS, FEASIBILITY AND ACCEPTABILITY OF MICRO-CREDENTIALS IN GLOBAL HEALTH GRADUATE EDUCATION

PERCEPTIONS, FEASIBILITY AND ACCEPTABILITY OF MICRO-CREDENTIALS IN GLOBAL HEALTH GRADUATE EDUCATION  
AN MSC THESIS

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**Lay Abstract**

Soft skills are personal attributes, behaviors, and psychosocial traits that individuals use in their interactions with others and the world around them. Micro-credentials are short, skill-specific learning modules designed to help students focus on developing specific, desirable skills. This project aimed to assess students' perceptions of micro-credential modules intended to enhance their soft skills. The findings indicated that micro-credential modules were perceived as an acceptable method for improving soft skills. However, time constraints were identified as a barrier to student participation. Students cited career advancement as the key motivator for engaging with micro-credentials. Further research is needed to understand the long-term impact of micro-credentials on employability prospects.

**Abstract**

***Background***

Global health presents a challenging environment involving multiple stakeholders with conflicting interests, necessitating soft skills such as incisive decision-making. Micro-credential modules offer an opportunity to equip global health students with these skills. Recognizing this, McMaster University's global health graduate program developed two micro-credential modules focusing on incisive decision-making and international collaboration. This study aimed to evaluate the feasibility and acceptability of micro-credentials as tools to enhance and assess learners' soft skills by examining students' perceptions and experiences.

***Methods***

Two asynchronous micro-credential modules focusing on the international collaboration and incisive decision-making skills were developed and piloted using Avenue to Learn (A2L). Pre- and feedback surveys, and interviews, were utilized to evaluate students' overall perceptions of the micro-credential modules. These methods also aimed to identify barriers to participation, offering insights into the factors that influenced students' engagement with the modules.

***Results***

The pre-survey received 15 responses, the feedback survey received 8 responses, and 3 individual interviews were conducted. The findings revealed that students were not familiar with the concept and purpose of micro-credential modules. The primary enrollment motivator was career advancement. However, time constraints and competing priorities were identified as significant barriers to participation. Students suggested that future modules could benefit from incorporating an in-person component to facilitate interactive discussions. Overall, micro-credential modules were perceived as an acceptable method for developing soft skills among global health students.

***Conclusion***

Micro-credential modules were identified as an acceptable and feasible method for enhancing students' soft skills. Time constraints were cited as a significant barrier to participation. To improve engagement, it is recommended that future modules be introduced before the commencement of the Global Health graduate program's academic coursework. Additionally, adopting a hybrid delivery approach is suggested, combining in-person interactive elements to facilitate direct interactions and idea exchange with an asynchronous online component to provide flexibility.

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**List of all Abbreviations and Symbols**

A2L: Avenue to Learn

CUGH: The Consortium of Universities for Global. Health

GME: Graduate medical education

CFIR: Consolidated Framework for Implementation research

FRAME-IT: Feasibility, Reach-out, Acceptability, Maintenance, Efficacy, Implementation, Tailorability

**Declaration of Academic Achievement**

The development of the incisive decision-making micro-credential modules has been developed by the author (Menna Komeiha) of this thesis under the supervision of Professor Deborah DiLiberto. The research work on which this thesis is based on was a joint effort between the author (Menna Komeiha) and another global health MSc student (Abby Tristani). The author (Menna Komeiha) conducted the qualitative data collection and analysis solely. The reported reflections, insights, and analysis are the product of the author’s (Menna Komeiha) efforts.

**Chapter 1: Introduction**

Working in the field of global health necessitates a diverse set of transferable skills, including the ability to collaborate effectively with peers from diverse backgrounds while maintaining cultural awareness. It also requires the development of incisive decision-making abilities, which are crucial for navigating high-pressure environments involving multiple stakeholders.

The MSc program in Global Health aims to equip students with these essential skills for a successful career. However, such competencies are seldom formally assessed, and their development is often dispersed across different courses. Micro-credentials have been reported as an acceptable method for professional development and have been successfully integrated within graduate programs. Offering students the opportunity to acquire and enhance these transferable skills through enrollment in asynchronous micro-credentials was therefore deemed an effective approach.

*Study Purpose and Rationale*

This study aimed to assess the feasibility and acceptability of employing micro-credentials as a pedagogical tool to enhance and evaluate learners' transferable skills.

The incisive decision-making micro-credential was designed to accommodate graduate students' demanding schedules, serving as a supplementary aid to enhance the skills learned during the 12-month MSc in Global Health program. Students were given the opportunity to complete the micro-credential after finishing their degree requirements. A pre- and post-survey design and focus group discussions were utilized to assess changes in students' perspectives regarding the acceptability of micro-credentials as a learning tool. Additionally, the micro-credential module included checkpoint quizzes to evaluate progress in enhancing students' transferable skills.

***Objectives and research questions***

*Objectives***:**

* To design micro-credential courses for graduate students on incisive decision-making and international collaboration
* To pilot the implementation of the micro-credential courses with Global Health graduate students and alumni
* To investigate the perceptions, acceptability and feasibility of implementing micro-credential courses within the Global Health program.

Research questions:

* What are the perceptions of graduate students in the Global Health program regarding micro-credential courses?
* To what extent is it feasible to implement micro-credential courses within the Global Health program?
* What is the acceptance rate of the micro-credential program among graduate students in the Global Health program at McMaster University?

**Chapter 2: Background**

The Global Health graduate program at McMaster University offers multi-institutional and transdisciplinary academic and research opportunities for aspiring global health professionals1. The program consists of two streams within the MSc—course-based and thesis—as well as a PhD stream1. By aligning with Sustainable Development Goals (SDGs) 3 (Good Health and Well-Being), 4 (Quality Education), and 17 (Partnerships for the Goals), the program aims to equip students with the necessary skills and experiences to transition smoothly into the job market1.

International collaboration is a key component, exemplified by the co-offering of courses with Maastricht University in the Netherlands1. Additionally, at the end of each academic year, students are provided the opportunity to attend a two-week symposium hosted by the Manipal Academy of Higher Education in India, where they can showcase their thesis projects and scholarly papers1.

The MSc in Global Health program seeks to prepare students for leadership roles in public health, health policy, philanthropy, and the private sector. Among the key competencies emphasized are international collaboration, entrepreneurship and accountability, cross-cultural intuition, and decisive decision-making1. Although these skills are woven throughout the program’s student-led learning approach, they are rarely subject to direct evaluation.

Furthermore, the emphasis on academic rigor and research skills may obscure or overshadow the development of these essential competencies. This recognition highlights the need for interventions to address this gap.

The focus of this micro-credential pilot project was primarily on the MSc program, with a long-term goal of integrating the micro-credentials into the MSc program’s offerings.

**The Post-Degree Conundrum**

Securing employment in the global health sector has proven to be challenging for entry-level job seekers. Prior research indicated that, out of 1,007 global health job postings, only 9.8% were designated for entry-level positions2. Employers primarily sought technical or subject matter experts, particularly in project management and HIV/AIDS, while also placing a strong emphasis on soft skills such as planning, communication, and management2. From the perspective of job seekers, 68.2% of recent global health graduates in the continental USA reported feeling that their academic training left them with limitations or gaps, particularly in areas such as new business development (25%), IT skills (17.5%), and project design and implementation (16%)3. This same group identified communication skills and project design/implementation as crucial for potential employers3. Additionally, employers were found to have higher expectations regarding applicants' soft skills, such as cultural sensitivity and collaboration, than what academic training typically provides3.

The literature underscores the persistent gap between employer expectations and the skill set of new global health graduates2–4. This discrepancy is not necessarily due to the absence of these skills but rather their marginalization in favor of rigorous academic training, placing graduates at a disadvantage when entering the job market.

To address this gap, we piloted a micro-credential project designed to enhance learners' international collaboration and incisive decision-making skills, with the latter being the focus of this thesis. These micro-credentials are strategically developed as short courses aimed at cultivating specific skills that are deemed desirable by employers, thereby providing learners with a competitive advantage when applying for positions in the global health sector.

**What Are Micro-Credentials?**

Micro-credentials are specialized certifications issued by higher education institutions to formally recognize a student’s proficiency in specific skills, knowledge, and competencies5. These credentials are designed to offer a flexible and time-efficient way for individuals to advance their expertise, often featuring shorter completion times compared to traditional diplomas and certificates and frequently being offered in an asynchronous format5. The popularity of micro-credentials is increasing among job seekers because they are tailored to address specific gaps and demands in the workforce, making individuals who possess them more attractive to employers6.

According to a report published in 2022 by the UNESCO, micro-credentials are designed to focus on a specific area of learning over a brief period, offering the flexibility to target either skills typically acquired in traditional educational settings or those that are tacit and transferable7.

For a micro-credential to be formally recognized, it must provide verifiable evidence of the learner’s knowledge, skills, or understanding and be grounded in clearly defined standards, awarded by a reputable institution8. Consequently, micro-credentials are distinguished from macro-credentials by their brevity, targeted focus, and alignment with the demands of the job market8.

In the aftermath of COVID-19, as life increasingly shifted towards virtual platforms, micro-credentials gained significant attention. Brown and Nic Giolla Mhichíl (2022) 9 described them as "the latest shiny new thing" in the realm of education, reflecting the growing interest among educational leaders. Notably, data revealed that 54% of the research on micro-credentials has been published within the span of less than the past eight years9.

As micro-credentials become increasingly popular in higher education, it is crucial to understand the strategic motivations behind their adoption. Adopting micro-credentials solely to compete with other institutions or out of fear of missing out may not be strategically sound, as these reasons do not contribute to the long-term sustainability of offering these credentials.

**Key drivers behind micro-credentials implementation and desirable outcomes**

A key driver for offering micro-credentials is to enhance the employability of graduates by enabling reskilling or upskilling, thereby improving job seekers' prospects in a rapidly evolving labor market9. Some literature also indicates that governments have leveraged micro-credentials to support job market recovery following the economic challenges brought on by COVID-196,9. Furthermore, from an economic standpoint, micro-credentials can generate additional revenue for educational institutions. HolonIQ (2021) estimates that the micro-credentials market could reach US$117 billion by 202510.

Economics play a crucial role in the rapid expansion of micro-credentials, as they allow institutions to attract a broader base of students, including alumni and international students, thereby increasing revenue11. By aligning with the evolving needs of the job market, micro-credentials also enhance the appeal of institutions to prospective students12.

Micro-credentials can also play a significant role in promoting lifelong learning, benefiting older adults, mature students, and individuals seeking career advancement6. According to Brown et al. (2021), 48% of articles on micro-credentials identified the promotion of lifelong learning as a key driver for implementing these programs 9. Additionally, micro-credentials have been used as part of socioeconomic equity initiatives, such as the European Pillar of Social Rights Action Plan, which aims to reduce poverty and enhance the accessibility of training and learning opportunities for a diverse range of learners13. Furthermore, micro-credentials are increasingly being incorporated into policy planning and implementation within the European Union, particularly with the goal of advancing the green agenda6.

Economic and social movements influenced drivers, in addition to the pursuit of attracting prospective students, institution might offer micro-credentials to enhance their reputation and prestige, and innovation13.

These reported drivers reflect competing priorities and may not align with the intended outcomes of micro-credential programs9. Micro-credentials pose a challenge to capitalist, neoliberal institutions by advocating laissez-faire principles, such as unrestricted access to higher education (given their significantly lower cost compared to full degrees), individual choice, and education as a personal commodity6. They foster an inclusive culture that supports lifelong learning and offers a more equitable approach to education that extends beyond traditional qualifications6.

**Micro-credentials and transitioning to the workforce**

The question of how employable graduates of global health programs are has been discussed in the literature, especially in light of concerns that the supply of graduates may exceed the demand for their skills4. In response, micro-credentials have emerged as a potential tool to enhance students’ perceived employability. Recent findings suggest that micro-credential learning significantly enhances students’ human capital—such as cultural, social, and scholastic capital14. Human capital was found to be a significant mediator in the relationship between students' perceived employability and the utilization of micro-credentials as a learning medium 14. In line with human capital theory, the value of micro-credentials appears to be demonstrated through their role in facilitating knowledge acquisition and competency development15. For both employers and students, the credential itself holds value15, which raises the question of what drives institutions to offer micro-credentials. One such driver seems to be academic prestige, which is leveraged by both learners and employers seeking to capitalize on it. Additionally, micro-credentials seem to motivate learners to exert greater effort in mastering the required skills15, which renders them better suited to the job market.

A mixed-method study investigating the impact of micro-credentials on learners' work readiness revealed that micro-credential learning environments had a significantly greater effect on enhancing learners' critical thinking, communication, and problem-solving skills compared to conventional classroom settings16.

Moreover, as micro-credentials often target skills that are directly relevant to the job market, students may be better equipped to identify alternative career pathways, develop career plans that are responsive to labor market needs, and acquire soft skills pertinent to their chosen careers14. By focusing on the specific competencies sought by employers, micro-credentials may help students align their learning experiences with industry demands, thereby improving their overall employability.

**Micro-credentials in Global Health education**

Although there is a scarcity of literature reporting on the implementation of micro-credentials in global health graduate programs and how students perceive this approach, a quick Google search reveals a growing number of micro-credentials in global health being offered by reputable academic institutions. This trend may signal the increasing popularity of this educational approach. Conversely, it is this lack of scholarly exploration that has inspired the development of this project.

**Micro-credentials and education reform discourses**

Micro-credentials have become integrated into various education reform discourses including reproduction discourse, reschooling, deschooling, and the reconceptualist discourse. The reproduction discourse assumes that educational institutions do not provide learners with equal opportunities but rather perpetuate cultural and social inequalities6,17. Reschooling assumes that the current traditional educational systems are in need for reform through prioritizing learner choice and undergoing digital transformation 6. The discourse of deschooling advocates for dismantling traditional education systems and replacing them with learner-centered approaches that grant individuals the freedom to decide what to learn and how to learn it18. This approach is often referred to as self-directed learning, emphasizing autonomy and personal agency in the educational process19. The reconceptualist discourse promotes a global perspective that critiques dominant Western standards in education20. It emphasizes the importance of contextualizing learning experiences by considering learners’ social and economic identities20. These discourses are important to consider when identifying and positioning micro-credentials within a graduate education framework. For instance, the reproduction discourse emphasizes creating a resilient workforce through mass education, social cohesion, and upskilling6. This discourse supports formal education, into which micro-credentials can be seamlessly incorporated. Another relevant discourse is reschooling, which focuses on reforming the traditional education system by providing learners with the freedom to pursue their interests and incorporating digital technologies6. Micro-credentials align with this discourse by offering digital, asynchronous formats that provide flexible learning options. Additionally, micro-credentials embody the concept of unbundling, allowing students to engage in specialized training based on their individual interests6.

However, the reschooling discourse has encountered skepticism despite its framing as a methodology for fostering new learning pathways and supporting learner choice6. Critics argue that micro-credentials, within this context, have not significantly deviated from the traditional degree framework6. These programs are perceived to perpetuate the notion of education as a personal commodity, measured primarily by employability and the ability to accumulate wealth through earned credentials6.

The deschooling discourse, which advocates for openness, personalization, and the democratization of the learning process, is associated with the concept of unbundling that is usually featured in micro-credential offerings. The deschooling prespective argues that traditional schooling is increasingly failing to offer significant life advantages6,21. However, it has been suggested that this discourse may not be well-suited for higher education institutions, as it is grounded in deregulation, libertarianism, and laissez-faire free market principles6.

The Reconceptualist discourse may be the most fitting within a global health framework, as it argues that lifelong learning fosters active citizenship and enhances societal participation6. This perspective supports collaborative, community-based approaches to research and interventions6. It operates under the assumption that higher education should address and dismantle inequalities and social injustice6. Moreover, the Reconceptualist discourse can be instrumental in shaping micro-credentials as tools to advance the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Education for All) and SDGs 5 and 10 (reducing gender and other inequalities)22.

Micro-credentials can be tailored to meet the needs of various stakeholders, raising important questions about why higher education institutions choose to adopt them and how these programs align with the institution's broader educational strategy. A starting point for addressing these questions could involve reflecting on what the institution considers to be beneficial for society, its vision for the future workforce, the target learner demographics, and the ultimate goals of providing education.

But where does the learners' perspective fit in? Most existing literature focuses on micro-credentials from the viewpoints of higher education institutions or the job market23. Researchers such as Oxley and van Rooyen (2021)24, Oliver (2021)25 and Schultz (2024)26 have emphasized the importance of incorporating students' perspectives in the development, design, and implementation of micro-credentials, along with utilizing a learner value framework. Although micro-credentials are marketed as a pathway to improved job prospects and a means of acquiring new skills and knowledge quickly, failing to integrate students' perspectives—particularly regarding the conceptualization of the material and its real value—could render these credentials as merely an educational trend27. Schultz (2024) found that students value the asynchronous delivery of micro-credentials, their short completion time, and the relevance of the skills and knowledge they provide for the labor market26. These findings indicate a student preference for micro-credentials that are fast, cost-effective, and high-quality, aligning with their needs in continuing education. The relevance to job market demands and employer expectations emerges as a key factor in attracting students.

**Advantages of micro-credentials**

Asynchronous learning opportunities emerge as a highly desirable feature of micro-credentials. This format allows learners to study at their own pace, integrate micro-credentials into their schedules, and access their education from any location, a concept known as learning mobility28. Learning mobility enables students to study from various locations and offers the option for exchanges, where students can spend time at institutions other than their home institution exchange28. Online learning has significantly enhanced learning mobility by connecting learners from around the globe, which can broaden students’ professional networks and potentially increase their employability29,30.

