PRELIMINARY ASSESSMENT OF MASTER OF PUBLIC HEALTH STUDENTS' PERCEPTION OF CORE COMPETENCIES AND USE OF INPLACE SOFTWARE IN THE FACILITATION OF COMPETENCE-BASED LEARNING

CHIKA AMANDA ARINZE

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By CHIKA AMANDA ARINZE, MBBS. MSc.

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TITLE: Preliminary Assessment of MPH Students' Perception of Core Competencies and Evaluation of the use of InPlace Software in the Facilitation of Competence-based Learning

AUTHOR: Chika A. Arinze (McMaster University)

SUPERVISOR: Dr. Emma Apatu

COMMITTEE MEMBERS: Dr. Mackenzie Slifierz, Dr. Cynthia Lokker

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ABSTRACT:

Objective: The future of public health in Canada depends on the competence of today's public health students. The Public Health Agency of Canada (PHAC) core competence categories are designed to guide public health practice and the training of public health students. The objectives of this study were to understand public health graduate students' perception of the PHAC core competencies and report the usability of a practicum placement software in the facilitation of competence-based learning.

Methods: Twelve students in the first year of the graduate program in public health participated in two focus group sessions. Participants were asked to select their top and least desired PHAC competencies and then discuss the reasons for their selection. Factors that may have influenced the category selection and their opinion on improving the competence categories were discussed. The system usability scale (SUS) was administered to the student participants and two staff members to help understand the usability of the practicum placement software in the facilitation of competence-based learning.

Results: Partnership, collaboration, and advocacy emerged as the top-desired, with public health sciences being the second top-desired. The assessment and analysis category was the least desired, followed by the Leadership competence category. Prior educational background, future career goals with respect to job prospects were among the key factors that influenced the students' competence selection. Conflict resolution, outreach, and community engagement were some of the suggestions of categories that could be included in the core competence categories. The system usability score for InPlace platform was 61.8 (95% 56.7- 66.9).

Conclusions: Overall, students believe that the PHAC core competencies are comprehensive. They suggested seeing certain terminologies become a prominent part of the competence categories. The use of InPlace platform in the facilitation of competence-based learning may require more time for adequate user experience.

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PREFACE

This master's thesis is formatted as a "sandwich" thesis. It contains two manuscripts that will be submitted to two journals for publication. The first chapter gives an in-depth background of my thesis topic. The second chapter is the first manuscript which contains an abstract, introduction, methods, results, and discussion. The third chapter is the second manuscript, and it contains an abstract, introduction, methods, results, and conclusion. The fourth chapter has research implications and an overall conclusion. At the time of submission of this thesis, the manuscripts are being prepared for submission to two peer-reviewed journals. A complete table of contents is provided on the next page.

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LIST OF ALL ABBREVIATIONS

CCPHC	Core competencies of public health in Canada
CV	Curriculum vitae
MPH	Master of Public Health
PD	Program director
PDS	Professional development series
PHAC	Public Health Agency of Canada
PUBLTH	Public health
SUS	System Usability Scale

DECLARATION OF ACADEMIC ACHIEVEMENT

I, Chika A Arinze, declare this thesis work to be my own. I proposed the study design, obtained access to the data, performed the analysis, led the writing of the manuscript, and wrote this thesis document.

My supervisor, Dr. Emma Apatu, initiated the incorporation of the InPlace platform and piloted its use in the facilitation of competence-based learning. The thesis committee members Dr. Apatu, Dr. Lokker, and Dr. Slifierz provided guidance and feedback for my thesis development, the manuscript, and this document. Therefore, they are listed as co-authors for Chapters 2 and 3.

CHAPTER 1: BACKGROUND

The Public Health Agency of Canada (PHAC) was established in 2004 as the government agency in charge of national public health strategy and promotion. In 2007, PHAC developed the Core Competencies for Public Health in Canada (CCPHC), which outlines the central knowledge, skills, and attitudes necessary to practice public health effectively.[1-3] Many graduate programs in the country use the CCPHC to build their curriculums. Since the development of the core competencies, the global and socio-political environments have changed. The public health field has also evolved to the point where new skill sets by public health practitioners may be needed. Considering that students' approach to learning a new skill in diverse contexts can be affected by their perception and pre-existing beliefs,[4] it is vital that these are explored in relation to the CCPHC. Therefore, understanding students' perception of the core competencies and ways to facilitate competence-based learning will contribute to the update of existing competencies.

1.1. The Practicum Track of the Public Health Program

The Master of Public Health (MPH) degree is a professional credential. The McMaster University MPH program attracts students from various disciplines, including health care professionals and learners with non-clinical backgrounds. The McMaster MPH program is generalist in nature and includes a thesis stream for students who wish to conduct research in public health, as well as a practicum stream, which provides students with a 4-month practicum placement. Additionally, practicum students complete five electives, two of which can be replaced by an optional part-time practicum. Although students' experiences collectively represent a wide range of skills and expertise, the practicum

stream is recommended by the PHAC, and the majority of the students choose this stream.[4] Besides the standard lecture-based courses and practicum placements, numerous competence-based workshops and seminars are also made available to students. The practicum is completed in various organizations within Canada, including McMaster-led research groups. Since the practicum experience enhances competence-based learning through practical application of public health knowledge to a real-world scenario, streamlining the management of the practicum placement process was necessitated. In the past, the practicum process was managed through an ad-hoc system that combines the use of paper-based learning tracking sheets, email, and Avenue–to-Learn – the University's learning management platform. InPlace, a practicum placement management portal, was integrated into the MPH program to help facilitate competence-based learning. The use of the InPlace platform to facilitate competence-based learning was piloted by integrating its use in the Professional Development Studio (PDS) course series.

1.2. The PDS Courses

In 2020, PDS I & II (PUBLTH 712 & 713) were introduced as new core courses in the MPH program curriculum that students take in their first year. The PDS I course is offered in the fall session. It provides students with opportunities to explore and assess their individual academic and professional public health interests as well as enhance skills in evidence-informed decision-making, communication, and project management.[5] PDS II is offered in the winter session. It presents students with several learning experiences that prepare them for practicum or thesis projects, professional skill building, and a period of time where they can reflect upon the competencies that they would like to gain

additional expertise beyond the general core courses. Thus in 2020, a survey that allowed students to rank the desirability of the core competencies was piloted as a way for students to identify which competencies they wanted to enhance through their electives and practicum/thesis. Some of the practical professional development opportunities offered to students through PDS include lectures on how to develop a curriculum vitae (CV), how to update their professional profile on LinkedIn, and various workshops on topics that complement the MPH curriculum and examine the importance of ethics in public health practice. The other core courses the students take in their first semester of the first year include the (1) Foundations of Population and Public Health Practice; (2) Introduction to Biostatistics; and (3) Population and Public Health Epidemiology. In the second semester, they take Public Health Policy and Research Methods. The last core course is an integrative capstone course, Leadership & Applied Public Health, that is taken in the second year. The cumulative contents from these core courses build the students' public health knowledge base.

1.3. InPlace Platform

InPlace is a placement administration software integrated into the MPH program in September 2020 for better management of the practicum process. It was intended to facilitate students' practicum learning experiences in the PDS courses. Configuration of the platform was an integral part of my thesis project. The intended configuration aimed to allow students to rank the CCPHC, identify their learning needs, and apply to practicum sites that align with their learning objectives. The practicum opportunities are made available on the platform with a brief description of the projects and the skills students will learn. It was also configured to improve student learning outcomes by enhancing a three-

way communication path among the students, the practicum supervisor, and the program staff. Besides facilitating skill acquisition, the platform would serve as a repository for students' CVs, practicum placement forms, assessment checklists, learning objectives, student/supervisor feedback, and pre/post competence assessment surveys.