**Challenges associated with micro-credentials**

The asynchronous nature of micro-credentials, along with the lack of peer support and face-to-face instruction, may deter some students who prefer traditional classroom environments. Definitions of learning emphasize the importance of participation and social interaction. For instance, Lave and Wenger define learning as a process of participation in a Community of Practice (CoP)28. Another relevant concept is the Landscape of Practice (LoP), which compares participation in multiple CoPs to navigating a landscape, with learning being the path traversed within that space28. The LoP framework defines learning outcomes as the identities learners form while engaging with the learning environment. Within this framework, several modes of identity building are identified, including engagement, imagination, and alignment. Engagement refers to interacting with individuals within CoPs28. Imagination involves using cognitive abilities to reflect on existing ways of thinking, develop theoretical perspectives, and explore new possibilities. Alignment is a reciprocal process where learners reflect on and adjust their biases, perspectives, and interpretations to ensure that their actions align with desired outcomes31,32.

Learners play a lead role in the concepts associated with LoPs, thus highlighting the need for involving them in the design process of learning products to achieve desired outcomes 28. Co-design allows learners to collaborate with developers in the development of design concepts to build a product that has been tailored to the needs of the user through understanding users’ perspectives 28.

Micro-credentials offer learners certificates that attest to the acquisition of a predetermined set of skills through the completion of a learning pathway, which comprises various learning opportunities (e.g., modules or tools). The brief duration of micro-credentials presents a valuable opportunity for incorporating co-design principles, allowing users to provide feedback that can be addressed and tested within a relatively short timeframe 28.

To certify learners' achievements, micro-credentials frequently use digital badges, which are often generated automatically through third-party services like Credly28. Some certification platforms offer a learning pathway function that integrates various badges (in the case of multiple micro-credentials) to visualize learning trajectories and showcase the development of a learner’s skills28. Additionally, these platforms may provide the option to embed a digital portfolio28.

**Micro-credentials as part of McMaster’s Global Health Graduate program**

Considered to be a feasibility study, this project sought to explore how graduate students at McMaster University’s Global Health program perceive two micro-credential programs designed to enhance skills in incisive decision-making and international collaboration. Traditional conceptual methods of health education, along with recent research, emphasize that intervention strategies should be grounded in critical empirical evidence and possess the potential to achieve desired goals33,34. To determine an intervention's likelihood of meeting its objectives, assess its efficacy, and identify potential challenges and gaps, feasibility trials are employed33,35. These trials provide insights into whether an intervention should advance to subsequent stages. Moreover, feasibility studies serve to evaluate the acceptability of an intervention, guide resource allocation planning, and lay the groundwork for future large-scale implementation35.

In line with this, the current feasibility study was conducted with the aim of exploring the potential for full-scale integration of micro-credentials into the Global Health graduate program. Investigating students' perceptions was deemed essential in evaluating the acceptability of micro-credentials as a tool for enhancing soft skills. Within the scope of this project, students occupy a key stakeholder position, as they are directly involved in experiencing the impact of integrating micro-credentials into their educational journey. As the primary users of these micro-credentials, students are also the most qualified to assess their effectiveness.

The literature strongly advocates for the inclusion of student perspectives in education reform initiatives and in research focused on educational interventions36,37. Incorporating their views not only enhances the validity of feasibility studies but also ensures that the interventions are tailored to meet the learners' needs.

The study involved conducting individual interviews and administering pre- and post-surveys. These micro-credential courses were specifically developed for this project and represent the first offerings within the Global Health program.

***Overview of the thesis***

*Objectives:*

* To design micro-credential courses for graduate students on incisive decision-making and international collaboration
* To pilot the implementation of the micro-credential courses with Global Health graduate students and alumni
* To investigate the perceptions, acceptability and feasibility of implementing micro-credential courses within the Global Health program.

*Research questions*

* What are the perceptions of graduate students in the Global Health program regarding micro-credential courses?
* To what extent is it feasible to implement micro-credential courses within the Global Health program?
* What is the acceptance rate of the micro-credential program among graduate students in the Global Health program at McMaster University?

*Adjusted PICOT framework:*

* Population (P): Global Health graduate program students and a select group of alumni.
* Intervention (I): International collaboration and incisive decision-making micro-credential modules.
* Context (C): Global Health graduate program at McMaster University.
* Outcome (O): Feasibility of piloting micro-credential programs as part of the Global Health graduate program, students’ perceptions of the micro-credentials and changes in soft skills acquisition and acceptability of the micro-credentials approach.
* Time (T): Nine (9) weeks.

The following chapters outline the overarching philosophical and conceptual approaches underpinning this thesis, provide an overview of the development process of the micro-credentials, detail the methodological approach used to examine students' perceptions of the micro-credentials, present the acquired results, and offer a discussion of these findings. This discussion includes implications for future research trajectories and an acknowledgment of the limitations of this research project.

**Chapter 3: Philosophical Orientation and conceptual framework**

***Philosophical orientation***

As a researcher, I have chosen to adopt a critical realist stance, positing that reality exists independently of our perceptions and theories, a view consistent with realist ontology38.

Additionally, I acknowledge that individuals acquire different types of knowledge in varying ways depending on ever-changing circumstances, reflecting a relativistic epistemology39. Critical realism appeals by rejecting the notion that acquired knowledge is absolute and objective, acknowledging that a margin of error, internal and external biases, and differing perspectives can lead to alternative valid interpretations of any given phenomenon. As a result, all theories are viewed as partial, fallible, and incomplete40. In a scientific context, this perspective creates a crucial distinction between objectivist views, typically associated with quantitative approaches, and realist views40. While objectivism asserts that reality can be fully captured through a single, definitive method, critical realism posits that although reality is singular, there are multiple scientifically valid ways to understand it40.

In terms of realist ontology, reality exists independently of how researchers, participants, and others perceive, theorize, or construct it4140. However, from a critical realist perspective, the understanding, theorization, or construction of reality is shaped by the perspectives and standpoints of researchers, participants, and others4140. This approach can be described as a form of constructivism and relativistic epistemology, acknowledging that while reality is objective, our understanding of it is influenced by subjective interpretations and social contexts4140.

Critical realism offers a foundation for conceptualizing multiple possible future outcomes, a significant advantage for pilot and feasibility studies. While reality constitutes the only factual aspect of the real world, this world also contains non-actualized possibilities that can become real under different circumstances, leading to endless possibilities within an open system42.

Feasibility studies typically focus on assessing the practicality of implementing a particular intervention and may include evaluating factors that can facilitate implementation while addressing or mitigating challenges. As a result, they involve examining multiple possibilities and their likely outcomes to determine whether an intervention will produce desirable results and how certain factors might impact the intervention's implementation, acceptability, and effectiveness. Within the context of this study, the goal was to assess students’ perceptions of the piloted micro-credential modules and examine their acceptability. By adopting a critical realist stance, I recognized that the collected data reflect each participant’s reality, though they may not necessarily represent an accurate depiction of the factual aspects of the real world. This approach acknowledges that unknown factors and individual perceptions could have influenced how reality was perceived.

**Positionality statement**

In light of my critical realist stance, data analysis was conducted with the understanding that the collected information is not an objective, absolute representation of reality but is instead a product of the perceptions and experiences of both participants and researchers43. This approach allowed for a nuanced interpretation of the data, acknowledging the subjective elements that shape how reality is understood and reported.

As a critical realist, I employed reflexive thematic analysis to critically examine and account for my own biases and subjective interpretations of the acquired results. This approach enabled me to recognize and reflect on instances where my position and experiences as a graduate student influenced the construction of codes and themes. It also facilitated an awareness of how students’ perceptions were shaped by their individual circumstances and experiences, which were sometimes independent of their interaction with the micro-credential content.

While acknowledging the inherent fallibility of any human endeavor, I made every effort to adopt a neutral stance. Nonetheless, it is important to recognize that both my biases and those of the students inevitably influenced the process of generating codes and themes and the subsequent interpretation of the results.

***Conceptual framework***

A diagram of steps and steps

Description automatically generated with medium confidence

Figure (1): assessing students’ perceptions of micro-credential modules as a learning aid for enhancing soft skills conceptual framework that was utilized in the design, conduction and implementation of this research project.

*The components of the conceptual framework*

The conceptual framework developed for this project consisted of four key stages, implemented sequentially to effectively capture students' perceptions of the piloted micro-credential modules. The first stage, **design**, involved the collaborative development of micro-credential content by the author and the research team, employing a student-led approach (detailed in Chapter 4). The second stage, **piloting**, was particularly sensitive and time-intensive, requiring the team to enroll students in the modules, upload content to the Avenue to Learn platform, address technical troubleshooting issues, and monitor student progress. The third stage, **evaluation**, involved gathering student perceptions through pre- and post-module feedback surveys and conducting individual interviews with interested participants. Finally, the fourth stage, **recommendations**, focused on analyzing research findings and reflecting on them to guide the design and implementation of future micro-credential modules. This stage was heavily informed by participant input and the author's hands-on experience with the development and piloting process.

**Chapter 3: Incisive decision-making micro-credential module development**

**Development and design overview**

The development of the micro-credential module on incisive decision-making began in the winter of 2024 and took six months to complete. A conceptual framework (Figure 3) was developed to guide the development and design process. The Global Health Education Competencies Toolkit was consulted to identify specific competency areas relevant to fostering and enhancing incisive decision-making skills. The module content was developed to address each identified competency area, incorporating checkpoint quizzes and reflection questions designed to benchmark student progress and encourage self-assessment. The piloting phase utilized the Avenue to Learn (A2L) platform, chosen for its familiarity among students, as it is used for other graduate courses at McMaster University.

After students were enrolled in the micro-credential module, the author remained actively involved by providing technical support to ensure students could navigate the material without difficulties. Additionally, the author monitored students' progression through the module, ensuring that they engaged with and completed the assigned content. The micro-credential module concluded in September, by which time students had completed all components of the module. At the conclusion of the module, the author used the course admin tools (available through A2L) to generate a final progress report to document student engagement and completion rates.

A diagram of a process

Description automatically generated

Figure (2): Incisive decision-making micro-credential module development, design and piloting process.

The following section offers an overview of the theoretical and practical elements and processes that guided the development and implementation of this project. It begins by outlining the grounding framework that shaped the overall approach, followed by the identification and refinement of the learning objectives and goals that guided the module's content. Subsequently, it delves into the conceptual framework that informed the module’s development and the adopted learning theory. Finally, it provides a detailed description of the implementation process, including the design, piloting, and delivery of the incisive decision-making micro-credential module.

**Identification of grounding framework**

The Global Health education competencies toolkit44 was used to provide a grounding framework that shaped the basic structure of the micro-credential, which included competencies that needed to be addressed. The toolkit acted as a primary resource for curating academic sources through suggesting peer-reviewed articles, books, documentaries, and grey literature papers for each competency domain.

**Refinement of learning objectives and competencies**

After reviewing the toolkit, the author (MK) worked on listing and expanding the learning objectives and desired outcomes. The learning objectives and outcomes as derived from the competency’s toolkit were:

• *Learning Objectives:*

1. Identify key resources that aid incisive decision-making.

2. Employ leading decision-making strategies in global health.

3. Determine the importance of ethical considerations in incisive decision-making.

4. Analyze decision-making processes within a global health-related context.

• *Learning Outcomes:*

1. Explain the purpose of incisive decision-making in health-related environments when examining global health issues.

2. Describe fundamental incisive decision-making strategies that aid in evaluating various global health contexts when addressing global health issues.

3. Discuss the ethical importance of incisive decision-making in the field of global health when assessing complex and sensitive health problems.

4. Evaluate various global health scenarios to describe appropriate decision-making processes and strategies when assessing available resources and external factors to propose alternatives.

Based on the desired learning objectives and outcomes, the author (MK) selected core competencies from the competencies toolkit that were rationalized to be vital for enhancing incisive- decision making capabilities. The selected competencies included:

Competency 4c. - Integrate community assets and resources to improve the health of individuals and populations (Basic Operational Level)44.

Competency 5f. - Apply leadership practices that support collaborative practice and team effectiveness44.

Competency 6a. - Demonstrate an understanding of and an ability to resolve common ethical issues and challenges that arise in working within diverse economic, political and cultural contexts as well as working with vulnerable populations and in low resource settings to address global health issues44.

**Establishing expected learning goals**

Incisive decision-making (within the context of this micro-credential module) was defined as a skill that entails the capacity to promptly assess and gather relevant information and evidence concerning a particular problem, while considering diverse social, cultural, economic, and political factors. This process is rationalized to enable global health professionals to formulate clear, well-informed decisions and alternative solutions that are responsive to the complexities of the situation at hand.

The incisive decision-making module aims to equip students with the essential skills to proficiently employ decision-making strategies that consider the unique needs, characteristics, and available resources within the communities they serve. Emphasis is placed on fostering an awareness of the potential impacts of their decisions and ensuring the ability to propose alternative courses of action and contingency plans that directly address the dynamic nature of the global health landscape.

Upon completing the incisive decision-making micro-credential module, students were expected to have strengthened their ability to communicate complex concepts and findings clearly and effectively to diverse audiences, fostering understanding and collaboration. They were also expected to have increased their capacity to identify, analyze, and resolve intricate challenges in global health while incorporating social, cultural, economic, and political considerations.

Additionally, students were expected to have enhanced their proficiency in prioritizing and managing responsibilities, coordinating efforts efficiently to achieve desired outcomes, and applying ethical principles. This includes reflecting on personal and others' biases and understanding stakeholders' competing interests to ensure alignment with ethical values in decision-making and actions. The four transferable skills domains that cover these areas are: communication, problem solving, organizational skills, and ethical awareness.

**Identification of conceptual framework**

A diagram of a health diagram

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Figure (3): Global Health Micro-credentials conceptual framework that was utilized in the development of the Incisive decision-making module.

A diagram of a student learning process

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Figure (4): A closer look at the student-led, Interactive, and measurable sections of the utilized conceptual framework.

A diagram of a student's instruction

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Figure (5): A closer look at the accessible and results sections of the utilized conceptual framework.

*Conceptual framework components*

The conceptual framework for this project encompassed four key domains deemed essential for enhancing students' soft skills: a student-led approach, the inclusion of interactive elements, measurable milestones, and the adoption of an acceptable teaching methodology.

At the core of this project was the student-led learning approach, with the teaching material developed by two graduate students from the Global Health program. The students, in collaboration with supervising faculty members, identified relevant soft skills that were important to the program's students and considered desirable by employers. The student-led approach was selected based on literature, which suggests that it helps students better master learned concepts and improve retention of newly acquired skills and information45–47. Additionally, this approach has been reported to enhance learners' engagement with the material, empower them to apply critical thinking—crucial for informed decision-making—and foster a greater sense of independence46.

This approach aligns with the cognitive learning theory underpinning this project, which emphasizes optimizing cognitive load to enhance learning outcomes. The framework aims to minimize extrinsic cognitive load, which encompasses external distractions like noisy environments that hinder a learner’s ability to focus 48. It also seeks to manage intrinsic cognitive load, related to the complexity of the presented material, such as abstract concepts 48. By addressing these factors, this adopted approach facilitates an increase in germane cognitive load, which refers to the mental processes that enable learners to integrate new material into their long-term memory effectively 48 49. This balanced management of cognitive load ensures that learners can process, understand, and retain the learned skills more efficiently 49. The student-led model supports this approach by selecting material relevant to students, presenting it in a simplified manner, and incorporating a flexible structure that can be adapted to meet future learning needs.

The content was designed to appeal to a wide range of learning preferences and to maintain learner engagement in an asynchronous learning environment50–52. To achieve this, various approaches to presenting the material were employed, as recommended by the Consortium of Universities for Global Health in their CUGH Global Health Education Competencies Toolkit 44.

The developed content included PowerPoint presentations that were converted into video formats for enhanced accessibility, case studies that mirrored real-life scenarios, suggested reading materials for further exploration, reflection and discussion questions, and a selection of documentaries. To foster interactivity, the modules incorporated graded checkpoints and quizzes, as well as ungraded discussion board reflections designed to simulate in-class discussions among learners.

**Incorporating learning Theory**

The COVID-19 pandemic, along with the stringent public health restrictions it brought, led to a shift towards virtual education, making asynchronous virtual learning a long-term norm53–55. Recent literature has described effective ways of utilizing virtual learning within graduate medical education (GME)56–58. Although video recordings and asynchronous presentations have typically been used as supplementary tools, research suggests that incorporating them into GME could increase attendance rates, promote participation in continuing education courses, provide standardized exposure to educational content, and offer learners a convenient method of learning that accommodates busy clinical workloads and work schedules 56–58.

The cognitive load theory49, which underpins the design of the content for the incisive decision-making module, was chosen because it considers how internal and external factors influence learners’ information processing abilities. This approach supports the development of content that effectively manages cognitive load while maintaining learners' attention and engagement with the material.

According to the cognitive load theory, humans have a limited working memory and an unlimited long-term memory that stores schematized knowledge and experiences 49. The process of learning thus depending on constructing schemas and arranging gained information in them 48 59.

The Cognitive Load Theory 49, examines the processing of information by working memory and identifies three types of cognitive load: extraneous, intrinsic, and germane 48 59. Each of these cognitive loads plays a significant role in how learners engage with educational material and the extent of learning achieved 48 59. Extraneous load refers to processes that detract from the learning objective, often due to external factors such as distracting environments or unengaging instructional materials 48. Intrinsic load pertains to the inherent complexity of the material, such as when learners are presented with intricate, interrelated information 48. Germane load involves the cognitive processes required for integrating acquired material into long-term memory, thereby influencing the learner's ability to absorb and effectively utilize the presented information 48 49. Thus, minimizing extraneous and intrinsic cognitive loads is crucial for enhancing the germane cognitive load, which is essential for improving learning effectiveness48. This can be achieved by simplifying the presented information, providing learners with a quiet, distraction-free environment, and developing engaging instructional materials, thereby enhancing learners' ability to absorb and retain the material more effectively48 59. It is also recommended that the use of various learning modalities, the integration of multiple information sources, and the reduction of redundancy and monotonous repetition can help decrease extraneous cognitive load 59. Additionally, beginning with low-fidelity tasks and progressing to high-fidelity tasks, while organizing information in ascending order of complexity, can reduce intrinsic load 59. To optimize germane load, learners should be presented with a variety of tasks, contextual interference should be integrated, and learners should be encouraged to engage in self-explanation 59. Furthermore, instructional materials should be tailored to align with learners’ familiarity with the content, a concept known as the expertise reversal effect, which suggests that design guidelines for experienced learners differ from those for novice learners59.

**Applying theory in practice**

To minimize both extrinsic and intrinsic cognitive loads, we opted for an asynchronous format to enable learners to study at their own pace and at times that best suited their schedules. The rationale was that this approach would reduce external distractions, such as concerns about impending deadlines, demanding work-life environments, and fatigue.

We selected video presentations as the primary medium to simulate a real classroom environment, fostering a human connection and promoting a sense of social interaction. Each video encouraged learners to participate in discussion boards and engage with their peers, providing opportunities for categorizing learned material and reflecting on it.

The videos were intentionally kept brief to maintain learners' attention. Previous research has demonstrated that longer videos result in decreased student engagement and a reduced likelihood of students attempting to answer embedded quizzes60.

The incisive decision-making module was divided into three parts, with each part comprising an explanatory video, a list of mandatory and supplementary readings and documentaries, check-in quizzes, and reflection questions. The videos included interspersed images to enhance clarity, and each slide adhered to an appropriate data-ink ratio to sustain engagement, minimize redundancy, and improve the clarity of the presented material56,61.

Additionally, the concept of interpolated testing was employed by embedding questions at various points throughout each video to enhance learners' attention and engagement62. These questions contributed to the passing grade required for module completion. Interpolated testing facilitates interleaved learning, a strategy in which learners engage with multiple concepts or skills in a mixed manner, rather than adopting a blocked learning approach that focuses on one topic at a time56,63. The module as a whole was structured with interleaving in mind by incorporating case studies that required learners to reflect upon and apply multiple concepts to arrive at the correct solution.

**Method of Presentation (Module setup)**

The incisive decision-making micro-credential module was presented in an online-virtual asynchronous format that allowed students to complete the check points in a self-paced manner. The included material was designed to appeal to a wide range of learning preferences and thus incorporated interactive readings, case studies, pre-recorded PowerPoint presentations and built-in evaluations.

All of the module’s materials were uploaded to A2L, an online teaching platform used by McMaster University. This platform was chosen because students were already required to use it for their program's courses, ensuring familiarity and eliminating the need for additional training.

The Incisive decision-making module began with a homepage that provided students with a brief overview of the content to be covered in the upcoming lessons, as well as an outline of the learning objectives.

A close-up of a document

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Figure (6): Incisive Decision-making home page.

Students were then directed to a short introductory video, followed by the module’s main learning content, which was divided into three sections. Each section built upon the content of the previous one and offered a summary, a list of learning objectives, and the desired outcomes.

*The three sections that formed the module’s content are listed below:*

1- “What is incisive decision-making” which provided an overview of incisive decision-making.

2- "Methods and Strategies for Successful Incisive Decision-Making" which encompassed various approaches and techniques essential for making effective decisions under pressure. It delved into different methodologies and strategies tailored to foster incisive decision-making. Additionally, the module thoroughly examined each of the identified competencies necessary for successful decision-making, elucidating the skills required to attain proficiency in each area.

3- "Applying Incisive Decision-Making Approaches" immersed learners in realistic simulated scenarios that demanded adept decision-making skills. Through the utilization of global health case studies, learners encountered multifaceted situations involving diverse stakeholders with conflicting priorities, necessitating the formulation of alternative action plans. These scenarios often unfold in settings with limited or scarce resources, challenging learners to devise innovative solutions while upholding ethical principles. Moreover, learners were expected to account for engaging local communities in addressing complex health challenges.

Each thematic section featured a recorded video lesson narrating the contents for ease of accessibility. Learners were required to go through mandatory supplemental readings before progressing to the next section. Following the completion of each section, learners were provided with a summary of key ideas which was followed by a mandatory assessment. This assessment evaluated learners' understanding of the concepts covered in the section, their vision of how the covered competency areas can be applied in a real-life situation, and their ability to design ethically sound solutions to complex problems. This assessment approach aimed to ensure that learners have adequately comprehended the provided information and have acquired the skills needed to apply incisive decision-making principles within the realm of global health.

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Figure (7): Incisive Decision-making module content.

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Figure (8): Incisive Decision making first checkpoint quiz.

To measure learners' progress, A2L tracked learners' progress through various means. These included the automatic grading of checkpoints and quizzes, monitoring discussion board posts, and recording the time taken to complete the material.

The module concluded with an interview featuring a leading expert in Global Health. This interview focused on practical experiences in the global health sector, offering insights into starting a career in global health, and emphasizing the key soft skills necessary for career success.

Accessibility was prioritized throughout the conceptualization and implementation of the micro-credential modules. Video recordings were utilized to simulate live lectures, providing a more engaging experience. An asynchronous format was adopted to offer added flexibility, allowing learners to fit the micro-credentials into their schedules more easily, which was theorized to increase enrollment. Additionally, the modules were offered free of charge to help overcome financial barriers, enhance their appeal to learners, and provide an equitable approach to soft skills development that is independent of financial means.

**Method of Evaluation**

The micro-credential module aimed to evaluate learners' comprehension of incisive decision-making and their capacity to apply suitable methods and strategies to tackle global health topics and challenges within complex environments. Learners were asked to deploy their incisive decision-making skills to address global health challenges in environments that featured multiple stakeholders with competing interests, constrained resources, and urgent, time-sensitive demands for action. Learners were assessed on their ability to navigate these dynamic scenarios effectively, demonstrating their proficiency in making informed decisions and implementing appropriate and ethical courses of action to address pressing global health issues.

At the end of each section, learners were presented with a mandatory multiple-choice quiz and a set of optional reflection questions. Learners were required to answer the questions prior to proceeding to the next section. After the completion of all of three sections, learners were asked to complete a multiple-choice quiz that is based on a case study that encompasses the included competency areas.

Learners were given three attempts to successfully complete each quiz and were mandated to attain a minimum passing grade of 80% for each attempt. The micro-credential was graded on a pass/fail basis, contingent upon successful completion of all check point quizzes.

**Chapter 4: Methodology**

**Research Ethics Board approval**

The research study underpinning this project received approval from the Hamilton Integrated Research Ethics Board (HiREB), under protocol number HiREB #17366.

***Study design***

A mixed-methods design was utilized to evaluate the feasibility and acceptability of implementing micro-credential courses within the Global Health graduate program. Additionally, this approach aimed to investigate students' perceptions of the course content and the progression of their soft skills.

The mixed-methods design was chosen to incorporate the humanistic aspects of the qualitative approach that allows for in-depth exploration64 with the generalizable and measurable aspects of quantitative methodologies. Additionally, this approach provided the research team with the flexibility to gather a diverse range of perspectives, gain greater insights, and to explore new leads as they emerge65. In assessing students’ perceptions and the acceptability of the micro-credential modules, the inquiry was grounded in subjective experiences and tacit knowledge66, with the primary objective of gaining a deeper understanding of students’ experiences. Our data analysis employed a parallel results convergent synthesis design, in which the quantitative and qualitative data were analyzed and presented separately67,68. Connections between the findings from the survey and interviews are explored and reflected upon in the discussion section68.

*Quantitative approach*

A Pre-post design69 was employed to collect and compare students’ perspectives, changes in soft skills, and the acceptability of the micro-credential modules before and after their completion. This pre-post study design was selected to assess the dependent variable of students’ soft skills in relation to the introduction of the micro-credential modules, which serve as the independent variable in this study. While the lack of randomization in this design precludes the assessment of causal relationships, it allows for the examination of associations between the micro-credentials (intervention) and the outcomes70.

Pre- and post-feedback survey instruments (Appendices A and B) were developed using REDCap to collect data on students' soft skills. The survey included Likert-scale multiple-choice questions to assess changes in students' soft skills both before and after completing the micro-credential modules. To capture additional insights that may not have been reflected in the available choices, the survey design also incorporated open-ended questions. The pre-survey was administered prior to the students’ engagement with the micro-credential modules, while the feedback survey was administered after module completion. Additionally, the pre-survey served as a recruitment tool for the qualitative phase of the study, which included focus group discussions and one-on-one interviews.

*Qualitative approach*

A series of one-on-one interviews were conducted starting at the midpoint of the micro-credentials trial (4.5 weeks after the launch of the modules). The interviews followed a semi-structured format, which enabled the facilitator to capture diverse collective and individual perspectives71. This format also provided flexibility to pursue emerging leads and explore topics that participants deemed worthy of further investigation.

This qualitative approach utilized participants' subjective experiences and tacit knowledge to generate findings and address the research questions72, thereby facilitating a comprehensive understanding of how the micro-credential modules impacted students’ soft skills. The interviews allowed for the exploration of personal experiences and included participants who might not be comfortable in a group setting. Additionally, the individual interviews provided greater flexibility in scheduling for participants.

In curating the interview guide (Appendix C), we utilized the Consolidated Framework for Implementation Research (CFIR), which allowed for exploring the contextual influences that influenced students’ perceptions of the micro-credential modules 73. The CFIR constructs, including intervention characteristics, outer setting, inner setting, characteristics of individuals, and process, shaped the interview questions and prompts that were used to elicit additional responses to areas of interest73,74.

*Study Population*

The identified population of interest were students enrolled in McMaster’s Global Health program and a select number of alumni who signed up for the micro-credential modules. We invited a total of 128 students (the total number of students enrolled in the Global Health graduate program and who could sign up for the micro-credential modules) to enroll in the micro-credentials. The number of students who registered for the micro-credentials was 27, and they formed the sampling frame for this study.

**Sampling Strategy**

*Pre- and feedback surveys*

A convenience sampling strategy was employed to recruit participants for this study. This non-probability sampling method was chosen due to its reliance on the accessibility of participants, allowing for the selection of individuals who were readily available75. This approach was particularly important given the time constraints and the limited sampling frame. Additionally, convenience sampling facilitated the exploration of emerging trends and patterns within the target population, providing an efficient means to gather the necessary information for evaluating the acceptability of the micro-credential modules75.

Convenience sampling is often criticized for its limited external validity, as it may not be representative of the broader population of interest75. Instead, the findings are restricted to the specific subgroup that was included in the research due to their accessibility75. This limitation means that the results cannot be generalized, particularly if there are significant differences between the overall population of interest and the conveniently accessible subgroup that was recruited75. However, the ease of implementation makes this sampling method ideal for projects with stringent time and logistical constraints, making it a particularly advantageous choice for the micro-credential modules project.

**Eligibility criteria**

Inclusion and exclusion criteria were strictly defined to ensure that results obtained from participants had adequate internal validity.

*Inclusion criteria*

Participants who were enrolled in the Global Health micro-credentials program at McMaster University as of April 2024, as well as a select number of alumni who participated in the 2024 Global Learning Symposium, and were proficient in conversing, reading, and writing in English, were eligible to participate.

*Exclusion criteria*

Participants who were not enrolled in the Global Health program at McMaster University as of April 2024, as well as Global Health students who had not enrolled in the micro-credential modules, were excluded from the study. Additionally, students who were unable to converse, read, or write in English were excluded, as the micro-credentials were provided exclusively in English.

The inclusion and exclusion criteria were defined with the goal of recruiting an inclusive sample to ensure the results having adequate internal validity and being representative of the experiences of the participants75. By inviting all students enrolled in the micro-credential modules, we aimed to recruit an inclusive sample by offering each member of the population of interest the chance to participate 76and tried to enhance the transferability of generated results by maximizing the sample size as much as possible.

*Focus groups and individual interviews*

Purposive sampling was carried out in conjugation with the pre-survey. At the end of the survey, students were invited to join the focus groups discussions or the individual interviews. We aimed to elicit responses pertaining to how students’ perceptions of micro-credentials have changed and contextual factors that might have impacted their perceptions.

We defined our inclusion and exclusion criteria with purposive sampling in mind to ensure that the recruited participants could provide reflections and perceptions relevant to the study's objectives. Additionally, purposive sampling helps reduce between-subject variance, leading to a more homogeneous sample77. This approach is crucial for understanding whether common phenomena or themes are representative of the broader population of interest78. However, due to the non-probability nature of purposive sampling it has limited external validity and thus cannot be generalized to the wider population (In this context Global Health graduate program students including those not enrolled in the micro-credential modules).

*Recruitment*

After launching the micro-credential modules, all enrolled students were sent a mass recruitment email inviting them to participate in the study and outlining the details of participation (Appendix D). Students were provided with a link to access the pre-survey, which was hosted on REDCap to ensure confidentiality. The survey started with a consent statement, which allowed students to decline participation or agree to participate and move ahead with answering the survey questions. Students were also informed that they had the right to close the survey window at any time. By progressing through the survey and clicking on the yes button found at the end of the consent statement, it was implied that students have consented to participate in the survey. For accessibility reasons, we set up the survey to allow students to complete answering the questions at a later time without losing their progress. After completing the survey and before submitting their responses, students were given the opportunity to express interest in participating in either focus group discussions or individual interviews. Team members subsequently contacted interested students via email to schedule their focus group or interview sessions.

*Consent*

Prior to participating in any of the research activities, potential participants were provided with an information letter that contained information pertaining to the purpose of the study, methodology, what participation entails, and participants’ rights. Participants were provided with an informed consent form prior to starting the survey and\or the focus group discussions or individual interviews. Consent was implied through answering the survey questions and\or attending the focus group discussions or individual interviews.

**Data collection**

*Pre-and feedback surveys*

Pre-and feedback surveys were conducted using REDCap, a secure and confidential online survey platform that allows for capturing survey answers in real time and linking between pre-and post surveys without comprising participants’ anonymity. The pre-and feedback surveys utilized multiple choice and open-ended questions. Reminders were sent at 4 weeks intervals to elicit participation.

*Focus group discussions and individual interviews*

Individual interviews were conducted at the end of the micro-credentials piloting phase (September 2024). All sessions were conducted virtually using Zoom. Closed captioning was enabled for accessibility reasons. At the start of each session, the session’s facilitator reiterated participants’ rights and answered participants’ questions. Informed consent was implied through participating in the session. Participants were informed that any recorded material cannot be retracted and will be used for research purposes. To preserve participants’ anonymity, the session facilitator reminded participants not to divulge any identifying information including names, occupation, and addresses. Participants were encouraged to use an alias during the interview and cameras were turned off. Member checking was carried out to ensure that participants’ perceptions were conveyed accurately. Focus group discussions were not conducted due to lack of interest from potential participants.

**Data analysis**

*Quantitative data*

Acquired quantitative data from the pre and feedback surveys underwent descriptive and comparative analysis to yield information pertaining to the demographic characteristics of the respondents and to compare between participants’ perceptions of micro-credentials before attempting the modules and after completing them.

Microsoft Excel was utilized to carryout descriptive summaries. This included percentage calculations and drawing before and after outcome comparisons when appropriate.

*Qualitative data*

Acquired qualitative from the pre and feedback surveys, focus group discussions, and individual interviews underwent descriptive and reflexive thematic analysis 79,80 using Microsoft Word. A combination of inductive and deductive approaches to codes generation were utilized. Codes were organized under an organically developed set of themes. The generation of themes evolved as analysis progress, since our chosen approach depended on information yielded from the data. Where appropriate, links were drawn between information gained from the survey and data acquired from the interviews. The coding process was carried out by a single coder. To ensure rigor, a code book was established which housed a definition of each of the determined codes and the themes under which they fit.

*Analysis framework*

FRAME-IT, a flexible framework for planning and evaluating early-stage health interventions that builds upon the RE-AIM framework, was utilized to inform the analysis plan for this project81. This choice was influenced by the pilot project's need to assess various factors, including Feasibility, Reach, Acceptability, Maintenance, Efficacy, Implementation, and Tailorability, all of which are addressed by FRAME-IT81. The FRAME-IT framework was utilized, when appropriate, to draw connections between the quantitative and qualitative data.

As part of the analysis plan, we aimed to include an intersectionality approach to show how complex the students’ experiences and the way in which contextual factors can impact their perceptions of the micro-credentials. However, due to limited participation the intersectionality approach could not be extrapolated. The author included reflections on intersectionality in the discussion section.

**Chapter 5: Results**

The analysis of the required results was influenced by the FRAME-IT framework. The author aimed to look into how students perceived the elements of Feasibility (F), Reach (R), Acceptability (A), Maintenance (M), Efficacy (E), Implementation (I), and Tailorability (T) (FRAME-IT) within the context of the piloted micro-credential modules. To ensure the clear and comprehensible presentation of the acquired results, the components of the FRAME-IT framework were reorganized.

For ease of narration, some of the elements of the FRAME-IT framework have been re-arranged. Tables (1, 2, & 3) provide a summary of the results.

**Reach (R)**

*Micro-credential modules enrollment rate*

A total of 28 students enrolled in the micro-credential modules, out of these 13 (46.43%) completed the modules. Out of the 15 (53.57%) students who did not complete the modules, 6 (21.43%) did not interact with any of the modules’ content and the remaining 7 (25%) students interacted with between 3% to 63% of the material but did not complete the checkpoint quizzes.

*Pre and feedback surveys participation rate*

All students who were eligible to enroll in the micro-credential modules were invited to respond to the pre- and feedback surveys. After excluding invalid responses (as RedCap records each answer attempt as a response, so incomplete and unsubmitted responses were removed), we collected a total of 15 responses from the pre-survey and 8 responses from the feedback survey. Although both surveys (see Appendix A and Appendix B) included questions to gather demographic information, this data was omitted from analysis to protect participant privacy. Given the low response rates and small target population, including demographic details could risk compromising participants' anonymity and thus decision was made to omit this information from analysis.

*Participants perceptions of micro-credentials from the pre-survey*

***Acceptability (A)***

Most participants (80%, n= 12) had not participated in any micro-credential courses within the past two years. Motivations for enrolling in micro-credentials varied, with 33.3% (n=5) citing career advancement, 20% (n=3) citing skill development, 6.7% (n=1) citing personal interest, and 26.7% (n=4) citing other undeclared motivations.

When asked what motivated them to enroll in the Global Health micro-credential courses, 60% (n=9) mentioned improving employability/career advancement, 13% (n=2) mentioned personal interest, and 20% (n=3) cited specific global health skill development. Reasons for not participating in the piloted micro-credential modules included uncertainty about the value of micro-credentials (6.7%, n=1) and lack of awareness of the program offerings (6.7%, n=1).