1.4. The Link between the Core Competencies, InPlace, PDS, and the Practicum

In line with McMaster University's problem-based education model, the public health graduate program aims to equip students with public health skills through lectures, workshops, practicums, thesis projects, and other hands-on professional development projects. The program is structured such that the students can either choose a practicum or thesis track. The lectures help in building the students' knowledge base with the fundamental principles of public health. The hands-on practical acquisition of the competencies is mainly through the completion of practicum or thesis projects. The InPlace platform is used to facilitate and deliver some of the practical learning components. Understanding the platform's usability from student and staff perspectives will help improve the future iterations of the platform. A schematic representation of the link between the program facets is shown in Figure 1.

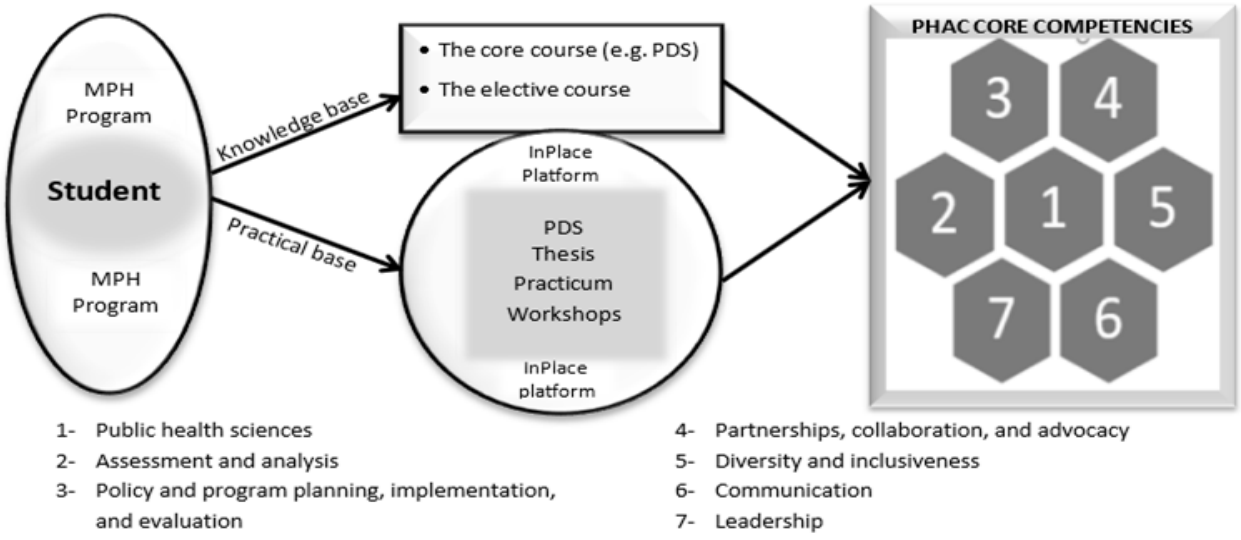

Fig 1: A schematic representation of the link between the Core Competencies, InPlace, PDS, and the Practicum

The PDS courses are the core courses that prepares students for the practical aspect. Since the platform serves as a repository for all the practicum forms, the ease of access and completion would make the delivery of PDS less cumbersome with respect to the number of times the administrative staff would have to go through a form. Because of the role InPlace is intended to play in facilitating students' competence-based learning, this study is designed to help understand whether the integration of the InPlace is beneficial to both the students and the staff.

1.5. The Rationale

In a bid to ensure a homogenous understanding of public health principles and practices across Canadian provinces, PHAC developed its first list of required competencies expected of any public health practitioner and also recommended that practicum placements should be an integral part of public health training just over a decade ago.[1-3] A recent study that examined the degree to which MPH programs' course descriptions

align with the PHAC core competence categories identified some misalignment.[6] It showed that Canadian MPH programs may be lacking in addressing core competencies relating to leadership, communication, diversity, and inclusiveness. These competence areas are better acquired by linking formal training with practical preceptorship through practicum postings. The practicum experience also serves as a bridge to a student's career in a governmental public health workforce.[7,8] According to the 2014 National Centre for Universities and Business Student Employability Index, 92% of students agree that it is important to have opportunities for placements, work experiences, or internships.[9] Exposure to real-world challenges through a practicum experience is beneficial to the students, the supervisory organizations, and the academic program.[10-17] For students, the practicum experience promotes career development and increases employability and job satisfaction after graduation.[13,14] The academic program gains community network opportunities and external program assessment through the practicum supervisors and students' feedback. The placement site gains by having highly motivated students apply their skills to complete projects within a short duration. There is also the possibility of assessing the student as a potential employee through the supervision of their career path.[15-17]

Despite the numerous benefits of a practicum experience, the management of the process can be challenging. One of the practicum placement challenges identified in the literature is the communication between the agencies and the department.[16,17] Since there is no guarantee that an agency will always have projects available for students, the practicum placements can be difficult to arrange, and the agency-department relationship may not be sustainable. Evaluation of the practicum process has also been shown to be an issue.[18-21] The complexity and the manageability of the entire practicum process

administration have not been well studied in the literature. However, the Interns and Mentors Program for ACTion (IMPACT) strategy recommends a six-step approach of managing the practicum process: (i) identifying field placement opportunities, (ii) marketing field experience opportunities to students, (iii) selecting students seeking field experience opportunities, (iv) placing students with practice partners, (v) evaluating student progress toward field experience objectives, and (vi) evaluating the program.[18] Another framework included technology as an important aspect of practice-based training.[19] Canadian schools that offer MPH programs tend to follow these steps with some variations. In the USA, 85% of accredited schools offering MPH programs controlled the practicum aspect at the school level.[20] At the University of British Columbia (Vancouver, British Columbia), identifying and securing a placement site is solely the student's responsibility.[21] Prior to September 2020, the McMaster MPH program managed these steps through a dated ad-hoc process. For better management of the practicum process and the optimization of the students' practicum learning experience, a placement management portal (InPlace) that offers an integrated learning platform has been integrated into the MPH program. Some studies have demonstrated that the benefits of integrating electronic supports for students improve educational and learning processes through the unification of learning tools and technological platforms in educational institution environments.[22,23]

1.6. Thesis Objectives

The objectives of this study are to understand:

- students' perception of the PHAC core competencies as they rank their top desired competencies in the first-year MPH program.

- students' reasons behind the ranking of the top and the least ranked competencies
- if the integration of the InPlace platform is beneficial to students in the facilitation of competence-based learning.
- if the integration of the InPlace platform is beneficial to administrative staff in the administration of the practicum process.
- the challenges of using InPlace and how it can be improved.

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CHAPTER 2: CORE COMPETENCIES MANUSCRIPT

Title: Master of Public Health Students' Perception of the Core Competencies for Public Health in Canada.

Authors: Chika A. Mackenzie S. Cynthia L, Emma A.

Candidate's role in the manuscript: I conducted the analysis and prepared the first draft of the manuscript.

2.1. Abstract

Objective: The future of public health in Canada depends on the competence of today's public health students. The Core Competencies for Public Health in Canada (CCPHC) were designed to guide public health training and practice in Canada. There are 36 competence statements arranged into seven categories. The objectives of this part of the study were to understand public health graduate students' perception of the core competence categories and their suggestions on what needs to be reflected in the competence categories.

Methods: Twelve students in their first year of a graduate program in public health participated in two focus group sessions. Participants were asked to rank the PHAC seven competence categories based on desirability and discuss the reasons for their ranking. Factors that may have influenced the ranking and their opinion on how to improve the competence categories were discussed. Ethics approval was obtained before contacting the participants.

Results: Five (42%) participants rated Partnership, collaboration, and advocacy as their top-desired category. Public health sciences and policy and program planning categories were rated top by three (25%) and two (17%) participants, respectively. The Diversity and inclusiveness category was neither rated as top or least. Assessment and leadership categories were the least rated in terms of desirability. Prior educational background and future career goals pertaining to job prospects were among the key factors that influenced the ranking. Some suggestions that could be included in the core competence categories include conflict resolution, outreach, and community engagement.