Participants rated their current awareness and understanding of micro-credentials, with 13% (n=2) rating it as "fair" and 6.7% (n=1) as "very good." Regarding knowledge of training objectives, 6.7% (n=1) rated it as "very good," 40% (n=6) as "good," 26.7% (n=4) as "fair," and 13% (n=2) as "poor."

***Efficacy (E)***

Acquired responses reflected a generally positive but varied impact of the micro-credential modules, with some participants feeling more prepared to collaborate internationally and apply incisive decision-making skills in global health contexts, while others expressed neutrality, suggesting potential differences in personal learning outcomes or expectations.

Participants were asked to rate a few sentences using a Likert scale to assess their level of confidence in their international collaboration and incisive decision-making knowledge and skills prior to interacting with the micro-credential modules.

**Confidence in Knowledge and Skills before interacting with the micro-credential modules content**

*International collaboration*

Among respondents, 26.7% (n=4) strongly agreed that they possess the knowledge needed to effectively collaborate with relevant international stakeholders, while 40% (n=6) agreed, 13% (n=2) felt neutral, and 6.7% (n=1) disagreed with the statement.

For the statement, “I have the knowledge needed to work with other professionals to effectively collaborate with relevant international stakeholders,” 33.3% (n=5) of respondents agreed, 26.7% (n=4) strongly agreed, and another 26.7% (n=4) felt neutral.

*Ethical issues and community involvement*

When asked to rate their agreement with the statement, “I have the knowledge needed to address ethical issues and ensure community involvement in research processes,” responses were varied. A total of 26.7% (n=4) strongly agreed, 13% (n=2) agreed, 33.3% (n=5) felt neutral, and 13% (n=2) disagreed.

*Conflict resolution*

Participants were asked to rate their agreement with the statement, “I have the knowledge needed to mediate and resolve conflicts in an international health context.” The responses showed that 40% (n=6) agreed, 26.7% (n=4) felt neutral, 13% (n=2) strongly agreed, and 6.7% (n=1) disagreed.

*Building transparent and trustworthy relationships*

Respondents were asked to rate their agreement with the statement, “I have the skills needed to foster transparent and trustworthy relationships in global health collaborations.” A majority, 53.3% (n=8), indicated agreement, while 20% (n=3) strongly agreed, and 13% (n=2) felt neutral.

When asked to rate the following statement “I have the knowledge needed to navigate diplomatic challenges in international health partnerships”, 40% (n=6) felt neutral, 6.7% (n=1) disagreed, and 33.3% (n=5) agreed, and 6.7% (n=1) strongly agreed.

For the statement, “I have the knowledge needed to identify effective strategies for building and maintaining community partnerships in global health projects,” responses showed that 33.3% (n=5) felt neutral, another 33.3% (n=5) agreed, and 20% (n=3) strongly agreed.

In response to the statement, “I have the knowledge needed to identify factors that build and maintain trust between international partners,” 26.7% (n=4) of participants expressed neutrality, 40% (n=6) agreed, and 20% (n=3) strongly agreed.

*Incisive decision-making*

Participants rated their agreement with the statement, “I have the knowledge needed to identify and describe incisive decision-making strategies for global health issues.” Results showed that 33.3% (n=5) felt neutral about this statement, 6.7% (n=1) disagreed, 26.7% (n=4) agreed, and 20% (n=3) strongly agreed.

For the statement, “I am able to describe basic strategies involved in incisive decision-making for global health issues, such as asset-based community building and agenda setting and implementation,” participants' responses varied. A total of 26.7% (n=4) agreed with it, 33.3% (n=5) felt neutral, 6.7% (n=1) disagreed, and 20% (n=3) strongly agreed.

Participants expressed mixed levels of agreement with the statement, “I have the knowledge needed to discuss the ethical aspects of decision-making in global health.” Among respondents, 26.7% (n=4) agreed, 6.7% (n=1) disagreed, 33.3% (n=5) felt neutral, and 20% (n=3) strongly agreed.

For the statement “I have the knowledge needed to assess resources and external factors to propose viable alternatives in global health scenarios,” responses were largely neutral, with 60% (n=9) expressing neutrality. Meanwhile, 13.3% (n=2) agreed, and another 13.3% (n=2) strongly agreed.

When asked to rate the statement “I have the knowledge needed to evaluate the potential outcomes and consequences of different decision-making options,” participants expressed a range of views. A third of respondents (33.3%, n=5) agreed with the statement, while 20% (n=3) expressed strong agreement. Conversely, 26.7% (n=4) felt neutral, and 6.7% (n=1) disagreed.

For the statement “I have the knowledge needed to recognize and mitigate biases that may affect my decision-making process,” participants expressed a variety of responses. A third (33.3%, n=5) felt neutral about their ability in this area, while 26.7% (n=4) agreed, and 13.3% (n=2) strongly agreed. Conversely, 13.3% (n=2) disagreed.

*Cultural and social implications*

When asked to rate the statement “I have the knowledge needed to consider cultural, ethical, and social implications when making decisions about global health initiatives,” 46.7% (n=7) of participants expressed agreement, while 20% (n=3) strongly agreed. Meanwhile, 13.3% (n=2) felt neutral about their capability in this area, and 6.7% (n=1) disagreed.

Participants responded to the statement “I have the knowledge needed to integrate data from diverse sources to inform evidence-based decisions in global health contexts” with a varied range of agreement levels. Equal portions of participants—26.7% (n=4) each—expressed neutrality, agreement, and strong agreement, indicating a generally positive perception of their skills in this area. However, 6.7% (n=1) disagreed with the statement.

***Tailorability (T)***

The next section of the survey explored factors that could encourage participants to enroll in future micro-credential offerings and how participants plan to use their certification in the future. Insights gained suggest that while participants found value in the micro-credential courses, there is room to improve their flexibility, interactivity, and alignment with specific career goals to better meet participants’ needs and expectations.

*Factors Encouraging Future Participation*

When asked about factors that would encourage future participation in the Global Health micro-credential courses, participants indicated several preferences: course alignment with their goals (6.7%), specific career benefits (13.3%), more information about the micro-credential program (6.7%), and increased interaction with other course participants (6.7%).

*Use of Micro-Credentials for Job Applications*

In terms of utilizing the Global Health micro-credentials for future job applications, one participant expressed they would list it on their resume (6.7%), while another mentioned using it to back up their skills with tangible credentials (6.7%).

*Suggestions for Future Micro-credential modules*

When asked what additional transferable skills future iterations of the Global Health micro-credentials should cover, one participant suggested understanding the job market and job preparedness in both the nonprofit and for-profit public health sectors (6.7%), while another recommended including policy analysis (6.7%).

*Participation in Focus Groups/Interviews*

Despite 40% of participants (n=6) expressing interest in joining the focus group discussions or participating in one-on-one interviews, none responded to the recruitment calls.

Table (1) Summary of the results acquired from the Pre-survey

|  |  |  |  |
| --- | --- | --- | --- |
| Reach (R) | Acceptability (A) | Efficacy (E) | Tailorability (T) |
| Micro-credential modules enrollment:   * 28 students enrolled in the modules. * 46.43% of students completed the modules. * 21.43% of students did not interact with any of the modules’ content. * 25% of students interacted with some of the modules’ content but did not complete them.   Pre and feedback surveys participation:   * 15 responses received from the pre survey. * 8 responses received from the feedback survey.   Participation in Focus Groups/Interviews:   * While 40% (n=6) expressed interest in focus groups or interviews, no one responded to recruitment calls. | **Past experience with Micro-credential modules:**   * 80% of pre-survey respondents had not participated in a micro-credential module during the past two years. * Reasons for participating in micro-credential modules included citing career advancement, skill and development, personal interest.   **Factors influencing enrollment in the piloted GH micro-credential modules:**   * Reasons for enrolling in the piloted micro-credential modules included: improving employability/career advancement (60%, n=9), personal interest (13%, n=2), and 20% (n=3) cited specific global health skill development. * Reasons for not participating included uncertainty about the value of micro-credentials (6.7%, n=1) and lack of awareness of the program offerings (6.7%, n=1). * Respondents rated their current awareness and understanding of micro-credentials, with 13% (n=2) rating it as "fair" and 6.7% (n=1) as "very good." * Knowledge of training objectives was rated as “very good” 6.7% (n=1), “good” 40% (n=6), “fair” 26.7% (n=4), and “poor”13% (n=2). | **Confidence in Knowledge and Skills before interacting with the micro-credential modules content**   * **Collaboration:**   + 26.7% strongly agreed and 40% agreed they possess knowledge for effective international stakeholder collaboration.   + For working with professionals to collaborate internationally, 26.7% strongly agreed, and 33.3% agreed. * **Ethical Issues & Community Involvement:**   + 26.7% strongly agreed, 13% agreed, and 33.3% felt neutral. * **Conflict Resolution:**   + 13% strongly agreed, 40% agreed, and 26.7% felt neutral on conflict resolution knowledge in an international context. * **Building Relationships:**   + 53.3% agreed they can foster trustworthy global health collaborations; 20% strongly agreed. * **Decision-Making:**   + Knowledge about incisive decision-making strategies: 26.7% agreed, 20% strongly agreed, 33.3% neutral.   + Addressing biases: 33.3% neutral, 26.7% agreed, and 13.3% strongly agreed. * **Cultural and social implications:**   + Knowledge to consider cultural/ethical implications: 46.7% agreed, 20% strongly agreed. | **Factors Encouraging Future Participation**   * Preferences for future participation included:   + Course alignment with goals: 6.7% (n=1).   + Specific career benefits: 13.3% (n=2).   + More information about the program: 6.7% (n=1).   + Increased peer interaction: 6.7% (n=1).   **Use of Micro-Credentials for Job Applications**   * 6.7% (n=1): Would list on their resume. * 6.7% (n=1): Would use to substantiate skills with tangible credentials.   **Suggestions for Future Skills Coverage**   * Job market understanding and preparedness in nonprofit and for-profit public health sectors: 6.7% (n=1). * Policy analysis: 6.7% (n=1). |

**Results from the Feedback survey**

The feedback survey, launched in September, was available to participants for three weeks, beginning two weeks after the completion of the micro-credential modules. Despite the extended time frame, the survey had a relatively low response rate, with only 8 participants completing it (n=8).

***Acceptability (A)***

*Prior Engagement with Micro-Credentials*

The feedback survey began by asking participants about their prior engagement with university-offered micro-credential courses over the past two years. A majority (87.5%, n=7) reported no prior participation, while one participant (12.5%) indicated prior experience and specified with the Global Health micro-credentials that were piloted under this study. Additionally, two participants (25%) noted that they are currently enrolled in other McMaster University micro-credential courses, motivated by career advancement (25%).

*Barriers to Enrollment in Global Health Micro-Credentials*

For those who chose not to participate in the Global Health micro-credential courses, primary reasons included lack of time (62.5%, n=5) and uncertainty about the value of the micro-credentials (37.5%, n=3). No participants cited lack of awareness or irrelevance to career goals, though one participant (12.5%) mentioned other unspecified reasons.

***Efficacy (E)***

The next section examined perceptions of soft skills after completing the micro-credential modules. Acquired perceptions suggest that overall micro-credential modules were perceived as valuable for consolidating learning and improving soft skills. The limited data point toward an individual-level positive perception of the modules’ efficacy rather than across the cohort.

*General Perceptions of Micro-Credentials and motivations for participating*

Participants generally rated their understanding and knowledge of micro-credentials as "fair," with one participant (12.5%) identifying employability and career advancement as key motivators for enrolling in the Global Health micro-credentials.

*Global Health Competencies and Skills*

When asked about their knowledge and skills related to global health competencies, one participant (12.5%) agreed with statements covering a range of skills, such as collaboration, ethical issue resolution, conflict mediation, and building trustworthy relationships. Additionally, agreement was shown for specific competencies, including diplomatic navigation, community partnership strategies, trust-building, and decision-making. Across these statements, single participants (12.5%) expressed agreement on aspects of assessing alternatives, evaluating consequences, mitigating biases, and integrating diverse data sources for evidence-based global health decisions.

Although the acquired data is limited, responses indicate a moderate level of agreement among participants regarding the acquisition of relevant global health competencies through the micro-credentials, although this level of agreement was limited to individual respondents for each competency area. This distribution suggests varied perceptions of the program's impact on participants’ confidence in their global health-related soft skills.

*Effectiveness of Micro-Credentials*

When participants were asked about the desired outcomes and impacts of the micro-credential modules, responses indicated a moderate level of agreement on their effectiveness. For instance, one participant (12.5%) agreed that the modules prepared them to demonstrate global health-related transferable skills to potential employers, as well as consolidated their knowledge from the Global Health program at McMaster University. Similarly, one participant (12.5%) expressed that the modules helped them acquire the specific transferable skills they were designed for.

*Impact on Collaboration Skills*

In terms of collaboration skills, one participant (12.5%) agreed that the micro-credentials increased their confidence in collaborating with international stakeholders and professionals from other fields. Agreement was also shown (12.5%) for the module’s impact on effectively collaborating with international stakeholders in a global health context, with one participant affirming that the international collaboration micro-credential course provided a solid foundation in the principles and practices of effective collaboration.

*Insights on Incisive Decision-Making Module*

The incisive decision-making module received positive responses from individual participants. One participant (12.5%) agreed that the module effectively taught principles for identifying and resolving ethical issues, especially when working with vulnerable populations. Similar levels of agreement were reported for statements regarding leadership application, adaptability to address healthcare needs in resource-constrained settings, and the ability to conduct situational analyses in real-world scenarios following the course.

Overall, the feedback suggests that participants found value in the micro-credential courses in terms of consolidating their learning, enhancing their collaboration skills, and equipping them with specific global health competencies. However, as these responses each came from individual participants, it highlights that while the program met some expectations, broader perceptions of impact may vary among the cohort.

*Participation in Focus Groups/Interviews*

None of the participants answered the question “Are you willing to participate in interviews or focus group discussions as part of the research study?”, which might indicate lack of willingness to participate and thus explain the no response for focus group discussions and individual interviews.

***Tailorability (T)***

The final section of the survey gathered insights on the future design and content of micro-credentials. Acquired responses provided constructive insights for refining future micro-credential modules. Respondents suggested that modules could be more valuable if they prioritize career relevance, allow for peer interaction, and expand content to include practical skills like policy analysis, grant writing, and project management.

*Perceptions of the micro-credential modules flexibility*

One participant (12.5%) felt they were "Completely able to integrate" the micro-credential modules into their routine, suggesting alignment with busy schedules.

*Motivating Factors for Future Participation*

When asked about motivating factors for participating in future micro-credentials, responses were varied. Three participants (37.5%) highlighted specific career benefits as a key incentive, and another three participants (37.5%) mentioned the importance of increased interaction with peers in the program. Additionally, two participants (25%) wanted more information about the program offerings, and one participant (12.5%) selected “other,” suggesting more time would be helpful.

*Application of Micro-Credentials*

Regarding the envisioned application of the micro-credentials in their careers, one participant (12.5%) planned to include it on their resume, and another (12.5%) believed it would expand their career options.

*Desired Transferable Skills for Future Modules*

When asked what additional transferable skills future courses should address, responses included organization (12.5%), policy analysis and grant writing (12.5%), and project management (12.5%). This feedback underscores a desire for skills that are applicable across diverse professional contexts and that support career growth in global health.

*Suggestions for future micro-credential modules*

One participant (12.5%) offered valuable feedback, suggesting that the micro-credential course could be enhanced by "Incorporating tools/items that we would see in the workplace, i.e., grant applications, implementation protocols, disaster management checklists from the WHO, etc." This response, provided in answer to the question about additional comments regarding the micro-credential experience, underscores a desire for practical, hands-on tools that closely align with real-world applications.

Table (2) Summary of results acquired from the feedback survey

|  |  |  |
| --- | --- | --- |
| Acceptability (A) | Efficacy (E) | *Tailorability (T)* |
| Prior Engagement with Micro-Credentials   * Participation History:   + 87.5% (n=7): No prior participation in university-offered micro-credentials.   + 12.5% (n=1): Prior experience specifically with the Global Health micro-credentials. * Current Enrollment:   + 25% (n=2): Enrolled in other McMaster University micro-credential courses, citing career advancement as a motivation.   Barriers to Enrollment in Global Health Micro-Credentials:   * + Lack of time: 62.5% (n=5).   + Uncertainty about the value of micro-credentials: 37.5% (n=3).   + No participants cited lack of awareness or irrelevance to career goals.   + 12.5% (n=1): Other unspecified reasons. | **General Perceptions of Micro-Credentials and motivations for participating**   * + Participants generally rated their understanding and knowledge of micro-credentials as "fair."   + **Motivation:** 12.5% (n=1) cited employability and career advancement as key motivators for enrolling in Global Health micro-credentials.   **Global Health Competencies and Skills**   * + Individual participants (12.5%, n=1) agreed with various global health skills, including:     - Collaboration, ethical issue resolution, conflict mediation, and building trustworthy relationships.     - Diplomatic navigation, trust-building, decision-making, and community partnership strategies.   + Similar agreement was observed for competencies such as assessing alternatives, evaluating consequences, mitigating biases, and integrating diverse data sources for evidence-based decisions.   **Effectiveness of Micro-Credentials**   * + One participant (12.5%) agreed that the modules:     - Prepared them to demonstrate global health-related transferable skills to potential employers.     - Consolidated their knowledge from the Global Health program at McMaster University.     - Helped them acquire the specific transferable skills the modules were designed for.   **Impact on Collaboration Skills**   * + One participant (12.5%) agreed that:     - The micro-credentials increased their confidence in collaborating with international stakeholders and professionals from other fields.     - The international collaboration micro-credential provided a solid foundation for effective collaboration in global health.   **Insights on Incisive Decision-Making Module**   * + One participant (12.5%) agreed the module effectively addressed:     - Ethical issue resolution, especially for vulnerable populations.     - Leadership application and adaptability in resource-constrained settings.     - Conducting situational analyses in real-world scenarios.   **Participation in Focus Groups/Interviews:**   * + No participants responded to the question about willingness to join focus groups or interviews.   + This may reflect a lack of interest or availability for further participation. | **Perceptions of the micro-credential modules flexibility:**   * + One participant (12.5%) reported being "Completely able to integrate" the modules into their routine, suggesting the design aligns well with busy schedules.   **Motivating Factors for Future Participation**   * **Career Relevance:**   + Three participants (37.5%) cited specific career benefits as a key motivation for engaging in future micro-credential courses. * **Peer Interaction:**   + Another three participants (37.5%) emphasized the importance of **increased interaction** with peers, highlighting a desire for collaborative and network-building opportunities. * **Program Awareness and Support:**   + Two participants (25%) indicated the need for more information about program offerings, pointing to the value of clear communication and promotion. * **Time Management:**   + One participant (12.5%) mentioned needing more time as a motivating factor for participation.   **Application of Micro-Credentials**   * **Resume and Career Development:**   + One participant (12.5%) planned to include the credentials on their resume.   + Another participant (12.5%) believed the credentials would expand career options, indicating their perceived value in enhancing professional opportunities.   **Desired Transferable Skills for Future Modules**  Participants suggested the inclusion of practical and versatile skills, including:   * Organization (12.5%) * Policy analysis and grant writing (12.5%) * Project management (12.5%)   **Suggestions for future micro-credential modules**   * **Workplace-Relevant Tools:**   + One participant (12.5%) recommended incorporating tools commonly used in professional settings, such as:     - Grant applications     - Implementation protocols     - Disaster management checklists from the WHO |

**Interviews**

A total of 3 interviews were conducted over the course of 2 weeks. We planned to carry out 8 focus groups and 17 individual interviews82, however, we had to contend with response rate.

Each of the three participants had a different experience with micro-credentials. Thus, it was rationalized that to accurately capture the nuances of each individual’s experiences and perceptions, the author decided to present findings in the form of stand-alone case studies.

***Case study (1) Participant A – enrolled in the modules but did not finish them***

The first interview featured a student who registered for the micro-credential modules but never got around to doing them due to not having time.

*Acceptability (A)*

The participant expressed interest in the micro-credential modules and reviewed some of the content presented in the international collaboration module. However, time constraints prevented them from completing the modules,

… So in terms of my experience, I was really interested in the micro-credentials and I still am. And I did register voluntary to be part of like the group or cohort who does the credentials... and I have like looked at the first module to some extent and I really enjoyed the content. I feel like… especially there was one around negotiation. I really liked like the content. But to be very honest, I just haven't had the time to focus on learning more and designate that time to complete the micro-credentials. But I personally think that it's a very great approach. (Participant A)

***Efficacy (E)***

The participant noted a change in how they viewed micro-credential modules as a learning tool after going through some of the content presented in the international collaboration module.

Yeah, definitely. So I think like I had a perception of you know how micro-credentials would be, but I personally thought they're more of like just learning theories… But I find that now that they're more practical knowledge and that you can use them in your everyday work, especially like as a global health student… If you're working in a nonprofit. So I feel like the type of education they give you is more practical than theoretical, which is a positive thing in my view. (Participant A)

The participant spoke to how they defined soft skills. Their definition emphasized the practical aspects of these skills,

I feel like soft skills, I guess my perception of them is that they are tangible everyday skills that you have that you are needed to have in order to operate well in workspace and in like a research setting. It's more of you know practicing what you've learned and being able to deliver rather than knowing the theory of it. That's my understanding. (Participant A)

***Tailorability (T)***

The participant discussed how micro-credentials can be integrated into the Global Health graduate program and highlighted the relevance of some soft skills to courses offered by the program,

I feel like going into a program you assume that you will have certain courses and learn stuff. But, you know, courses are not always too specific. They're usually broad. They talk about various concepts and there's not too much time to focus on each concept or go deep. Within each concept if like, you know, it's a big classroom and like there's a lot of different interests. So we generally learn a lot of things, but not in too detail. I feel like the micro-credentials though, they are exactly the opposite. They allow you to focus on a specific skill or knowledge you want to learn… and it's in more in depth about that specific thing. For example, if I'm in a global health policy course… Yes, there are concepts of negotiation that are taught, but there's not too much time to focus on the depth of that. But then in a micro-credential, there could be more focus and in-depth learning of that specific soft skill that I want to develop. (Participant A)

The relevance of the presented soft skills to future career endeavours presented an attraction point for students to participate in micro-credentials. The student commented that,

Okay, so for me specifically, I'm really interested in the niche of global health diplomacy and global health policy in general and I feel like… the one around international collaboration… is a huge concept and a needed one for me to learn more about. Just because working in a global health setting, you need to understand… You know, the challenges and how to overcome them like the time zone differences everything… Collaborating with like the global north with the global south so I feel like… that is a very much needed and useful skill for me to develop through the micro credentials. And then the other one around decision making, I feel like I don't have too, too much work experience… but from the exposure that I've had, I believe that usually in work settings, you need to be decisive and be able to make the calls when they are it's the time… and you don't have too much time to wait and you need to have the skills of being able to make those decisions with the minimum risk. So these two skills I feel like maybe they're not tossed too much in the academic world… about developing them through micro-credentials is very useful. (Participant A)

***Implementation (I)***

The participant spoke about the delivery mode (mechanism) of micro-credentials which showed a leaning towards continuing with a virtual delivery mode with embedded opportunities for peer-to-peer interaction. Additionally, the participant highlighted a strong preference for making the material available for periodical review by learners after the modules have wrapped up,

I personally believe that there could be two components to it. I think like the fact that it's online, it makes it really accessible… But I feel like there should be a chance to be able to go back and have access to that portal for a really long time. So you can go back and practice or re-look at the… you know the whole concept… So I feel like that's something… If, for example, you have access just for a limited amount of time… that wouldn't be sufficient… And I personally think if there is a chance that… the practice part of, for example, if it's like negotiation or like international work, there could be a component where you work in a group setting even online to deliver that that you've learned the skills that were taught, that would be amazing… I think for the bulk of the content, it could be recorded videos of presentations… And then for the practice section of it, like there could be two to three like dates announced in the beginning of the course… where you know those will be in like online Zoom meetings or a place for you to collaborate… But I personally really learn a lot better with like an online recording of a presentation along with the slides just because I can watch it in my own pace, take notes, you know, make it faster or slower in terms of like the video speed. (Participant A)

The low participation and response rates made the researcher curious about whether the time when the micro-credential modules were piloted played a role. The participant stated that,

So I have two opinions on this… I personally think one way to do it is to do it before the courses start, like as a prerequisite. Because everybody is excited. Everybody has the time… is kind of asked to do like the SGS courses that we had to take and it also prepares you for the year you have ahead and gets you excited… or during the, well, like during the break between the two semesters or like asking them to do it before the second semester starts is also an idea that I had. (Participant A)

Additionally, the participant mentioned that students’ preferences should be assessed before launching other micro-credential modules,

I just feel like there should be a survey on what are some of the skills that students want to learn when they get admitted into the global health program. And then if they're not delivered in the courses… there could be micro-credentials created around those skills… (Participant A)

***Reach-out (R)***

When asked about whether they would recommend the offered micro-credential modules to other students, one participant stated that,

Yes, definitely. If they have the time… and there's no like if there was no limit in like time and resources right… I feel like it would be amazing because I personally take more away… when working on micro-credentials than some long courses. (Participant A)

***Case study (2) Participant B – Did not enroll in the micro-credential modules***

The second interview featured a student who was interested in the micro-credentials but did not register or participate due to lack of time.

***Acceptability (A)***

The participant spoke to barriers to participation which included having a busy schedule as noted by participant,

So I didn't actually participate in the micro-credential. I saw that someone on my LinkedIn did participate and he like posted that… It was really good and he had like a little certificate at the end or something and he posted that… I'm not sure. I did see a lot of like posting on it, like for it through A2L and emails as well. So that's sort of my experience with it…I was just so busy… Over the summer, I was… working full time and then also writing my thesis as well… And so I did have the intention of doing it. Like, I think I remember I asked like, oh, is it free and things like that and… It is free… Which is really great. I just… couldn't find the time to do it. (Participant B)

***Efficacy (E)***

The participant reflected on how soft skills were linked to experiences encountered during the Global Health graduate program,

I think soft skills are like a thousand percent important for this program, especially if you're going on exchange or even to India for the… the symposium… Just because like you're meeting so many different people with different like backgrounds, even like all the kids from, you know, Maastricht and then everybody from India and then everyone from Canada. So it's like different levels of cultures… I don't know how to explain it fully, but it is different just in the way like the types of jokes we're making, the way we go about working in group chats, for example. And then when you get to more like other important factors like in foundations two like the… of the assignments we have to do, like everybody said different levels of English… People have different ways of communicating things… you need cultural sensitivity, definitely 100% in all those situations… (Participant B)

***Tailorability (T)***

When asked about what a perfect micro-credential would look like, the participant mentioned including scenario play and debriefing activities, in addition to providing the opportunity to take the micro-credential modules prior to starting the Global Health Foundations I and II courses,

… So, but anyway, what would that look like? You know, situational learning, like I love like a little scenario. What would you do? What should you do? And then like debriefing, I think that's a good way to do that… And then maybe also using examples related to like global health situations or things that you would experience in the global health program… Okay, this is me. I don't know if I'm about to say this or, you know, but like if you can do that like prior to Global Health Foundations 1 and 2… I think perhaps… that could be beneficial just because you know, it's definitely a steep learning curve for like other people and stuff like that… (Participant B)

Furthermore, the participant indicated a preference for online learning. Notably, they mentioned that incorporating some of the micro-credentials’ content as part of other course offerings could be beneficial,

… Online, if it was like a micro-credential, which it is, but if it was like involved in like incorporated into like a classroom setting like that's fine. But if it was a part of like a class, that would have been cool as well, if we were to do it in person. (Participant B)

***Implementation (I)***

When asked about the best time to open future micro-credentials for enrollment, the participant discussed the possibility of offering them as part of students’ “getting ready” package that they receive prior to the start of the program,

… Prior to starting the program and there's like an email we get with a bunch of like recommended reading… put it in that email and take it beforehand… and I think that would be a really great place to see that because Foundations One is one like so many different time zones and like a lot of time people haven't done that before and It was hard. It was a lot of work, right? And a lot of that was like getting to know people as well so you can mitigate that through that I think or like better equip students to do that… So I think like before the school year (Participant B)

In terms of assessing students’ soft skills, the participant suggested using surveys and creating opportunities for students to work closely with professors,

… Well, maybe like students who did take the course or the micro-credential, you can like follow up with them with like a survey x amount of time, like a period of time later and you like ask them questions about, you know, if their survey affected or influenced or if they've applied anything they've learned from that over the course of their degree or their time here and collect sort of demographic data like, you know, did you go on exchange? Did you do anything else? Things like that. The issue is, of course, like it's another survey people aren't going to fill out… I don't know, maybe… professors have students that they work with more closely like in a research assistant… (Participant B)

The art of communication, cultural sensitivity, and collaboration skills were mentioned as desirable for future micro-credential modules,

This one's so basic, but I think sometimes just how to have the art of conversation… like how to small talk 101 kind of thing… I did actually like a workshop on that like when I was younger and I still to this day…That has helped me… especially I am an introvert. I identify as an introvert I don't know if that's like real, but it's helped me so far. And especially when I went to India like just meeting everybody from Maastricht and then from India, I am like… Hey, how are you doing? And then, you know, you have these conversations and then it gets kind of monotonous and then to dive deeper into that, obviously you don't have to be friends with everyone… also maybe how to leverage like your LinkedIn… (Participant B)

When asked about the relevancy of soft skills to the job market, the participant mentioned that it is beneficial for getting the job done but not necessarily for finding employment,

… for my job in particular the number one skill you need to have is time management…So micro-credentials, incisive decision-making, I actually think that's actually could be a really important one because again got to make these decisions and you got to be incisive about them. I think it could be useful in terms of completing the job. However, in terms of gaining that employment. I don't see a benefit… But as a personal benefit… there's personal benefit for that… and a lot of time you don't see soft skills. Like when you get interviewed, you don't see soft skills at all… like nobody will ever say ah, yes, your soft skills are good that's why we're promoting you… but at the same time, like…you need those soft skills, but they're not going to say, yes, your soft skills are good in addition to everything else. It's like, we like you and you're competent, so we're going to keep you. And then if your soft skills put you over the edge over someone else, they're not going to say, oh yeah, it's your soft skills. (Participant B)

***Case study (3) Participant C – Acquired the micro-credential modules completion certificate***

The third interview was conducted with a student who finished both international collaboration and incisive decision-making modules. Notably, the student mentioned that they did not participate in all of the reflection discussions, “I did the micro-credential modules. I did the modules, but I don' t think I finished all the reflections.” (Participant C)

***Efficacy (E)***

When asked about their perception of the micro-credential modules, the participant expressed surprise at the level of nuance presented. They noted learning many new concepts and appreciated how the overlap between the two modules reinforced certain ideas,

Like before this… I' d never taken a micro-credential before. So I really wasn't sure what to expect... But overall, it was quite a positive experience… So going into it, I thought like, we'll just talk about like collaboration good, teamwork good… but I was quite surprised at how much nuance there was and how like we talked about like, or not we, but the modules use like different frameworks that I' d never heard of before. And I learned a lot of new things, which I was quite surprised about. And even though there were some themes that did overlap between, between the two modules, for example, talking about collaboration and like leadership, I found that I liked that overlap because it helps like reinforce some of the concepts and themes overall. So it was, it was generally a positive experience. (Participant C)

The participant noted that completing the micro-credential modules helped them reflect on their role as external actors within the context of global health,

What I could really appreciate after the modules… the whole idea of like global health work on short-term projects versus long-term projects… as a global health student, I think I've realized that a lot of global health is driven by institutions in North America and in Europe. And you know, as external actors… it really highlighted to me what is my role in this global health system. And how my role is not necessarily to be the person that determines the long-term change, but I can facilitate short-term collaborations and efforts that will support internal actors and communities to enact that long-term change themselves. (Participant C)

The relevance of the micro-credential modules to the job market was described as providing learners with insight into their potential roles in global health, while highlighting the interdisciplinary and collaborative nature of the field,

I think in terms of relevance… I think it' s really good in helping students, especially if students haven' t worked in the global health market. I think it' s really important in highlighting the role that students can play as professionals in the global health market… I think it really helps in terms of understanding, like how interdisciplinary and how just cross-cultural these teams are, and just the necessary skills in order to sort of navigate that… interdisciplinary, so intercultural, and so collaborative. So I think in terms of just keeping in mind with certain principles and certain concepts, I think it was quite useful in that sense. (Participant C)

When asked whether the modules effectively developed the soft skills of incisive decision-making and international collaboration, the participant confirmed that they did. They appreciated how each module clearly outlined the components of these skills and the steps toward mastering them,

I do think so… like I said previously, really going into this, I was because like I've done previous trainings before, like whether that' s for work or for volunteering, where we've talked about this, we haven' t talked about incisive decision- making specifically, but we have talked about teamwork, collaboration, and decision-making, and how they' re important, and we’ve discussed this in the global health program as well, but I feel like this micro credential was really unique and also like really beneficial in that it actually depicts the elements of like what collaboration is, what incisive decision making is, and how you can like achieve that and how you can capture that. (Participant C)

The participant noted that they appreciated the case study approach used to present each module's content. They attributed this to the case studies offering real-world applications, which they found engaging and helpful for gaining a deeper understanding of the material,

I personally really liked the case studies… So, there sometimes when you are sitting on your computer just listening or like reading something… you might not be focused so to speak, whereas the case studies were not only interesting but it is sort of like a real world application of the concept and so the fact that the case studies were sort of like in the middle of all the lectures and I think there were case studies in the reflection questions as well. I think having that in the middle was sort of a mental break in a way where it allowed you to say oh so this is what the speaker means when they' re talking about this concept and this is what it looks like in the real world so I think that was really helpful in terms of really understanding what these things like collaboration and decisive decision making understanding what that looks like in the real world and a real situation. (Participant C)

When asked about the topics covered in the modules and their relevance to developing skills in international collaboration and incisive decision-making, the participant noted that there were a few topics, such as diplomacy and asset-based management, with which they were previously unfamiliar. They appreciated how the modules connected these topics to the global health domain,

I think there were some that I wasn't familiar with as well. I think an example of that would be, there was one on diplomacy, I think, in the collaboration one, and then in the incisive decision-making, like, asset-based management… there were elements of those topics that I' d heard of. Like, I know what diplomacy means, and I know what asset-based management or collaboration is, but in terms of, like, the global health ecosystem, and how that, like, where that plays a role in the global health ecosystem, and how that also contributes to incisive decision-making and doing work in global health, I think that was quite unique, and it was quite thorough. So, I appreciated that, especially because it was something that I personally hadn't really learned before. (Participant C)

***Tailorability (T)***

The participant viewed the flexible, asynchronous format of the modules favorably, as it allowed them to incorporate the content into their busy summer schedule,

I think for the videos especially if this is like a summer micro credential program I think it was convenient in terms of you know people have other obligations and I myself with like my work and my thesis whatever that might be like a little bit harder to like work with and… I think that it was really nice to be able to do it on my own time. (Participant C)

***Implementation (I)***

However, the student expressed a preference for the reflection questions to be conducted via a call, Zoom, or in person to enable interaction among students,

But one thing that I did think that it might be nice to maybe not be asynchronous was the reflections or the discussion questions. I didn't complete all of them but I did get through some of them and they were really good questions, and I thought, like, in the discussion board, I know the intention was for students to, you know, reply back and have, like, a discussion. But I find that I prefer having discussions, like, over a call, over Zoom, or in person… because, like, you re naturally going to get an exchange between, like, the different people participating, and you'll sort of allow people to think of perspectives or ideas that they never thought of before. (participant C)

The participant also described their experience with online discussion board and mentioned that they did not interact with other people’s posts, “Everyone just posts what they think, and personally, I didn't really read through other people' s responses.” (Participant C)

The participant discussed potential changes they would like to see in future offerings of the micro-credential modules, specifically expressing a desire to view the correct answers after submitting their quizzes. They suggested that links to required and recommended videos and academic papers be provided in a standalone PDF or a separate list, rather than solely in the references section. The participant noted that enhancing the accessibility of these links could increase the likelihood of their pursuing these additional learning resources,

I think one thing that I wish to see is, because for the quizzes, there was like a certain amount of times that you could do it, which was I was fine with that, but I think for some of the quizzes, there was one or two questions that I kept getting wrong, and I didn't I know why, and I wanted to go, like, even after I finished all the attempts, I wanted to go back and see which question I got wrong… so just being able to review your, your quizzes after, like, your submissions are done, I think I would have liked that, because that would have just been, like, additional learning to see, like, oh, I misunderstood this, or I understood this well, and then the sort of second thing was, I realized that in some of the videos, there were, there were links embedded in the slideshow, but because it was a video, I couldn't click on the link, and I know there' s, like, a references list in Avenue to Learn, but I didn't see that references list until later… so if there were some way to either, like, attach, like, the slideshow, or, like, make the links more accessible, or just, like, or have, like, PDFs of certain studies, like, embedded for additional reading, I think that would make it a lot easier for me to access, you know, that extra learning, but it'll also make me more likely to, to seek out that extra learning and see where these case studies are coming from, or where these concepts are coming from. (Participant C)

***Reach-out (R)***

The participant stated that they would recommend the micro-credential modules to other students, as they found the material reinforced concepts covered in the program’s theoretical courses and provided a conceptual foundation applicable in the workforce,

Oh, yes100%, 100%, and the reason why I say that is… in this global health program… we have talked so much about teamwork, collaboration, partnerships, you know, just like, all of these key buzzwords… we've tried to discuss what that means in courses, and I' m not negating that, but I think that this micro-credential, like, not only reinforces that, but it also gives you a more nuanced, like, theoretical and conceptual background that you can then utilize in the workforce, so I think especially for global health students, but even for non-global health students, like, science students or public policy students who are just interested in, just working in international fields or in the health field, I feel like this could be a very beneficial micro-credential program for them. (Participant C)

The results demonstrate that micro-credentials hold potential as feasible and acceptable educational tools within the GH graduate program, particularly for enhancing students’ soft skills. Career advancement emerged as the primary motivator for participants to enroll in the modules, while time constraints were consistently identified as a barrier to participation. The successful launch of the modules on the A2L platform further highlighted its suitability for future initiatives. A2L’s compatibility with various media formats—such as voice recordings, videos, and PowerPoint slides—and its ability to integrate links for live video conferencing enhance its usability and adaptability to diverse learner preferences.