Conclusions: Overall, students believe that the PHAC core competencies are comprehensive. Suggestions were made on terminologies that could be a prominent part of the competence categories.

Keywords: Graduate education; Communication; Leadership; Public health; Canada; Public Health Agency of Canada (PHAC); Core competencies; MPH; Partnership, collaboration, and advocacy; Assessment and analysis; Policy and program planning; Implementation and evaluation; Diversity and inclusiveness.

2.2. Introduction

In 2007, the Public Health Agency of Canada developed 36 core competence statements that are arranged into the following seven domains: public health sciences; assessment and analysis; policy and program planning, implementation and evaluation; partnerships, collaboration and advocacy; diversity and inclusiveness; communication; and leadership.[1,2] These competencies outline the generic skills needed to practice public health in Canada. Even though some programs may be lacking in addressing some key competencies, most public health graduate programs use the domains as a guideline for developing program curriculum.[2-4] It has been over a decade since the current version of the core competencies was developed. The global economic and socio-political environments have changed significantly with rapid globalization constantly challenging public health policies and practices.[5] Climate change devastations, crime and war zone displacements, global pandemics such as COVID-19, technological changes, and the consequences of poverty and inequality are just a few examples of how public health trends are demanding policy changes in every sector.[5-10] In all of these, lessons have been learned, especially about what works and what does not. Hence, the concepts and context of the core competencies may need to be reviewed and updated.[11,12] This will ensure that emerging public health needs in Canada are captured in the competencies and introduced as new skill sets to aspiring public health practitioners. Since the future of public health in Canada depends on the competence of today's public health students whose approach to learning can be affected by their perception and pre-existing beliefs,[13,14] understanding students'

perception of the core competencies will help to identify the gaps and improve the future versions of the core competencies.

Efforts toward lowering the importance of public health and limiting its scope are some of the public health challenges that pose a threat to the health of many Canadians.[15,16] This calls for leadership and health advocacy skills among aspiring public health practitioners. With accelerating globalization, the public health of many nations no longer resides within its own jurisdiction. Public health and global health have become indistinguishable, warranting the emergence of different sets of competencies to address the growing need for global public health.[17,18] Even within Canada, the interpretation of the core competencies from the Indigenous perspective shows how other perspectives can enrich the meanings of the concepts.[19] In this study, we report on the interpretation of the core competencies from the perspective of public health students.

2.3. Materials and Methods

2.3.1. Sampling and Study Participants

The purposive sampling method was used based on predefined criteria that are relevant to the research question(s)[20]. The predefined criteria used were the McMaster University public health graduate students who were enrolled in PDS I in the 2020/2021 school year. Following ethics board approval, written consent to participate in an on-line focus group session was sent out by email to all eligible participants in February 2021. A weekly reminder was sent out twice within that period. Fifteen people, representing a 55% response rate, returned the consent. One person did not give consent to participation and was not contacted any further. Two scheduling options for participation

in the focus group session were sent to the remaining 14 people that gave consent. Two people did not show up for any of the focus group sessions. A total of 12 people participated in the two focus group sessions conducted in March 2021 through Zoom.

2.3.2. Data collection

Data were collected through two separate focus group sessions. Eight questions with sub-questions were used to steer the focus group discussions starting with questions about the competence ranking and progressing with questions aimed at gaining insight into the reason for the ranking (see Appendix 1). The questions and the questioning style were piloted on another student of the same department. Three content experts (EA, MS, CL) also provided feedback on the focus group questions before they were administered. The timing of the data collection was early in the second semester, and the students had taken some of the MPH courses.

Prior to the focus group sessions, an introductory email was sent to all participants explaining what the study is about and what is expected of them during the focus group session. They were also reminded that the discussion would be recorded. The commitment to protecting their privacy and confidentiality was restated. A brief definition of the PHAC competence categories was also sent with a link to the full publication.[1]

During the focus group sessions, the participants were welcomed and given an overview of the research objectives. Their role as participants were recapped. The promise of confidentiality was reiterated. Although they were reminded that the information they provide is secured, they were also encouraged not to give any identifying information during the discussion. The participants were reminded not to

record any part of the sessions. They were also reminded of what to do if they wished to withdraw consent during the focus group session. The Krueger (2000) model was used to guide the questioning style.[21,22] The Zoom platform was used for the sessions and the poll tool was used to administer some of the questions (see Appendix 1). The duration of each focus group session was approximately 1.5 hours. After the focus group, the transcribed responses were sent to the participants to ensure they represented what was discussed.

2.3.3. Outcome measures

Outcome measures were the student's perception of the PHAC competencies, the ranking of the competencies, and the reason behind the ranking. The ranking of the competencies was based on desirability. The most and least desired competencies were identified through participants' ranking of the competence categories. The participants were asked to discuss reasons why one category emerged as the top-ranked and another as the least ranked based on desirability. They were also asked to reflect on how their past experiences, career trajectories, and a brief description of each competence category may have influenced their ranking. For this study, desirability is an expression of the student's perception of the core competencies on their eagerness to acquire the competencies.

2.3.4. Ethical consideration

To ensure that the study proceedings are conducted according to the Declaration of Helsinki principles, the Hamilton Integrated Research Ethics Board (HiREB) approved the study protocol (ID #11174). Each participant was required to provide written consent

before participation in the study. The consent included a statement indicating that study participants have the right to withdraw from the study at any time.

Every effort was made to minimize privacy and security issues that are inherent in using online platforms for research purposes. The Zoom platforms' privacy and data collection policies were reviewed, and every participant had to use the University access to log into the platform. Although Zoom recordings were restricted to the host, the participants were reminded not to mention any identifiable information and advised against recording any part of the sessions.

2.3.5. Analysis

The unit of analysis was the complete dialogue around each topic of discussion. NVivo windows software was used to conduct a thematic analysis of transcribed audio recordings of the focus group sessions. The analysis was conducted in three phases: content analysis, pattern analysis, and thematic analysis. The content analysis was both deductive and inductive and aimed at generating codes. Most of the codes were generated deductively based on the framework of the questions used to guide the focus group discussions. Before going into in-depth discussions, the participants were asked to rank the competence categories using the Zoom polling system. Auto coding using the terminologies in the competence categories was used to generate related codes and associated phrases. The visualization tool in NVivo was used to inductively identify additional potential code words. The question-based pattern analysis was focused on generating themes from the codes that relate to each question. The discussions of one question were excluded from the analysis because of the impact of the focus group timing.

2.4. Results

Twelve students participated in the study. Eight people participated on the first day and four on the second day of the focus group sessions. The same focus group questions were used to steer both sessions. The findings are presented here based on the three themes and five sub-themes that emerged from the analysis of the focus group discussions around the PHAC core competencies.

2.4.1. PHAC competence selection

When students were asked if they could recall their competence ranking at the beginning of the first (fall) semester, only four (33%) could remember but not with much confidence. Consequently, during the focus group session, they were provided with a list of the competence categories. They were asked to select their top and least preferred based on their desire to develop specific competencies in public health. Partnerships, collaboration, and advocacy emerged as the top-desired competence, while assessment and analysis emerged as the least desired. The full result is shown in Table 1.