Participants expressed interest in adding components related to grant writing to align with career needs. Additionally, there was a strong preference for incorporating an in-person component to foster active discussions and collaborative learning experiences. A summary of these findings, organized using the FRAME-IT framework, is presented in Table 3.

Table (3) The FRAME-IT framework

|  |  |
| --- | --- |
| Constructs | Research-focused construct facets |
| Feasibility | * The development and piloting of micro-credential modules as part of the GH program is feasible. * Virtual delivery using the A2L platform is feasible. * No technical challenges reported. |
| Reach-out | * Desired population (graduate students of the GH program) reached. * Participants indicated willingness to recommend the micro-credential modules to other students. |
| Acceptability | * Micro-credential modules were reported to be an acceptable method to enhance students’ soft skills * Acceptability evaluation might be impacted by participants’ low-response rate. * Time-constrains were reported as a barrier to participation. * Modules were offered free of charge to increase acceptability. |
| Maintenance | * Career advancement was reported to be a primary motivator for undertaking and completing the micro-credential modules. * Further longitudinal investigation is required to evaluate long-term use of micro-credential modules and sustenance of learned concepts. |
| Efficacy | * Success rate evaluation warrants longitudinal follow-up. * Self-reported results indicate that participants gained a better understanding of the concepts presented in the micro-credential modules. |
| Implementation | * Modules were implemented as planned. * Participation was impacted by self-reported time-constraints. * Low participation rates in the surveys and focus groups might have been linked to cited time constraints. * Low awareness of the concept of micro-credentials may have impacted participation rates. * The discussion questions were designed to provide learners’ with an opportunity to reflect on their learning journey and engage in critical discussions with peers. * The A2L platform supports various media formats, including voice recordings, videos, and PowerPoint slides, and allows users to incorporate links for live video conferencing. This versatility enhances usability and enables customization to accommodate a diverse range of learners' preferences. |
| Tailorability | * The micro-credential modules were design to respond to the needs of the GH job market. * The modules were created by two of the GH program’s students and thus the developed content was student centric. * Participants suggests incorporating elements related to grant writing. * Participants reported a desire for incorporating an in-person component to allow for active discussions. * Participants suggested making future micro-credential modules available to students at the start of the program. |

**Chapter 6: Discussion**

**Feasibility and Acceptability of Micro-Credentials for Developing Soft Skills**

Our findings suggest that micro-credentials represent a feasible and acceptable method for enhancing students' soft skills. However, their effectiveness is influenced by factors such as delivery mode and timing. Most participants in the piloted modules reported engaging with micro-credentials primarily for career development or advancement. While these programs may enhance employability by certifying desirable skill sets, the extent to which they influence hiring decisions remains uncertain83–85.

Insights gathered from the interviews highlighted three distinct scenarios regarding student engagement with the micro-credential modules. One participant noted that while they enrolled in the modules and reviewed some content, they did not complete the material, citing time constraints. This individual emphasized the value of the practical applications and implications of the soft skills presented and recommended introducing the modules as prerequisites to the program’s courses to improve participation rates. Additionally, they suggested soliciting student input on future content before its release.

Another participant, who did not engage with the micro-credential modules, attributed their non-participation to a busy schedule but acknowledged the relevance of the soft skills to the program's theoretical components. This student proposed that future micro-credential modules be offered prior to starting the Global Health Foundations I and II courses, noting that these courses require international collaboration and that the modules could provide valuable preparatory insights. They also suggested incorporating scenario-based exercises and debriefing activities, emphasizing the importance of launching the modules at the program's outset. Regarding soft skills assessment, this participant recommended using surveys and creating opportunities for closer interaction with professors. They further expressed that while soft skills are essential for task completion, they do not necessarily guarantee employment.

The third participant, who completed the micro-credential modules, highlighted the value of the detailed content, which deepened their understanding and prompted reflection on their role as an external actor. They appreciated the case study approach employed in the modules and found the asynchronous online format particularly beneficial for accommodating their busy summer schedule. However, they expressed a preference for discussions conducted via video calls, Zoom, or in-person sessions to foster interaction among students.

Across these three cases, time constraints emerged as a common barrier. Participants who did not complete or engage with the modules indicated a preference for introducing them early in the program as part of a prerequisite package. This timing adjustment, they suggested, would enable students to integrate newly acquired soft skills into their coursework and provide opportunities to practice these skills in a structured and safe environment. It was implied that the summer semester pilot conflicted with competing priorities, such as summer placements and thesis work, limiting student engagement.

Another key insight was that despite interest in the micro-credential modules for career development, low awareness of the concept of micro-credentials and their objectives may have diminished interest and created unclear or incorrect expectations regarding their career advancement potential. Furthermore, the suggestion to incorporate a synchronous component reflects a desire for enhanced peer-to-peer interaction, which could facilitate practical application of the module content. Peer learning has been recognized as an effective approach to developing soft skills, and incorporating interactive elements may foster greater participation through peer support and motivation.

Qualitative data indicate that while students perceive soft skills are critical for task execution, they may not serve as primary determinants of hiring or career progression. This disconnect could stem from the subjective nature of soft skills, which complicates their evaluation and standardization as employment requirements86. To address this issue, it is proposed that future micro-credential modules be positioned as tools to help students better understand the global health field and equip them with practical insights for navigating complex situations.

A clear distinction should be made between micro-credentials as mechanisms for enhancing soft skills—thereby improving task performance—and their role as direct pathways to employment or career progression. This distinction is crucial to managing student expectations effectively. While both employees and employers internally acknowledge the value of soft skills, their external emphasis is limited due to the challenges associated with objective assessment and standardization. Ensuring that micro-credential programs clearly communicate these nuances could enhance their perceived utility and alignment with students' key priorities, particularly in relation to career preparation objectives.

**Soft Skills in Global Health Contexts**

In global health, particularly in academic research and collaborations between the Global North and South, certain soft skills, such as international collaboration, are of heightened relevance. These skills enable professionals to navigate interprofessional teams and work effectively across diverse cultural and socioeconomic contexts while upholding principles of health equity and cultural awareness87,88.

One of the piloted micro-credential modules focused on international collaboration. Students reported that this skill was particularly relevant to the MSc Global Health program, which required them to engage in virtual teamwork with overseas colleagues, addressing challenges such as time zone differences, language barriers, and cultural diversity. After completing the module, students expressed greater confidence in their ability to work within international teams, highlighting the module's alignment with practical program requirements.

Incisive decision-making is a critical skill for navigating complex situations in high-stress environments, where resources are often limited, and conflicting interests are commonplace44,87. The incisive decision-making modules were designed to emphasize the interconnectedness of collaborative teamwork, leadership, accountability, and mutual trust by examining real-world case studies. These modules aimed to equip participants with practical insights for applying these principles in challenging scenarios.

Students reported feeling more comfortable with making quick decisions while considering the interests of involved stakeholders and the limitations of available resources. However, self-reported efficacy cannot serve as an objective measure for assessing progress, as real-world situations are inherently complex and involve numerous intertwining and often conflicting factors89,90. Additionally, self-reported measures are usually context-specific and might be shrouded by internal biases90. A longitudinal evaluation of soft skills based on performance outcomes may provide a more robust understanding of the effectiveness of micro-credential modules in enhancing students' decision-making and other soft skills.

**Delivery Modes: Asynchronous and Mixed Approaches**

The asynchronous delivery mode of the micro-credential modules was generally acceptable, particularly for students with demanding schedules. Some students expressed a preference for a mixed delivery approach that combines in-person interactive elements with asynchronous learning. However, to rigorously assess the efficacy of asynchronous and hybrid approaches, future studies should employ randomized controlled trials (RCT). Conducting a RCT could help evaluate the efficiency of each delivery method—in-person, virtual, and hybrid—by comparing their outcomes. An RCT would provide quantitative data to assess how specific learner characteristics, such as learning preferences, and time management skills, influence the effectiveness of each approach.

Interactive discussions, especially in person, were reported as effective for building on learned material, facilitating the exchange of ideas, and fostering the development of tacit and soft skills91,92. In contrast, while asynchronous learning offers flexibility by removing time and location constraints93, it may limit engagement in discussions due to the lack of direct interaction94. This, in turn, may reduce opportunities for idea exchange and collaborative learning.

The micro-credential modules were designed in accordance with cognitive load theory48 to minimize both external and internal cognitive loads while enhancing germane load. This approach aimed to facilitate the integration of learned concepts into students’ long-term memory, enabling the effective application of theoretical knowledge in practical settings. To achieve this, the material was tailored to accommodate diverse learner preferences, with a deliberate focus on eliminating redundancy and specialized jargon. Instead, the modules emphasized clarity and interactivity.

The content within each module was structured in ascending complexity, beginning with foundational explanations of concepts and culminating in advanced case studies that integrated multiple, often overlapping, ideas. Additionally, students were encouraged to engage in self-explanation through reflective discussions to further consolidate their understanding of the material.

Despite reported time constraints, the high completion rates of the modules suggest that the objectives of the learning theory were successfully achieved, as students were able to progress effectively through the content. Moreover, feedback from case studies indicates that students were able to establish connections between the micro-credential content and the theoretical courses in the Global Health program. They also demonstrated an understanding of the practical implications of the module content, highlighting the effectiveness of the design in bridging theoretical and applied learning.

While micro-credentials hold significant potential for fostering soft skills in global health and other fields, their effectiveness is heavily influenced by the delivery mode and engagement strategies employed. Striking a balance between the flexibility of asynchronous learning and the interactive advantages of in-person elements could improve both the acceptability and impact of these programs.

Furthermore, cognitive load theory serves as a particularly appropriate framework for designing future micro-credentials. By simplifying complex concepts and minimizing extraneous cognitive load, this approach enhances the accessibility of learning materials while promoting the integration of knowledge into long-term memory. This is particularly important for developing soft skills, as these competencies are foundational for shaping professional social abilities and navigating the complex dynamics of global health.

**The Role of Intersectionality in Developing and Evaluating Soft Skills in Global Health**

Soft skills are primarily acquired, developed, and enhanced through practical application in the public sphere and everyday social interactions95,96. Unlike technical knowledge, they cannot be fully cultivated through academic textbooks or lectures, which serve as guiding tools rather than substitutes for real-world experience. The effective evaluation of soft skills acquisition requires a longitudinal, performance-based framework—a methodology that falls outside the scope of this study. Nevertheless, our approach aimed to provide students with opportunities to apply theoretical knowledge to real-life scenarios through the use of case studies.

Completion rates for the modules may serve as preliminary indicators of feasibility and acceptability. However, the real-world application of these skills is subject to variability influenced by both external and internal factors. High-stress situations, for instance, may impair an individual’s ability to make incisive decisions, while personal attributes such as cultural background, self-awareness, and socioeconomic status can shape team dynamics and influence collaboration.

The international collaboration module adopted a perspective that placed students as active agents of influence rather than passive recipients of external efforts. While the module included topics such as diplomacy and the importance of open dialogue, its content was designed with the "Northern sphere" student in mind. This framing implicitly reflected the privileges often associated with being a graduate student from a prestigious institution—privileges that can be compounded by factors such as ethnicity, gender, culture, and income.

For example, a white male global health professional collaborating with colleagues in a patriarchal society on resource redistribution projects may experience interactions differently from a racialized female professional working in a matriarchal context on maternal health initiatives. Both may share similar educational backgrounds, but their experiences are shaped by how intersecting identities influence perception, interactions, and rapport-building with local communities. This underscores the importance of recognizing privilege and identity in global health training and practice.

The content of the micro-credential modules was developed by two students in the program, one of whom (the author) is a racialized female. The author acknowledges that her experiences, perceptions, and positionality—whether shaped by privilege or disadvantage—are unique to her and do not necessarily reflect the broader experiences of individuals who share similar identities. Additionally, as a graduate student at a Western university, the author recognizes the privilege inherent in her position. While efforts were made to present the module material as neutrally as possible, the potential for unconscious bias remains.

To address this limitation and enhance the inclusivity of future modules, it is strongly recommended, as suggested by participants, that the design process involve consultation with a diverse group of students from the program. Incorporating perspectives from international partners would further enrich the content and contribute to a more balanced worldview.

Soft skills are inherently social and are deeply influenced by the cultural and societal norms of the local context. Students must therefore be trained to adapt their approaches to align with the cultural specificities of the communities they engage with. For instance, the process of decision-making can differ significantly between societies that prioritize collectivist ideals versus those that emphasize individualistic well-being. This underscores the importance of avoiding a "one-size-fits-all" approach. Instead, the optimal course of action should consider local culture, available resources, stakeholder interests, the problem at hand, and its potential future implications.

To address these complexities, it is imperative that future modules be co-designed with input from program students and other key stakeholders. This participatory approach would not only enrich the content but also better equip students to navigate the complexities of the global health scene.

**Incorporating Local Perspectives and Shared Accountability**

The incisive decision-making module emphasized the importance of centering community interests in planning and implementing interventions. It advocated for community-led action, where researchers adopt a supportive role, empowering local communities to lead, sustain, and implement change independently of external agents. Achieving this, however, requires significant investment in building rapport, trust, transparency, and shared accountability.

These processes are complicated by existing biases and power imbalances, which can create gaps that require time and shared effort to bridge. The dynamics of trust-building and collaboration are further influenced by intersecting identities, which may either facilitate or hinder the establishment of meaningful connections97,98. For example, perceptions of authority, cultural competence, and relatability can differ based on gender, ethnicity, and socioeconomic status, influencing the extent to which researchers can integrate into local contexts and contribute to sustainable change.

Understanding and addressing the complexities of identity and intersectionality is essential for fostering meaningful global health partnerships. The development of soft skills in this context requires not only their practical application but also critical reflection on power dynamics and privilege. By acknowledging and addressing these factors, global health professionals can navigate diverse environments more effectively, foster equitable collaborations, and enhance the impact of their work.

The content of the modules sought to address topics such as intersectionality, privilege, and rapport-building, particularly within the context of institutional-level collaborations and decision-making. However, navigating these complex concepts can differ significantly when working with individuals, especially in settings characterized by low literacy or severe disadvantages among local stakeholders. The modules were developed by graduate students without broader stakeholder consultation. While the authors aimed to incorporate diverse perspectives and representations, the content was ultimately limited to the information available in the reference sources they utilized.

Although participants did not explicitly highlight the importance of local community perspectives, their feedback indicated a strong preference for launching micro-credential modules prior to the start of the program’s coursework, when excitement and engagement levels were higher. This suggests a misalignment between the timing of the modules' release and students' competing priorities at the time. The author reflects that failing to incorporate student input prior to launching the modules contributed to lower participation rates, illustrating the potential impact of not consulting the intended audience on project outcomes.

Moreover, participants emphasized that students enhance their soft skills not only for career advancement but also to collaborate more effectively with the communities they serve. This process requires the active inclusion of input from those communities to ensure that training aligns with their needs and contexts. The findings underscore the importance of co-developing future modules with both students and local stakeholders to create content that is contextually relevant and capable of addressing the nuances of global health practice.

**Motivations to enhance soft skills**

Students identified career advancement as a key motivator for engaging in the micro-credential modules. However, there was notable uncertainty regarding the nature of micro-credentials, their underlying objectives, and the anticipated benefits. Despite their recent surge in popularity within graduate education, micro-credentials remain a relatively novel concept99, which may contribute to limited familiarity among students. Moreover, individuals in scientific and medical fields often prioritize traditional, rigorous academic subjects and may have less exposure to concepts related to soft skills100–102. This underscores the importance of introducing students to the concept of micro-credentials and emphasizing the value of soft skills 100–102, particularly in fields such as global health.

***Limitations***

The low participation rates in surveys and interviews—despite relatively high engagement with the micro-credential modules themselves—may be largely attributed to the timing of data collection. Many students completed their graduate studies by the end of August, likely diminishing their interest in participating in research activities as they transitioned to new professional or academic endeavors. Furthermore, the pilot phase of the micro-credential modules coincided with the beginning of students’ internships, which may have exacerbated time constraints and reduced their capacity to engage with the study.

The limited number of responses obtained raises potential concerns regarding the representativeness of the collected feedback. Nonetheless, the feedback received suggests that participants generally found value in the micro-credential courses, particularly in consolidating their learning, enhancing collaboration skills, and developing specific global health competencies. However, as each response represents an individual perspective, it is important to acknowledge that while the program met some participants’ expectations, broader perceptions of its impact may vary across the cohort. Additionally, the perceived limitations of the incorporated qualitative methodology include the fact that the acquired results might not be reflexive103 of other students’ experiences.

Another notable limitation of the study is the short follow-up period, which did not allow for the assessment of long-term perceptions regarding the effectiveness and impact of the micro-credential modules on students’ soft skills development. Furthermore, the absence of consultation with program students during the development of the modules—despite their intended purpose of enhancing students' soft skills—may have negatively influenced engagement. The lack of a participatory approach likely hindered the alignment of the modules with student needs and preferences.

Additionally, the results highlight a limitation related to students' lack of awareness about the concept and purpose of micro-credential modules. This gap in understanding may have further impacted their engagement and the perceived relevance of the modules.

***Future micro-credentials and research trajectories***

To address these challenges, it is recommended that micro-credential modules be introduced at the beginning of the academic year, accompanied by longitudinal evaluations to monitor students' development of soft skills. Such evaluations could track the application of acquired knowledge in real-world contexts as students progress through course content and practical experiences. This approach would not only provide insights into the effectiveness of the modules but also inform iterative revisions to ensure the content aligns more closely with students' evolving needs. The author advocates for adopting a participatory approach by inviting students to contribute input on the modules’ content and the soft skills addressed. Additionally, incorporating perspectives from local community leaders and international peers, where applicable, is recommended to ensure a more comprehensive and culturally relevant design. Additionally, integrating real-life scenario role-play and case studies into graduate program curricula can provide students with a low-cost, accessible opportunity to practice their skills in a low-risk environment.

To address the low awareness of micro-credential modules, it is advised to provide students with a clear overview of what micro-credentials are, their value, and their expected outcomes prior to the modules' launch. This introduction should occur at a time when students’ schedules allow for meaningful discussions between them and the module developers. Such conversations would help align the modules with students’ interests and expectations, fostering a sense of ownership and relevance. It is anticipated that these measures would enhance both student engagement and the overall effectiveness of the program.

The purpose behind the development of micro-credentials should align with students’ needs and expectations, serving as a reflection of these priorities. Micro-credentials aimed at enhancing students’ soft skills should integrate the perspectives of students and local communities, addressing the skills necessary for students to collaborate effectively and work meaningfully within these communities. Conversely, micro-credentials advertised as tools to improve employability should incorporate the perspectives of employers and provide networking opportunities with industry leaders, as their interests and priorities may differ significantly from those of students. Making this distinction is essential to ensure that micro-credential offerings meet students’ expectations and deliver on their intended purpose.

Based on students’ feedback, it is recommended that micro-credential modules be piloted before the commencement of the program’s coursework. This timing would minimize conflicts with students’ academic priorities, such as thesis writing and summer internships, which typically occur during the summer semester.

Future research could benefit from adopting a longitudinal design to assess the sustained impact of micro-credentials. By examining objective outcome measures, such as job performance and employability, researchers could gain valuable insights into the long-term career benefits of these programs. This approach would provide a more comprehensive understanding of how micro-credentials influence professional development and workforce integration over time. Additionally, implementing a quasi-experimental research design could provide valuable insights into the comparative effectiveness of asynchronous and hybrid micro-credentials. Feedback from students highlighted a preference for incorporating an in-person component to enhance peer-to-peer knowledge exchange. However, time constraints emerged as the primary barrier to participation, even within the flexible asynchronous format of the piloted micro-credential modules. This proposed research design would not only facilitate the evaluation of the effectiveness of these delivery methods but also enable a comprehensive examination of uptake and student engagement across the two approaches.

The table below provides a summary of recommendations for future micro-credential offerings and research trajectories based on the findings of this project. Adopting longitudinal evaluations and research designs, coupled with a participatory approach to foster student engagement, is essential. Aligning micro-credential offerings with student expectations and designing materials with a clear understanding of their intended purpose is crucial. For example, micro-credentials aimed at enhancing students’ soft skills will differ significantly from those designed to boost employability, as the latter would require input from employers and the establishment of networks with industry leaders. Furthermore, incorporating students’ perspectives is vital to ensure that the duration of micro-credential offerings does not conflict with their academic priorities, as this could deter participation.

Table (4) summary of recommendations for future micro-credential offerings and future research trajectories

|  |
| --- |
| Future micro-credential offerings |
| *Timing & Evaluation:* Introduce modules at the beginning of the academic year with longitudinal evaluations to track soft skills development and real-world application. |
| *Participatory Approach:* Involve students, local community leaders, and international peers in module development to ensure cultural relevance and alignment with student needs. |
| *Determine the goal behind offering micro-credentials:* Micro-credentials designed to enhance students’ employability should incorporate the perspectives of employers and industry leaders to ensure proper alignment with market demands. In contrast, micro-credentials aimed at enhancing students’ soft skills should integrate the perspectives of students and local communities to ensure relevance and cultural appropriateness. |
| *Awareness & Engagement:* Provide clear introductions to micro-credentials before module launch, allowing meaningful discussions between students and developers to align expectations. |
| Future research trajectories |
| *Longitudinal Research:* Use longitudinal designs to assess long-term impacts on career outcomes, such as job performance and employability, for a deeper understanding of professional benefits. |
| *Quasi-experimental design:* Compare the outcomes of hybrid and fully asynchronous micro-credentials in terms of their impact on students' soft skills. |

**Conclusion**

Micro-credentials are perceived as a feasible and acceptable method for enhancing students’ soft skills, particularly in areas embedded within the curriculum but not consistently assessed through traditional evaluation methods, such as incisive decision-making. This approach offers students hands-on experience in realistic scenarios, helping to build self-confidence and better prepare them for future career challenges.

The asynchronous online delivery model increased the acceptability of the modules among students, as it allowed for greater flexibility and easier integration into their busy schedules. However, the inclusion of more direct peer-to-peer interactions in reflection discussions could further enhance the learning experience by fostering healthy dialogue and encouraging the exchange of ideas.

To maximize engagement and impact, future micro-credential modules could be introduced before the start of the program’s coursework. This timing would capitalize on students' initial enthusiasm and avoid conflicts with academic priorities. Additionally, incorporating input from students and other stakeholders during the development process would enhance the relevance of the modules and promote a participatory approach to their design and implementation.

The table below summarizes the key takeaways from this thesis.

Table (5) Key takeaways

|  |
| --- |
| Key takeaways |
| *Feasibility & Acceptability:* Micro-credentials are a feasible and acceptable method for enhancing students’ soft skills. |
| *Flexible Delivery:* Asynchronous online modules are well-received due to flexibility and ease of integration into students' schedules. |
| *Peer Interactions:* Increasing peer-to-peer engagement in reflection discussions can enhance learning through dialogue and idea exchange. |
| *Timing & Stakeholder Input:* Introducing modules before coursework starts would boost engagement and prevent conflicts with academic priorities. Involving students and stakeholders in development ensures relevance and a participatory design. |

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Appendix A

**ENROLLMENT SURVEY GUIDE**

**Study Title**: Soft Skills: From a Subjective Concept to a Measurable Objective

**PART 1: WORDING FOR THE ONLINE SURVEY**

The following text will appear throughout the online survey:

**The “Preamble” Statement:**

This text will appear at the beginning of the online survey and before the actual questions:

This survey is administered by Menna Komeiha and Abby Tristani, master thesis students with the Global Health Office, Faculty of Health Sciences at McMaster University. The purpose of this study is to critically address aspects of interdisciplinary teaching and learning within the Graduate Global Health programs at McMaster University. We are interested in exploring the potential of microcredentials as a digital innovation to enhance student engagement, retention, and success. What we learn from this survey will help us understand if microcredentials offer a framework for students to reflect upon their interdisciplinary learning experiences and develop a consolidated and marketable portfolio of in-demand employable skills, thus supporting success following graduation.

This survey should take approximately 30 minutes to complete. Participants filling out this survey must be enrolled in a 2024 MSc Graduate Global Health program at McMaster University.

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, Hamilton Integrated Research Ethics Board at 905-521-2100 ext.42013.

If the participant clicks the “next” button, the next screen will take the participant to the “Consent to Participate” statement.

If the participant clicks the “exit” button, the screen will display the “Quit” statement below.

**CONSENT TO PARTICIPATE**

By enrolling in this study, you will be asked to complete an enrolment survey before accessing the microcredentials module of your choice. This survey is estimated to take 30 minutes to complete.

**Potential Harms, Risks or Discomforts**

The researchers on the study team will work hard to keep your information private and your identifiable data will not be shared with anyone except with your consent or as required by law. As part of this survey, we will be collecting demographic information to better understand the characteristics of our participants, this may include details such as age, gender, and email address. It is important to note that any of the demographic information provided will be used solely for research purposes and will be aggregated and anonymized to ensure your privacy. All personal information such as your name and email address will be removed from the data and will be replaced with a number. A list linking the number with your name will be kept on a password-protected computer in the Global Health Office at McMaster University, separate from original files.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

As a participant, you have the right to refrain from answering any questions you are uncomfortable with, and you can take breaks as needed. You are free to withdraw from the study by simply logging off instead of submitting your survey answers. It is important to note that once survey answers are submitted, they cannot be retracted.

**Potential Benefits**

The results of this project may not directly benefit you. However, they will provide valuable insight to the Graduate GH programs on how to structure future modules and areas that require improvement. Your participation contributes to the enhancement of the program for future students, ensuring it remains relevant and effective in preparing students for successful careers in global health.

**Compensation**

After completing this survey, you will become eligible to receive a $10 virtual gift card that will be sent via email.

**Confidentiality**

For the purposes of ensuring proper monitoring of the research study, it is possible that representatives of the Hamilton Integrated REB (HiREB), this institution, and affiliated sites may consult your original research data to check that the information collected for the study is correct and follows proper laws and guidelines. By participating in this study, you authorize such access. Every effort will be made to maintain the confidentiality and privacy of participants. All collected information will be de-identified and stored securely in the study's electronic file management system on a computer protected by passwords and firewalls. Participants will be assigned a study ID number to ensure anonymity. These ID numbers will be randomly allocated, and a master linking list of study ID numbers will be stored separately on a private electronic server within a password-protected folder. Only the researchers will have access to the master linking list. Upon completion of the study, identifiable data will be permanently erased using overwriting software. Please note that direct quotes might be used in the results’ manuscript. By participating in this study, you do not waive any rights to which you may be entitled under the law.

**Participation and Withdrawal**

Your participation in this project is entirely voluntary and not linked to your eligibility to enroll in any microcredential module. Should you choose to participate, rest assured that you can withdraw at any time, including during the study, without facing any penalties or consequences. Additionally, you are free to participate in any other research study. Your participation in another study will not affect your ability to participate in this study. You do not need to tell us if you are participating in another study.

Please note that once survey results are submitted, we will be unable to accommodate requests for data removal. Importantly, your decision to withdraw will not impact your ability to complete modules or enroll in future ones.

**Questions about the Study**

If you have questions or need more information about the study itself, please contact us at: [komeiham@mcmaster.ca](mailto:Komeiham@mcmaster.ca) or [tristana@mcmaster.ca](mailto:tristana@mcmaster.ca)

Having read the above, I understand that by clicking the “Yes” button below, I agree to take part in this study under the terms and conditions outlined in the accompanied Participant Information Sheet.

If you do not agree to quotes or other results arising from your participation in the study being included, even anonymously, in any reports about the study, please contact the research assistant, Menna Komeiha (komeiham@mcmaster.ca) or Abby Tristani (tristana@mcmaster.ca).

If the participant clicks the “yes” button, the next screen will take the participant to the survey questions.

If the participant clicks the “no” button, the next screen will display the statement below – the “Do Not Agree to Participate” statement.

**The “Do Not Agree to Participate” Statement:**

This text will appear if the participant does not agree to participate:

Thank you. You have decided not to participate in this survey. No data has been collected from you.

**The “Quit” Statement:**

There will be a quit button displayed throughout the survey. If the participant decides to hit the “quit button” at any time during the survey, the following statement will appear.

Thank you. You have decided to quit this survey. None of your survey responses have been collected or stored.

**The “Thank You for Completing the Survey” statement:**

This wording will appear after the respondent has completed the survey.

Thank you for taking this survey. Your answers are a valuable part of this research.

**The “Providing participants with the Study’s final results” statement:**

After the answers have been submitted, a screen will appear that says the following:

YES "I would like to receive a summary of the study’s results".

Please use this link to sign up to receive a notification when the study’s results have been published. Please note that this information will be stored separately and will not be linked to any information that you submit as a participant in this study.

NO "I do not want to receive a summary of the study’s results."

**PART 2: SURVEY QUESTIONS**

**Section 1: Background**

1. Age:
   1. 18-24
   2. 25-34
   3. 35-44
   4. 45-54
   5. 55-64
   6. 65 or older
2. Gender:
   1. Male
   2. Female
   3. Transgender
   4. Two-Spirit
   5. Non-binary
   6. Prefer not to say
   7. I identify as \_\_\_\_\_\_
3. Do you identify as a member of a minority or racialized group?
   1. Yes
   2. No
   3. Prefer not to disclose
4. Do you identify as an Indigenous person?
   1. Yes
   2. No
5. What is your highest level of education obtained?
   1. Bachelor’s Degree
   2. Master’s Degree
   3. Doctoral Degree
   4. Professional Degree (e.g., MD, JD)
   5. Other (please specify)

**Section 2: Experience**

1. Have you previously participated in any microcredential courses at a university?
   1. Yes/No
   2. If yes, please provide the names of the microcredential courses and the universities where you completed them.
2. Are you currently aware of or involved in any microcredential programs at McMaster University?
   1. Yes/No
   2. If yes, please briefly describe your involvement and experience
3. How would you rate your current level of awareness and understanding of microcredentials?
   1. Very Poor
   2. Poor
   3. Fair
   4. Good
   5. Very Good
4. What motivated you to enroll in microcredential courses?
   1. Career advancement
   2. Skill development
   3. Personal interest
   4. Stay updated in the field
   5. Other (please specify)

**Section 3: Skills, Confidence, Knowledge**

1. I have the skills needed to effectively collaborate with relevant international stakeholders
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly Agree
2. I am confident that I can effectively collaborate with relevant international stakeholders
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
3. I am confident that I am able to work with other members of other professions to effectively collaborate with relevant international stakeholders
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
4. Please rate how knowledgeable you feel about your ability to effectively collaborate with relevant international stakeholders
   1. Not at all knowledgeable
   2. Slightly knowledgeable
   3. Moderately knowledgeable
   4. Very knowledgeable
   5. Extremely knowledgeable
5. I have the skills needed to \_\_\_\_
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
6. I am confident that I can \_\_\_\_\_
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
7. I am confident that I am able to \_\_\_\_
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
8. Please rate how knowledgeable you feel about your ability to \_\_\_
   1. Not at all knowledgeable
   2. Slightly knowledgeable
   3. Moderately knowledgeable
   4. Very knowledgeable
   5. Extremely knowledgeable

**Section 4: Willingness to Participate in the Research**

1. Are you willing to participate in interviews or focus group discussions as part of the research study?
   1. Yes
   2. No

Appendix B

**FEEDBACK SURVEY GUIDE**

**Study Title**: Soft Skills: From a Subjective Concept to a Measurable Objective

**PART 1: WORDING FOR THE ONLINE SURVEY**

The following text will appear throughout the online survey:

**The “Preamble” Statement:**

*This text will appear at the beginning of the online survey and before the actual questions:*

This survey is administered by Menna Komeiha and Abby Tristani, master thesis students with the Global Health Office, Faculty of Health Sciences at McMaster University. The purpose of this study is to critically address aspects of interdisciplinary teaching and learning within the Master of Science in Global Health (MSc GH) program at McMaster University. We are interested in exploring the potential of microcredentials as a digital innovation to enhance student engagement, retention, and success. What we learn from this survey will help us understand if microcredentials offer a framework for students to reflect upon their interdisciplinary learning experiences and develop a consolidated and marketable portfolio of in-demand employable skills, thus supporting success following graduation.

This survey should take approximately 30 minutes to complete. Participants filling out this survey must be enrolled in the 2024 MSc Global Health program at McMaster University.

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, Hamilton Integrated Research Ethics Board at 905-521-2100 ext.42013.

*If the participant clicks the “next” button, the next screen will take the participant to the “Consent to Participate” statement.*

*If the participant clicks the “exit” button, the screen will display the “Quit” statement below.*

**CONSENT TO PARTICIPATE**

By enrolling in this study, you will be asked to complete an enrolment survey before accessing the microcredentials module of your choice. This survey is estimated to take 30 minutes to complete.

**Potential Harms, Risks or Discomforts**

The researchers on the study team will work hard to keep your information private and your identifiable data will not be shared with anyone except with your consent or as required by law. As part of this survey, we will be collecting demographic information to better understand the characteristics of our participants, this may include details such as age, gender, and email address. It is important to note that any of the demographic information provided will be used solely for research purposes and will be aggregated and anonymized to ensure your privacy. All personal information such as your name and email address will be removed from the data and will be replaced with a number. A list linking the number with your name will be kept on a password-protected computer in the Global Health Office at McMaster University, separate from original files.