Table 1: Core competence ranking

Competence Categories	**Top desired n (%)**	**Least desired n (%)**
Public health sciences	3 (25)	1 (8)
Assessment and analysis	0	8 (67)
Policy and program planning, implementation, and evaluation	2 (17)	0

Partnerships, collaboration, and advocacy	5 (42)	0
Diversity and inclusiveness	0	0
Communication	1(8)	0
Leadership	1 (8)	3 (25)

The meanings attributed by the participants to the words of the competence categories in relation to their understanding of what public health represents played a role in their ranking decision. For instance, the words "collaboration" and "partnership" resonated as fundamental in achieving anything in public health. "Advocacy" from the lens of social determinants of health was considered an important role of public health practitioners as indicated in the quote: "*I was tempted by the term advocacy because I feel like since we're in public health, should be concerned about social determinants of health and advocating for health for all is a big reason to vote for partnership."*

Public health sciences, Communication, Leadership, and Policy and program planning were the other competence categories that got some votes in the ranking. Those that voted core public health science as their top competence also believe it is the most fundamental thing any public health professional would need to know to work in the field. In an attempt to compare the fundamentality of core public health science to that of the partnership competence category, one participant argued that the latter is all-encompassing and touches on all the other core competencies. The one person that chose Leadership as the top desired explained that the level of misinformation that occurred during the peak of the COVID-19 pandemic was the motivating factor: "*I chose*

communication for my most desired, considering how important exchange of information is, especially in the context of COVID-19 pandemic." The interpretation of the words of the competence categories also played a role in voting leadership and assessment and analysis as the least rated competence categories. "*I feel like maybe just some of that specific wording of budgets and reports might make someone think that it is just a very specific part of public health, and maybe not be something that is as important as other things that seem to apply more to general public health" (*see Appendix 2)

Since most of the students could not confidently recall their initial ranking from when they started the program, there was no way to assess whether their ranking has changed based on what they have learned since the beginning of the program. However, when they were asked to discuss the reasons for their ranking, emphasis was made on the impact of their learnings from the graduate courses, particularly the PDS. The use of such phrases as 'I think,' 'it felt like,' and 'it kind of' in the quotes below signaled positive sentiments that taking the program courses had an impact on the ranking of partnerships, collaboration, and advocacy as the top desired.

> *"Yeah, I ranked partnership as top and assessment as the least, so I feel very validated in my choices. For partnership, collaboration, and advocacy, it felt like the one specific to what we really discussed in the PDS course, especially because we had different guest lecturers come in throughout the year. And even in terms of collaboration, the group projects were done collaboratively, and that was my main reason for choosing partnerships, collaboration, and advocacy."*

"For me, the core public health science is mostly talking about specific courses like biostatistics and epidemiology, but PDS course kind of relates all the basic sciences together and then put it into practice. So, I ranked partnerships as my first choice because from the content that we are learning, you can see that it focuses on the employable skill side of all the other competencies in relation to partnerships and collaborations within the workspaces."

"I chose the partnerships, collaboration, and advocacy competence. And I think, in part, it reflects what we have learned throughout this program with a huge focus on equity, partnerships, collaboration and even in the policy course, we talked a lot about partnerships and working within and between organizations."

"I think public health was more about working collaboratively, and after taking the courses, I think the topic we talked about the most from the very beginning of the program was about engaging the community, identifying stakeholders, and engaging them. So that is why I chose collaboration and partnerships for the first choice of my career goals."

For the least desirable competence, lack of confidence in the ability to conduct assessment and analysis was the most prominent reason for the ranking. A noteworthy statement was that the selection of assessment and analysis as the least desired does not mean that it is not as important as the other competencies. However, it was considered that some aspects of it are discussed in the lectures. Lack of exposure was mentioned as the major contributing factor that breeds the lack of confidence, as is buttressed in the following quotes:

"If I'm going to touch more on the analysis side of things, I feel like it is something that often comes up as 'and then you do analysis.' It is one piece in the whole system."

"I chose assessment and analysis as the least, and that is not because I don't think it is important. It is more due to lack of exposure to it. It looks like there are so many components to it and lots of practical aspects in assessment and analysis that I am just not as familiar with. For me, it is a lack of confidence in my abilities to do that kind of work."

"It was not my least desired, or m*aybe I interpreted it wrongly, but I chose it on the basis that we didn't have enough exposure to assessment and analysis in our courses."*

"I think the courses always talk very little about preparing budgets and reports. So, we're unfamiliar with that."

Those that selected leadership as the least, stated future career goals as the main reason: "*when I think about my goals, it is not to be some leader. I just want to know that I am helping people and just doing the best I can to make a difference."*

2.4.2. Factors that influenced the ranking

Students were asked to discuss the factors that may have influenced their choice of ranking. Although some of the factors were mentioned under the competence selection section, more details are presented in this section to put them in the perspective of sub-themes.

i. The professional development series course was one of the most influential factors because references were made to PDS throughout the discussion, irrespective of the topic being discussed. Although students had some interest in public health before coming into the program, the skills they learned in the PDS and other graduate courses since the beginning of the program had broadened the scope of their interest. The PDS is a hands-on course that gives the students practical opportunities to showcase the competencies learned. The course is designed to build students' confidence by fostering interactions between the students and public health practitioners from different departments and agencies. Completing group projects with colleagues highlighted the essence of partnership and collaboration in public health and helped them improve their communication skills.

> "*In PDS 1 especially, we are given the opportunity to work with our peers. I think this really brought to the forefront the importance of partnerships and collaboration with other people. Not only did it enhance our learning, but it also gave us a kind of experience and opportunity to learn how to work in partnership with others in the public health field."*

The PDS course also influenced the ranking of assessment and analysis as the least-ranked competence category, as demonstrated in these quotes: '*I chose it because we did not have enough exposure to assessment and analysis during our PDS courses.'* However, it is important to note that this statement could have been made in the context of a specific aspect of the assessment and analysis competence category, as seen in this other quote: *"I think the courses (PDS) always talks very little about preparing budgets and reports. So, we are unfamiliar with that."*

ii. Prior academic and non-academic experiences also played a dynamic role in the participants' choice of ranking. Participants' prior education and nonacademic experiences seemed to have shaped their understanding of the competence categories and influenced their ranking choices. The impact of prior education was buttressed when the participants referenced their undergraduate educational background as an important consideration when ranking both their top and least competence categories. Non-academic life experiences also played a role but not without a connection to participants' educational background and interests. Positive and negative sentiments regarding the contributions are reflected in these quotes:

> *"My plans and my goals before entering the program have influenced the ranking. When certain aspects come up that align with these interests and goals, there's kind of a mental switch that allows me to focus more on those things."*
>
> *"I think I ranked the core public health sciences (as top), and that is because I feel like my background, in terms of my undergraduate degree, was more of core sciences. Whereas now I feel like, in public health, we are obviously integrating a lot more of social aspects, especially when you look at the social determinants of health and stuff like that. But I think that my background definitely made me look at things more through a core science perspective, and as a result, I came into the program expecting that."*
>
> *'My undergrad was not very assessment and analysis heavy. So, I did not have that much of a background in it. Because I had not been exposed to it, I did not have much of an interest in it. This, kind of, has not changed so far in the*

program even though we have been exposed to it more. That is just due to not having any past experiences and still not feeling a hundred percent comfortable with that kind of work., I think that probably would have influenced me looking back to the ranking."

"I would say for me, that's definitely possible because I know I came in with this basic science background, but also looking to move away from that. So, the basic science was not in my career trajectory, and my past experiences really didn't make me want to go in that direction."

iii. Future career goals pertaining to job prospects seemed to have been considered a lot as they ranked. Words like 'work', 'interest', or 'career goals' in some phrases depicted the impact of future job prospects in the selection of the competencies. A general agreement was echoed each time a career goal was discussed as a huge influence. Goals such as working in a public health unit or at different levels of the health care system influenced the ranking of partnership and collaboration. Even the idea of working behind the scenes in data analysis or program development influenced some of the rankings, as can be deduced from these quotes:

"I think my answer was also pretty influenced by why I came into the program. I answered program, policy, and program planning. I came into the public health program because I was kind of interested in that behind the scenes work that goes into developing the programs. I definitely think it kind of made me think a little bit more that this is the right path."

"Looking at assessment and analysis, from what my understanding was before, even earlier in the program, is that it would require more, you know, um, being away from working with people and kind of maybe at a desk or at a computer, um, which wasn't very appealing to me."

iv. Lack of confidence due to lack of exposure to analysis played a specific role in lower ranking. Participants presumed that this competence is all about data analysis, has many components, and is different for each project. The idea of budgeting as a component of this competence category fostered the lack of confidence. Although there were indications for the need to gain more experience before being confident enough to conduct assessment and analysis, the lack of interest in this category could be deduced from their belief that this is a very small aspect that is not necessarily needed to practice public health. Moreover, it can easily be sourced out. Another point that was raised that may have contributed to the lack of interest is that the majority of the students choose the practicum stream and may not have as much need as a thesis student for data analysis.

"I agree, it seems small, and it is not the biggest thing that you need to develop necessarily. And the way it is touched on a lot of the time is like, 'and then analysis."

"if you have data that needs to be analyzed, you could externally source for someone or something to analyze the data for you. What is really important are the findings, and this might be a reason that I would see it being ranked low."

"And also, because most of us choose practicum, we tend to see it as something more practice-based while analysis is more research-based. So maybe that is why we didn't choose it for the first".

v. Brief descriptions of the competence categories provided to the participants before the focus group sessions did not seem to make a remarkable impact on their ranking choices. When they were asked to discuss how that may have influenced their ranking, there was a general agreement that it was helpful. However, approximately 50% of the participants said it did not influence their ranking. The rest of the participants believed that having the definition ultimately influenced their ranking, especially by helping in their interpretation of the competencies as implied in these quotes:

"I feel like sometimes if you just read the name of a competence category, it might give you a certain impression, but then when you read the definition, it might be something different than you thought it was. Your impression might change just based on the wording that the definition uses. It might make you think, 'Oh, wait, no, that's not exactly what I was thinking that competence was about.' So that might deter you from ranking it maybe as highly as you would have or something."

"I would probably agree with that and just second it because, for some of them, I think I would have interpreted a little bit differently for sure than what is described in the little blurb. I think, like a good example of that one is assessment and analysis. It is described really differently than I would have interpreted it on my

own. I would have gone to more like basic science, like assessment and analysis kind of ideas. Had I not been given like a little extra blurb about it."

2.4.3. Suggestions for improving the PHAC competence categories

The participants were asked about their overall perception of the competencies. There was a unanimous agreement that the core competencies as prescribed by the PHAC are comprehensive and legitimizes the field of public health in Canada. Referring to the COVID-19 pandemic situation revealed the essence of having such guidance documents available for public health practitioners. Considering that the core competencies were developed for those in practice, the students were asked for opinions about how it reads and if they would prefer another set of competencies that are student-focused. They believed that since the core competencies have been shown to be effective in guiding training and practice of public health, there was no need for a student-specific set of competencies and that adjusting the language a bit to make it student-friendly may be all that may be needed.

"I feel like having these sorts of competencies kind of legitimizes the field that we're in. So, simplifying them too much, especially for MPH students, wouldn't be ideal because then, it would kind of lower the rigor of the profession a little bit."

The participants made other suggestions when asked if there were other sets of competencies they felt should be included in the core competence list. These suggestions and an example of corresponding quotes are seen in Table 2.

Table 2: Suggestions for new competence Categories.

Suggestions	Example of Noteworthy Quotations
Outreach and community engagement	• *"The only category that comes to mind for me, not maybe to be added, is outreach, but I do think that it should be emphasized."* • *"With outreach, would you be referring to community engagement under outreach?"* • *"Community engagement is so important, making sure that you pair with community members and meet with them and they have equal input as stakeholders, but is it important enough to be its own section?"* • *"It might maybe even be more impactful to include it in the partnerships because that way they (community) are considered on equal footing with those who do have a public health jurisdiction. For example, government or hospital associations and the community being on an equal footing will make the community an important voice."* • *"When I think of partnerships, I think of entities that have more jurisdiction over policy and over public health decisions. Whereas when I think of community engagement, I think of actual outreach towards communities."* • *"The community is the most important stakeholder in my opinion, at least when considering a public health policy."*
Ethics	• *"I would say a competence that could be included in the ethics. I just searched the term ethics, and it didn't show up."*
Pandemic/	• *"I don't know if it will be under core public health topics or if it can be a separate topic, but it should be given importance."*

emergency preparedness	
Conflict resolution	• **"***It probably does fit under communication, but like conflict resolution in managing maybe different interest groups or something like that."* • *"What if programs are kind of like counterintuitive to one another?"* • *"Even in partnerships, you cannot work if you have a conflict."*
Social determinants of health	• **"***Would social determinants of health fall under the core public health sciences? Because I believe having a thorough understanding of social determinants of health should be mandatory for anyone who is involved in public health practice. It could very much be on its own as a competence itself. understanding how race and gender and stuff like income, education impacts, population health, and public health, is really important in my opinion***."**
Equity	• *"The one thing I do not see that I think is integral to public health and our MPH experience for sure is equity. I do see diversity and inclusiveness, and there is also advocacy. I think equity can play a part in these, but I do not see it being very explicitly mentioned despite the fact that it's like a guiding principle in public health."*
Indigenous people	• *Personally, I think Indigenous people, Indigenous public health, should have been there too as a category to give it some weight and make people look into it too."*

Technology and innovation	• *"And that makes me think of technology and innovation. I don't know if innovation would be another category or sometimes, I feel like they're grouped, but that is another idea I have."* • *"Absolutely! Especially for like data, like I suppose assessment and analysis, even just like public health surveillance, which requires lots of technology and things like that to be effective. It is not really here. I guess it doesn't necessarily apply to everyone in public health, but whatever you are dealing with, there is certainly data involved."*

An interesting conversation ensued when community outreach as a competence category was mentioned. Some believed outreach should be under the partnership category and not on its own. Community engagement was used to elaborate what outreach represents, and an attempt to separate the meaning from that of partnership was made in this quote:

> *"When I think of partnerships, I think of entities that have more jurisdiction over policy and over public health decisions. Whereas when I think of community engagement, I think of actual outreach towards communities."*

2.5. Discussions

The PHAC is reputable in guiding the practice of public health in Canada. The core competence document has served as a fundamental resource in the training of public health students. However, since the development of these competence categories, public health in Canada has evolved. To ensure that the concepts remain relevant in the

ever-evolving public health environment, there is a need for constant review of the competencies. The findings of this study bring the students' perspective to the limelight, especially in their ranking of partnership collaboration and advocacy as the top-ranked in desirability. Even though the emergence of partnership as the top core competence may have been influenced by what they learned from the program courses, the variability in the ranking is of interest. Despite the small sample size, five of the seven competence categories were each ranked as someone's top competence, and the reasons for the rankings were expressed during the discussion.

It was interesting to note that the Diversity and inclusiveness competence category did not get a single vote either as top or least desired. Even though the small sample size could adequately explain this, it may still require further investigation. The fact that there was no mention of this category during the discussion can be interpreted in many directions. It could mean that the students think less of this category, or perhaps they interpreted it differently from the concepts it was meant to reinforce. The latter is especially in consideration of some of the suggested competencies (social determinants of health and Indigenous health) that can easily be mapped to it. Since prior educational background and recent knowledge gained from the PDS and other graduate courses were identified as factors that influenced the choices of ranking, an argument can be made about the possibility that concepts of diversity and inclusiveness were not given equal attention as other competence categories. The findings of Apatu et al. (2021) showing that Canadian MPH programs may be lacking in addressing core competencies relating to leadership, communication, diversity, and inclusiveness seem to support this argument.[3] This could also explain why leadership was ranked among

the least desired competencies. It is worth noting that at the time of the study, the participant had not taken some of the leadership courses, and this may also explain why the leadership category was selected as one of the least desired.

The Assessment and analysis category was unanimously ranked the least desired due to lack of confidence in conducting data analysis. This was an interesting finding considering that the department is known for its strong analytical methodology skills. Participant's interpretation of the terms played a considerable role in this ranking. The impression that budgeting and data analysis can easily be outsourced to a third party dissuaded the participants from showing more interest in this category. This will continue to be an issue if not adequately addressed. Since the participants mentioned that the assessment and analysis category is data-intensive, different for each project, and has many components, it may be beneficial to look for ways to make it desirable to learners from these perspectives.