If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your specific consent to the disclosure.

As a participant, you have the right to refrain from answering any questions you are uncomfortable with, and you can take breaks as needed. You are free to withdraw from the study by simply logging off instead of submitting your survey answers. It is important to note that once survey answers are submitted, they cannot be retracted.

**Potential Benefits**

The results of this project may not directly benefit you. However, they will provide valuable insight to the MSc GH program on how to structure future modules and areas that require improvement. Your participation contributes to the enhancement of the program for future students, ensuring it remains relevant and effective in preparing students for successful careers in global health.

**Compensation**

After completing this survey, you will become eligible to receive a $10 virtual gift card that will be sent via email.

**Confidentiality**

For the purposes of ensuring proper monitoring of the research study, it is possible that representatives of the Hamilton Integrated REB (HiREB), this institution, and affiliated sites may consult your original research data to check that the information collected for the study is correct and follows proper laws and guidelines. By participating in this study, you authorize such access. Every effort will be made to maintain the confidentiality and privacy of participants. All collected information will be de-identified and stored securely in the study's electronic file management system on a computer protected by passwords and firewalls. Participants will be assigned a study ID number to ensure anonymity. These ID numbers will be randomly allocated, and a master linking list of study ID numbers will be stored separately on a private electronic server within a password-protected folder. Only the researchers will have access to the master linking list. Upon completion of the study, identifiable data will be permanently erased using overwriting software. Please note that direct quotes might be used in the results’ manuscript. By participating in this study, you do not waive any rights to which you may be entitled under the law.

**Participation and Withdrawal**

Your participation in this project is entirely voluntary and not linked to your eligibility to enroll in any microcredential module. Should you choose to participate, rest assured that you can withdraw at any time, even after signing the consent form or during the course of the study, without facing any penalties or consequences. Additionally, you are free to participate in any other research study. Your participation in another study will not affect your ability to participate in this study. You do not need to tell us if you are participating in another study.

Please note that once survey results are submitted, we will be unable to accommodate requests for data removal. Importantly, your decision to withdraw will not impact your ability to complete modules or enroll in future ones.

**Questions about the Study**

If you have questions or need more information about the study itself, please contact us at: [komeiham@mcmaster.ca](mailto:Komeiham@mcmaster.ca) or [tristana@mcmaster.ca](mailto:tristana@mcmaster.ca)

Having read the above, I understand that by clicking the “Yes” button below, I agree to take part in this study under the terms and conditions outlined in the accompanied Participant Information Sheet.

If you do not agree to quotes or other results arising from your participation in the study being included, even anonymously, in any reports about the study, please contact the research assistant, Menna Komeiha (komeiham@mcmaster.ca) or Abby Tristani (tristana@mcmaster.ca).

*If the participant clicks the “yes” button, the next screen will take the participant to the survey questions.*

*If the participant clicks the “no” button, the next screen will display the statement below – the “Do Not Agree to Participate” statement.*

**The “Do Not Agree to Participate” Statement:**

*This text will appear if the participant does not agree to participate:*

Thank you. You have decided not to participate in this survey. No data has been collected from you.

**The “Quit” Statement:**

*There will be a quit button displayed throughout the survey. If the participant decides to hit the “quit button” at any time during the survey, the following statement will appear.*

Thank you. You have decided to quit this survey. None of your survey responses have been collected or stored.

**The “Thank You for Completing the Survey” statement:**

*This wording will appear after the respondent has completed the survey.*

Thank you for taking this survey. Your answers are a valuable part of this research.

**The “Providing participants with the Study’s final results” statement:**

*After the answers have been submitted, a screen will appear that says the following:*

YES "I would like to receive a summary of the study’s results".

Please send the brief summary of the study results to this email address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NO "I do not want to receive a summary of the study’s results."

**PART 2: SURVEY QUESTIONS**

**Section 1: Background**

1. Age
   1. 18-24
   2. 25-34
   3. 35-44
   4. 45-54
   5. 55-64
   6. 65 or older
2. Gender:
   1. Male
   2. Female
   3. Transgender
   4. Two-Spirit
   5. Non-binary
   6. Prefer not to say
   7. I identify as \_\_\_\_\_\_
3. Do you identify as a member of a minority or racialized group?
   1. Yes
   2. No
   3. Prefer not to disclose
4. Do you identify as an Indigenous person?
   1. Yes
   2. No
5. What is your highest level of education obtained?
   1. Bachelor’s Degree
   2. Master’s Degree
   3. Doctoral Degree
   4. Professional Degree (e.g., MD, JD)
   5. Other (please specify)

**Section 2: Experience**

1. Have you previously participated in any microcredential courses at a university?
   1. Yes/No
   2. If yes, please provide the names of the microcredential courses and the universities where you completed them.
2. Are you currently aware of or involved in any microcredential programs at McMaster University?
   1. Yes/No
   2. If yes, please briefly describe your involvement and experience
3. How would you rate your current level of awareness and understanding of microcredentials?
   1. Very Poor
   2. Poor
   3. Fair
   4. Good
   5. Very Good
4. What motivated you to enroll in microcredential courses?
   1. Career advancement
   2. Skill development
   3. Personal interest
   4. Stay updated in the field
   5. Other (please specify)

**Section 3: Skills, Confidence, Knowledge**

1. After completing the microcredential modules, how prepared are you to demonstrate your global-health related transferable skills to a potential employer?
   1. Not at all likely
   2. Somewhat likely
   3. Neutral
   4. Very likely
   5. Extremely likely
2. The microcredential modules allowed me to consolidate what I have learned during the Global Health program at McMaster University.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly Agree
3. The microcredential modules supported your acquisition of the transferable skill that they were designed for.
   1. Strongly disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly Agree
4. As a result of completing the microcredentials I am confident that I can effectively collaborate with relevant international stakeholders
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
5. After completing the microcredentials I am confident that I am able to work with other members of other professions to effectively collaborate with relevant international stakeholders
   1. Not at all confident
   2. Slightly confident
   3. Moderately confident
   4. Very confident
   5. Extremely confident
6. As a result of completing the microcredential courses, please rate how knowledgeable you feel about your ability to effectively collaborate with relevant international stakeholders
   1. Not at all knowledgeable
   2. Slightly knowledgeable
   3. Moderately knowledgeable
   4. Very knowledgeable
   5. Extremely knowledgeable
7. Indicate the degree to which you agree with the following statements about the microcredential courses:
   1. The international collaboration microcredential course was effective for learning the principles and practices of effectively collaborating with relevant international stakeholders from a global health perspective
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
   2. After taking the international collaboration microcredential course, I have a better understanding about how to effectively collaborate with relevant international stakeholders from a global health perspective than I had before taking this course
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
   3. After completing the international collaboration microcredential course, I am better equipped to apply the principles and practices of effectively collaborating with relevant international stakeholders to real world experiences than I was before taking this course.
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
   4. The incisive decision-making microcredential was effective for learning the principles and practices necessary in identifying and resolving common ethical issues and challenges when working with vulnerable populationsStrongly disagree
      1. Disagree
      2. Neutral
      3. Agree
      4. Strongly agree
   5. After participating in the incisive decision-making microcredential course, I have a better understanding of how to effectively apply leadership practices and foster collaborative skills
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
   6. Following the incisive decision-making microcredential course, I am better equipped to adapt my specific expertise to address healthcare needs in resource-constrained settings
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
   7. After taking the incisive decision-making microcredential course, I am better equipped to conduct comprehensive situational analyses in a real-world setting
      1. Strongly disagree
      2. Disagree
      3. Neutral
      4. Agree
      5. Strongly agree
8. The microcredentials were designed to fit the learners’ busy schedule. To what extent were you able to seamlessly integrate the various components of the modules into your routine without encountering significant conflict?
   1. Not at all able to integrate
   2. Slightly able to integrate
   3. Moderately able to integrate
   4. Mostly able to integrate
   5. Completely able to integrate

**Section 4: Open Ended Questions**

* + - 1. How do envision using the microcredential badges in future job applications?
      2. What other transferable skills would you like future iterations of microcredential modules to address?
      3. Do you have any other comments you would like to add regarding your experience with the microcredential course?

**APPENDIX C**

**SEMI STRUCTURED FOCUS GROUP DISCUSSION & INTERVIEW GUIDE**

Part 1: Introduction and Instructions

Hello, my name is \_\_\_\_. Thank you for agreeing to participate in this focus group discussion/interview. Just to remind everyone, I am looking at your perspectives on the microcredential modules that were piloted over the summer semester. This is so that the development of these learning modules can be optimized and effectively implemented in future offerings.

What is a focus group? A focus group is an interactive discussion where we can gain several perspectives about a topic and members of the group can think about and comment on what others have said in the group.

**OR:**

What is an interview? An interview is a structured conversation to gather information about a topic. This will serve as a means for the research team to evaluate the experiences you have had throughout the microcredential acquisition process.

In a minute, we will all introduce ourselves – first names only or if you are comfortable, you can use an alias. But first I would like to remind you of the Consent Form you have previously signed.

**FOR FACILITATOR: REVIEW INFORMED CONSENT FORM AND ANSWER ANY QUESTIONS ABOUT IT. REMIND PARTICIPANTS THAT IF THEY NO LONGER WISH TO PARTICIPATE IN THE FOCUS GOUP, THEY ARE FREE TO LOG OFF WITH NO CONSEQUENCE.**

**Confidentiality**: Before we begin our discussion, I want to spend a few moments talking about confidentiality and to go over some basic ground rules for our focus group discussion/interview today:

* Everyone’s views are welcomed and important.
* The information which we will collect today will be attributable (connected or associated) to you as a group, only.
* Because of the nature of small communities or groups, it is possible that people could link participants in this room to quotes in the report.  This is why we need to talk about confidentiality.
* We are assuming that when we learn about one another's views, they remain confidential.  In a small group like this, people are identifiable to some degree by their views and opinions.
* Having said this, and having made these requests, you know that we cannot guarantee that the request will be honoured by everyone in the meeting.
* So we are asking you to make only those comments that you would be comfortable making in a public setting; and to hold back making comments that you would not say publicly.
* If you want to stop being in the focus group/interview you can you can leave or stay and simply stop talking, but it will not be possible for you to pull out your data from the flow of the conversation because of the interconnected nature of the group discussion where one person’s comments can stimulate the sharing of comments made by others in the group.
* Anything heard in the meeting should stay in the meeting.
* All voices are to be heard, so I will step in if too many people are speaking at once or to make sure that everyone has a chance to speak.
* I may also step in if I feel the conversation is straying off topic.
* You can expect this discussion group to last about 60 minutes.

**Use of the Record function**

* As you will recall, this focus group/interview will be recorded to increase accuracy and to reduce the chance of misinterpreting what anyone says.
* All records and transcripts will be saved on password protected computer in a secure file.
* The recordings will be listened to by myself and/or an independent, trained transcriber in order to transcribe the audio into a written transcript. The thesis supervisor will also have access to the recordings.
* Names will be removed from transcripts. Participants will have coded numbers attached to their name which only I will know.
* Only the thesis supervisor and I will have access to transcripts (with your personal names removed) of this focus group/interview.
* I’ll also ask that when using abbreviations or acronyms, you say the full name at least once to aid transcription.
* We may also use a “flip chart” to write down key points during the focus group/interview and take notes.

**FOR FACILITATOR: AT THIS POINT, ASK GROUP MEMBERS TO QUICKLY INTRODUCE THEMSELVES – REMIND THEM THAT IT IS ‘FIRST NAMES ONLY’.**

**Part 2: Focus Group Discussions**

**FOR FACILITATOR: FOCUS GROUP DISCUSSION BEGINS WITH THE FACILITATOR ASKING THE FIRST QUESTION. OPEN UP DISCUSSION FOR GENERAL RESPONSES OF PARTICIPANTS TO EACH QUESTION.**

**Let’s start with discussing your overall experiences with the microcredentials modules:**

1. How would you describe your micro credential experience?
2. Can you describe the most significant change to your perspective on soft skills as a result of participating in the microcredentials modules?
   1. Prompt: For example, what was your perspective on soft skills before the microredentials modules, and what do you think about it now?
   2. Note to facilitator: The idea here is to get students ‘fresh’ perspective of their ‘most significant change’ before being influenced by any specific topics/ideas raised in later FGD questions. Try to get each participant to answer this question.
3. In what ways do you feel the microcredentials modules have prepared you for the job market?
   1. Prompt: how relevant were the soft skills that the modules addressed to your chosen professional domain?
   2. Prompt: In what way did the microcredentials modules prepare you for a career in global health?

**Now I’d like to discuss the microcredentials learning objective. The microcredentials aimed to develop some of the soft skills that are needed to pursue a career in global health. This means developing international collaboration and incisive decision-making skills.**

* Do you feel this objective was achieved?
* Note to facilitator: Depending on the students’ answer, you will need to follow up with the appropriate YES or NO question below:
  + If YES, what about the microcredentials modules was helpful in achieving this objective, and why?
    - Note to facilitator: Listen to what students describe as helpful before moving on to the prompts below. When you’ve moved on to the prompts below, try and cover as many of the learning strategies listed as possible.
    - Prompt: Consider for example, the readings/materials, case studies, reflection prompts, assessment of learning questions, embedded videos, and asynchronous self-paced nature of the modules.
  + If NO, what about the microcredentials modules prevented the achievement of this objective, and why?

**I’d also like to discuss the topics covered in the microcredentials modules in relation to the modules learning objective. Note: List of topics is still under development.**

* What comments do you have about these topics in relation to developing your international collaboration and incisive decision-making skills?
  + Probe: Which topics were more/less relevant/helpful in developing your international collaboration and incisive decision-making skills, and why?
  + Note to facilitator: You do not need to discuss all topics, rather probe within the topics students raise as more/less relevant/helpful to ascertain why.

**Final thoughts:**

* Would you recommend the microcredentials modules to other MSc students?
  + Probe: Why?
* What are the changes or additions you would like to see made to the microcredentials modules?
* Do you have any final thoughts you would like to add on your experience in the microcredentials modules?

**Appendix D**

**INFORMATION LETTER**

You are being invited to participate in a research study because you are a master’s student in the Global Health program at McMaster University where our study is taking place.

This study is conducted by:

|  |  |
| --- | --- |
| **Local Principal Investigator:**  Dr. Deborah DiLiberto  Global Health  McMaster University  Hamilton, ON, Canada  E-mail: diliberd@mcmaster.ca | **Student Investigators:**  Menna Komeiha  Abby Tristani  Global Health Graduate program  McMaster University  Hamilton, ON, Canada  E-mails: komeiham@mcmaster.ca tristana@mcmaster.ca |

In order to decide whether or not you want to be a part of this research study, you should understand what is involved and the potential risks and benefits. This form provides detailed information about the research study. Once you understand the study, you will be asked to sign this form if you wish to participate. Please take you time to make your decision.

WHY IS THE RESEARCH BEING DONE?

This research aims to address the evolving Canadian job market, which increasingly demands individuals to acquire new skills and develop existing competencies to remain relevant while competing for job opportunities. Currently, employment trends demonstrate that employers are searching for candidates with transferable skills that can be utilized across domains including incisive decision-making and international collaboration. Microcredentials have emerged as a novel method to showcase individuals’ transferable skills in a way that employers are able to understand during the application process. As the labour market continues to move toward skill-based hiring strategies, we want to know if microcredentials are effective means of knowledge translation and beneficial for individuals entering the workforce.

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to gauge the implementation and effectiveness of incisive decision-making and international collaboration microcredential courses within McMaster University's MSc Global Health program. You are being asked to participate in this research study because you are a current student in the MSc Global Health program at McMaster University.

WHAT WILL MY RESPONSIBILITIES BE IF I TAKE PART IN THIS STUDY?

If you choose to participate in this study, we will ask you to do the following things:

* Answer questions and engage in discussion about your knowledge, attitudes, and behaviours concerning the incisive decision-making and international collaboration microcredentials offered within the Global Health program at McMaster University.

We are inviting all the students who have enrolled in one or both microcredential courses to participate in this research study. Participants will be asked to complete an enrollment survey that will take approximately 30 minutes to complete. You will only complete it once. Following the enrollment survey, participants will have the ability to participate in a series of virtual focus group discussions or individual interviews.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

Participation in any research study may involve a loss of privacy. Information you provide will be recorded, but your name or personal details will not be used in any reports of the information provided. The information that is collected from this study will be locked at our project office. We will do our best to make sure that any personal information is kept private.

HOW MANY PEOPLE WILL BE IN THIS STUDY?

Up to 130 students within the Global Health program will be invited to participate in this study.

WHAT ARE THE POSSIBLE BENEFITS FOR ME AND/OR FOR SOCIETY?

We want to know if microcredentials are an effective means of knowledge translation and how to effectively integrate them into traditional graduate programs. There will be no direct benefit to you from participating in this study, However, the information we gather from this study will provide valuable insight on how to structure future models and areas for improvement.

IF I DO NOT WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

It is important for you to know that you can choose not to take part in the study. Your participation is not required as part of the microcredential completion and choosing not to participate will in no way affect your completion of your master’s degree.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your identifiable data will not be shared with anyone. All material with identifiable information will be stored in a separate server and placed in a password protected folder that is encrypted by VeraCrypt software.

CAN I PARTICIPATE IN THIS STUDY AND ANOTHER STUDY?

Yes, you are free to participate in any other research activity. Your participation in another study will not affect your ability to participate in this study. You do not need to disclose if you are participating in another study.

WILL I BE PAID TO PARTIPATE IN THIS STUDY?

If you agree to take part, you will receive a $10 in gift card compensation for each research activity you choose to participate in (e.g., $10 for participating in the survey, $10 for participating in the focus group discussions).

WILL THERE BE ANY COSTS?

There are no costs to you for taking part in this study.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHOM CAN I CALL?

If you are have any questions about the research now or later, please contact us directly at [komeiham@mcmaster.ca](mailto:komeiham@mcmaster.ca) or [tristana@mcmaster.ca](mailto:tristana@mcmaster.ca). We look forward to your involvement in this important research endeavor.