2.5.1. Limitations

Some of the limitations of this study are inherent to qualitative research, in that findings usually cannot be generalized outside of the study community. Further, the sample size was small, also limiting generalization. Although the homogeneity. Although the homogeneity of participants strengthens the interpretation of the findings, extrapolating the perspectives of this very homogenous group of participants to other public health programs or graduate students will not be appropriate. However, the insights generated from this research can be investigated further in quantitative research.

Another major limitation was the timing of the focus group. The ranking was supposed to have been conducted in the first semester, but it was completed in the second semester due to some delays in ethics approval. This influenced the ranking because the students got more exposure to the concepts of the core competencies through the lectures. The extent of the impact was reflected in the discussion each time the PDS courses were mentioned. For this reason, their responses to the question 'Knowing what you know now after taking the PDS course, would you still choose the same competence as your top/least' were not included in the analysis.

A brief description of each competence category was sent to the students prior to each focus group session. Since each competence category has subcategories that were not included in the brief definitions, they were also encouraged to read the full core competence article and reflect on the concepts therein. Some had mentioned that having a brief definition of each category influenced their ranking. However, there was no guarantee that all the participants read the full competence document before the discussion. Reading or not reading the PHAC competence document may have influenced the ranking of the competencies in any direction. Having a refreshed knowledge of the competence could have given them a clearer insight into the concepts of the core competencies. The credibility of their responses would only depend on the fact that one of their lectures may have required them to read it at some point. If they had not read it, then there is a higher propensity that the discussions around the ranking would have been based on the literal meaning of the words in each competence category. This played out in the selection of partnership as the top-ranked and

assessment as the least-ranked competencies. Even with the brief description provided, the literal meaning of the words does not reflect the intended concept in its entirety.

Another limitation was the use of a virtual focus group. Due to the pandemic restriction, the virtual focus group was the only option available for this study. Many had turned off the video option. To an extent, the observation aspect of a focus group session was eliminated. The analysis was based only on the recorded human voices, which also did not bring out many emotions. The words that implied emotions were the only way of assessing the sentiments of the participants. The other setback was the technical challenge from the interruptions of internet networks. At some point, the participants could not hear the interviewer and vice versa. This challenge is worth mentioning as there was no way to determine whether it was reflected in the results.

The interviewer in this study is a student of the same MPH program. With an in-depth knowledge of the core competencies, the interviewer's awareness of self as a research instrument was very crucial to ensure this did not impact the outcomes of the discussions. To minimize subjectivity, the polls were administered in between discussions during the focus group sessions. The results of the polls were used to corroborate the findings of the discussion. Reflexivity was also ensured during the analysis and interpretation of data. At the early stage of analysis, the research team comprised of three experts with a broader perspective of methodological objectivity reviewed the codebook and some examples of noteworthy quotes. To further ensure transparency and trustworthiness, a summary of the findings was sent to the participants to review and verify that the findings are reflective of what was discussed during the focus group sessions.

2.6. Conclusion

Our study has demonstrated that there is a need to understand the perspective of students in the development of guidance documents used in higher education. In the field of public health, the socio-political environment is very dynamic and constantly evolving. Partnership and collaboration remain of the most important competencies in public health practice.

2.7. References

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2.8. Appendix

Appendix 1: Focus Group Interview Script

Question 1:
Estimated time: 1 minute
Please take a moment to reflect on your ranking. Do you remember your top and least ranking? Yes/No poll through Zoom/M-Teams:

→ **Question 1b:** Chose it from the list (a list of the competencies will be provided)

Question 2: **Estimated time: 30seconds**
The ranking shows that the majority ranked XXX competence category as the most desired. Did you rank this as your most desired? Yes/No poll through Zoom/M-Teams

Question 3: **Estimated time: 5-10 minutes**
If you ranked XXX the top desired, what made you rank it as the top desired, and for those who did not rank it top desired, can you think about reasons why your classmates would rank it as the top desired.

Question 4: **Estimated time: 30seconds**
The ranking shows that the majority ranked XXX competence category as the least desired. Did you rank this as your least desired? Yes/No poll through Zoom/M-Teams

Question 5: **Estimated time: 5-10 minutes**
If you ranked XXX the least desired, what made you rank it as your least desired, and for those who did not rank it as least desired, can you think about reasons why your classmates would rank it as least desired.

→ **Question 3b and 5b:** **Estimated time: 5 minutes**
Every student comes into the graduate program with dreams and a career trajectory. Can we discuss how each student's future plans may have influenced their ranking?

→ **Question 3c and 5c:** **Estimated time: 5 minutes**
Our past experiences have a way of influencing our decisions. Can you reflect on any past experience that may have influenced the ranking?

Question 6: **Estimated time: 5 minutes**
A brief explanation of each category was presented for your reference during the ranking. Can we discuss the possibility of that influencing the ranking?

→ **Question 6b:** **Estimated time: 5 minutes**
The brief description was presented in a particular order. Can you discuss the possibilities of that order influencing the ranking?

Question 7: **Estimated time: 5 minutes**

Overall, what is your perception of the PHAC competencies? Are there other categories you would like to see reflected in the PHAC competence categories?

→ **Question 7b:** **Estimated time: 5 minutes**
Knowing what you know now, after taking PDS, would you still choose the same competence as top/least. YES/NO poll on ZOOM/Team.

Question 8: **Estimated time: 5-10 minutes**

You all had to use the InPlace platform at some point. You used it for some content of the PDS course like registering for workshops, submitting your resume, fill out the practicum forms, communicating with the department, etc. I know it is a new tool, and learning a new tool is not always easy at first. How would you describe your experience with using InPlace and how that may have affected your ranking?

→ **Question 8b:** **Estimated time: 30 seconds**
Overall, would you say InPlace was useful in helping you navigate your learning goals? Yes/No poll through Zoom/M-Teams

→ **Question 8c:** **Estimated time: 5 minutes**
Thinking about the preparation for practicum placement or thesis project and reflecting on the ranking process, in what ways have the use of InPlace helped you in identifying learning needs?

→ **Question 8d:** **Estimated time: 5 minutes**
Is there anything else you would like us to know based on your experience with using InPlace? Are there suggestions on how it can be improved?

→ **Question 8e:** Administer usability scale **Estimated time: 3 minutes**

Appendix 2: Core Competence Categories

Core Public Health Sciences	This category includes key knowledge and critical thinking skills related to the public health sciences: behavioral and social sciences, biostatistics, epidemiology, environmental public health, demography, workplace health, and the prevention of chronic diseases, infectious diseases, psychosocial problems and injuries. Competence in this category requires the ability to apply knowledge in practice. • Demonstrate knowledge about the following concepts: the health status of populations, inequities in health, the determinants of health and illness, strategies for health promotion, disease and injury prevention and health protection, as well as the factors that influence the delivery and use of health services. • Demonstrate knowledge about the history, structure and interaction of public health and health care services at local, provincial/territorial, national, and international levels. • Apply the public health sciences to practice. • Use evidence and research to inform health policies and programs. • Demonstrate the ability to pursue lifelong learning opportunities in the field of public health.
Assessment and Analysis	This category describes the core competencies needed to collect, assess, analyze and apply information (including data, facts, concepts and theories). These competencies are required to make evidence-based decisions, prepare budgets and reports, conduct investigations and make recommendations for policy and program development. • Recognize that a health concern or issue exists. • Identify relevant and appropriate sources of information, including community assets and resources. • Collect, store, retrieve and use accurate and appropriate information on public health issues. • Analyze information to determine appropriate implications, uses, gaps and limitations. • Determine the meaning of information, considering the current ethical, political, scientific, socio-cultural and economic contexts. • Recommend specific actions based on the analysis of information.
Policy and Program Planning, Implementation and Evaluation	This category describes the core competencies needed to effectively choose options, and to plan, implement and evaluate policies and/or programs in public health. This includes the management of incidents such as outbreaks and emergencies • Describe selected policy and program options to address a specific public health issue. • Describe the implications of each option, especially as they apply to the determinants of health and recommend or decide on a course of action. • Develop a plan to implement a course of action taking into account relevant evidence, legislation, emergency planning procedures, regulations and policies. • Implement a policy or program and/or take appropriate action to address a specific public health issue. • Demonstrate the ability to implement effective practice guidelines. • Evaluate the action, policy or program. • Demonstrate an ability to set and follow priorities, and to maximize outcomes based on available resources. • Demonstrate the ability to fulfill functional roles in response to a public health emergency

Partnerships, Collaboration and Advocacy	This category captures the competencies required to influence and work with others to improve the health and well-being of the public through the pursuit of a common goal. Partnership and collaboration optimizes performance through shared resources and responsibilities. Advocacy—speaking, writing or acting in favour of a particular cause, policy or group of people—often aims to reduce inequities in health status or access to health services. Identify and collaborate with partners in addressing public health issues. • Use skills such as team building, negotiation, conflict management and group facilitation to build partnerships. • Mediate between differing interests in the pursuit of health and well-being, and facilitate the allocation of resources. • Advocate for healthy public policies and services that promote and protect the health and well-being of individuals and communities.
Diversity and Inclusiveness	This category identifies the socio-cultural competencies required to interact effectively with diverse individuals, groups and communities. It is the embodiment of attitudes and practices that result in inclusive behaviours, practices, programs and policies. • Recognize how the determinants of health (biological, social, cultural, economic and physical) influence the health and well-being of specific population groups. • Address population diversity when planning, implementing, adapting and evaluating public health programs and policies. • Apply culturally-relevant and appropriate approaches with people from diverse cultural, socioeconomic and educational backgrounds, and persons of all ages, genders, health status, sexual orientations and abilities.
Communication	Communication involves an interchange of ideas, opinions and information. This category addresses numerous dimensions of communication including internal and external exchanges; written, verbal, non-verbal and listening skills; computer literacy; providing appropriate information to different audiences; working with the media and social marketing techniques. • Communicate effectively with individuals, families, groups, communities and colleagues. • Interpret information for professional, non-professional and community audiences. • Mobilize individuals and communities by using appropriate media, community resources and social marketing techniques. • Use current technology to communicate effectively
Leadership	This category focuses on leadership competencies that build capacity, improve performance and enhance the quality of the working environment. They also enable organizations and communities to create, communicate and apply shared visions, missions and values. • Describe the mission and priorities of the public health organization where one works and apply them in practice. • Contribute to developing key values and a shared vision in planning and implementing public health programs and policies in the community. • Utilize public health ethics to manage self, others, information and resources. • Contribute to team and organizational learning in order to advance public health goals. • Contribute to maintaining organizational performance standards. • Demonstrate an ability to build community capacity by sharing knowledge, tools, expertise and experience.

CHAPTER 3: INPLACE USER EXPERIENCE

Title: User Experience of a Practicum Administration Software (InPlace) In the Facilitation of Competence-based Learning.

Authors: Chika A. Mackenzie S. Cynthia L, Emma A.

Candidate's role in the manuscript: I conducted the analysis and prepared the first draft of the manuscript.

3.1. Abstract

Objective: Technology is essential in the facilitation of many operations in higher institutions. In recent years, the use of web-based platforms to deliver academic content, including practice-based training, has gained popularity. However, its use in practicum process administration is not well studied in the literature. In the 2020/2021 academic year, the MPH program at McMaster university incorporated the InPlace platform to streamline the practicum process administration. This study aims to understand the user experience of the practicum administration software (InPlace) In the facilitation of competence-based learning.

Methods: Twelve students participated in focused group sessions that lasted approximately 1.5 hours. Two staff members participated in one-on-one semi-structured interviews. The System Usability Scale (SUS) was used to get a quantitative measure of the usability of the InPlace platform. Outcome measures included user experience from the student and the staff perspective.

Result: The SUS score was 61.8 (95% confidence interval, 56.7-66.9). Eight students (66.7%) indicated that the InPlace platform was useful in helping them navigate their learning goals. Two students (16.7%) could not give a definitive response due to limited exposure. The staff perspective demonstrated the benefit of the platform with respect to communication, practicum process, and overall program administration.

Conclusion: Usage of the electronic practicum placement platform seems to have perceived benefits; however, usage of the system proves to still be in the nascent phase of operation and warrants further development.

3.2. Introduction

The use of technology in education has been an integral part of graduate programs. The impact of technology on the staff and students is constantly being investigated.[1-3] Using internet/web-based platforms for the delivery of educational content has become commonplace. With the lessons learned from the COVID-19 pandemic lockdown experience, it is now obvious that going forward, many higher institutions will implement a mixed-method style of teaching with web-based learning complementing the traditional methods of delivering educational content with the benefit of reaching students in different jurisdictions and them having access to the course content at any time.

Besides the delivery of educational content, the internet-based interface has been instrumental in the smooth running of higher institutions, facilitating student registration, fees payment, and library administration, to mention a few. Even though the growing use of web-based systems for higher education delivery is generally accepted now, the problems they cause or solve are still not well defined. However, the implementation of course management platforms has been shown to improve the delivery of professional development courses.[1,2] It also has the potential to save both space and time, thereby creating opportunities to absorb more students.[3]

Despite the benefits, the degree to which an institution incorporates technology depends on many factors. At McMaster University, some of those factors are security and funding. The MPH program was recently funded to pilot the use of InPlace, a practicum management software. The platform was implemented in 2020 as a pilot project to help facilitate competence-based learning in the 2020/2021 first-year graduate

students of public health program. It was intended to help the administrative staff manage the practicum process.

3.3. Methods

Following ethics board approval, predefined criteria that are relevant to the research question(s) were used to carry out purposive sampling of students and staff of the McMaster University Public Health graduate program. Students who were enrolled to take the PDS course in the 2020/2021 school year and faculty or administrative staff who were involved with the practicum placement process were included. Twelve students and two staff members gave consent to participate.

Qualitative data on user experience was collected through virtual focus group sessions for the student's participant and a separate virtual semi-structured interview for each staff participant. Each of these sessions represents a case. Some data were also collected through polling during the sessions. The System Usability Scale (SUS) was used to get a quantitative measure of the usability of the InPlace platform.[4] During the focus group and interview sessions, an overview of the study objectives and their role as participants were reiterated. The duration of each focus group session was approximately 1.5 hours, but this time was not only allocated to discussions about the InPlace platform. The methods and findings of the rest of the focus group discussions have been submitted for publication in another journal.

Outcome measures were software user experiences from the staff and students' perspectives. From the student's perspective, the focus was on the usability of the

platform in the facilitation of competence-based learning. The staff perspective was focused on communication and administration of the practicum process.

3.4. Analysis

Transcripts of the audio recordings from the focus group sessions and the semi-structured interviews were coded using the NVivo software. The analysis was conducted in two phases. Each of the three sessions (focus group, staff #1, and staff #2) of data collection represents a case, and the unit of analysis was the case. The semi-structured interviews were analyzed first. Deductive coding of the staff interviews was based on the framework of questions used in the semi-structured interviews (see Appendix 3). Communication, practicum process, workshop, and usability were among the categories that were generated. An in-depth examination of discussions around the categories identified words that expressed challenges, improvement, and satisfaction in the use of the platform. The identified terms were used for the second phase for the deductive coding of the focus group session. Inductive coding was also used to further generate codes that expressed difficulty, delays, confusion, and usability. User experience emerged as a theme, with staff and student perspectives forming the sub-themes. The descriptive analysis of the SUS questionnaire was conducted, and the subjective assessment of the SUS was analyzed using the framework provided by the United States Department of Health and Human Services.[5,6] The participants' ratings on each question were converted to new figures. The sum was then multiplied by 2.5 and divided by the number of participants.

3.5. Results

Both staff and student participants provided a subjective usability assessment of the platform using the SUS questionnaire. The system usability score was 61.8 (95% confidence interval, 56.7-66.9). Generally, a usability score less than 68 is considered to be below average.[5,6] However, because the system is new and at the piloting stage, this finding may indicate potential room for improvement. The discussions on the students and staff user experience themes also corroborated the results of the SUS.

3.5.1. User experience – staff

While the student's perspective was focused on the usefulness and usability of the platform in navigating career goals, the staff perspective was focused on the usefulness of the platform with respect to communication, practicum process, and overall program administration. The two staff members (one program director [PD] and one administrative staff) who participated in this study had varying opinions in some of the areas. This could be explained by how they interacted with the platform. The PD had a supervisory perspective of the system, and the administrative staff who coordinates the practicum process had a more practical perspective of the platform and gave more insight into the day-to-day use of the platform. Their perspectives are summarized below as sub-themes.

Workshops and Practicum Process:

Both participants gave an overview of the process that was used before the integration of InPlace. The old practicum administration process had many repetitive steps that were not devoid of mistakes, including missing vital information such as the supervisor's name, the contact information, or location of placement. The process required the students to complete paper forms and submit them to the administrative staff, who then

would review each field in the form to ensure that there was no missing information before submitting it to the PD. The PD then signs the form and returns it to the staff. The process from rectifying issues of missing information to completion and storage could take many back-and-forth email communications with repeated printing and scanning of the forms. So, there was a great expression of excitement in their voices when they talked about how the integration of InPlace has not only eliminated the problem but it also prevents it from recurring. In the platform, the fields were made mandatory to ensure that students provide all necessary information. The completed forms are automatically stored electronically. No paper trail, no scanning, and any information needed to respond to student inquiries are just a click away. The staff members believe the platform added considerable value, as was expressed in the following quote.

> *"Okay! so the process has gotten 1000% better. And even though right now we are still kind of at that stage where we are learning how everything works, we are now understanding how the pieces are coming together, some aspect of it, and it has helped. It has helped because I am not getting 20 practicum learning contracts in my email. Everything is done electronically. This way, it is already done. It is in the system. I do not need to print anything; the PD does not need to sign anything. It is all Click, click, click, click, click."*

Automation of some aspects of the practicum process was another thing that generated a positive response about the platform. While acknowledging the challenges of learning a new system, the administrative staff believes that the automation of communication in the platform has helped improve the overall management of the practicum process. The

explanation of automation in the context of communication is seen in the following quote.

> "*so, for example, the learning contract is due within the first week to 10 days of the practicum starting. So, they have got it in there. Let me just take a step back, for example, once they go in, so they have to create a placement, and that is when they put in all the other placement details: who the supervisor is going to be, where they're going to be, location, supervisor's email, telephone number, all that fun stuff. And then once they do that, I go in, and I confirm their placement. And once I do that, that's when things start with the learning contract. That is when these automatic emails start generating. Okay, once I take my step, they are going to get an automatic email saying, hey, your learning contract is now ready and available for you to go in and fill out. Once they fill that out and they submit it, their supervisor gets an automatic email to say, it has now been submitted by your student; please go and acknowledge the content. Once she does that, it then comes to me; I make sure that everything is in place, nothing is missing. Once I submit, it goes to the program director for final approval. So yes, we are definitely there (automation), and this is just starting."*

The PD acknowledged that in terms of the practicum process, she had not used the platform in that capacity. However, reviewing students' CVs and background information already inputted in the system before their one-on-one session was very helpful in facilitating the practice sessions, especially with guiding the student's interest in practicum choices and selection of electives. A major challenge that was identified regarding the practicum process is the inability of the students to send off their

practicum learning contracts to their supervisors for a final review before submitting them. When asked about the use of the platform for workshop purposes, they mentioned that the platform had not been used for that purpose.

Communication:

Communication was looked at in three ways: (1) communication between students and staff; (2) communication between the program and the practicum sites; and (3) communication between students and their practicum or thesis supervisors. Of these communication links, improvement was observed only in communication between students and staff. The improvement was observed more by the administrative staff because of her level of involvement with the practicum process. The difference in the role each staff plays within the MPH program was reflected in their responses to how the platform had improved communication. From the supervisory level (PD's perspective), communication has not improved, but communication has improved from the administrative perspective. The improvement in communication from the administrative perspective is related to the improvement of the practicum process management that is due to the automation of email messaging to students at key communication points. Identification of the major communication points has led to communications happening earlier than previously; in some instances, students are even initiating it, as can be seen in the following quotes:

> *"I feel like it has helped in terms of communication because once the student confirms their placement, they log in and input all the required information. So, I feel that because within InPlace, we communicate with the students that this is what we need to do, and this is what we need you to do to make sure that things flow through*

nicely, just input all the details. Because the fields in InPlace made the details mandatory, like certain things are mandatory, they cannot proceed to the next step without ensuring that all the fields are met. So that, to me, is amazing. I think that is a really good feeling. I think those are really good options to have in InPlace."

"And in terms of improving communication, yes because I mean we can talk about the placement already; students are now emailing me with questions and whatnot, and I already have the information in front of me, so we're not going back and forth wasting time to get little bits of information. It's already there because they've input everything (into the platform), but I think what's really important is the fact that the program informs the students what is needed of them like what we need them to do, and I think that's the biggest and the most important piece of communication in order to get this thing to work. if they do not know what to do, how could they possibly get it to work? They will have no idea. Yes, it has definitely helped out because now they know; we've informed them what they need to do; they have been doing what they need to do. I like the fact that they are open enough and they feel comfortable enough to email me saying, hey, I am stuck; what do I do, where do I go, how do I fix this?"

From the PD's perspective, communication is between the student and their practicum or thesis supervisor, and this level of communication had not improved at the time of data collection. While the opinion of the administrative staff was based on the usefulness of the platform in identifying the key communication points and harnessing the benefits thereof, the PD was focusing on communication optimization prospects, especially with respect to reaching the supervisors and inter-departmental

communication. The PD's explanation portrays the areas of communication that still need to be improved, as can be seen in these quotes:

"I would say at this point in the pilot, it hasn't improved communication. I think that is just because we're still working through the kinks in the system, in terms of like how the back end is set up, and what that actually looks like for supervisors and students. There are a lot of generic templates on the back end, and we are trying to tailor those, but they are not at a place right now where they are fully tailored, where they can clearly communicate the various steps for students and supervisors. So, it has great potential, but it is just not there yet."

Overall Administration

The staff participants were asked to discuss the impact of InPlace platform in the overall administration of the MPH program. They both affirmed that it increased their workload mainly because it is in its infancy, and there is a lot to learn. One major challenge was the navigation of the platform. Their responses corroborated that of the students that even though it has great potential for improvement, at the moment, it is not very intuitive. One reason being that the technical language is quite different from the functional language. And even though there is support from the programmers, the language is still a hurdle. The key areas that need improvement are (1) development of two guidance documents, one for students and one for supervisors; (2) tailoring emails to communicate precisely what needs to be communicated at each communication point, (3) creating a pathway for supervisors to have access to students learning contracts without having to log into the platform; and (4) Having interdepartmental connectivity for easy accessibility of documents stored on the platform.

3.5.2. User experience - student

In terms of overall usefulness, eight students (66.7%) indicated that the InPlace platform was useful in helping them navigate their learning goals. Two students (16.7%) indicated that due to limited exposure, they were not able to give a definitive response, and two said it was not very useful (16.7%). Although students believe the software is a useful tool, especially for the centralization of practicum and thesis pieces, the majority echoed that it was not user-friendly; the reasons being that they were not familiar with the system because they had not used it as much. The practicum process was not fully initiated on the platform when the focus group was conducted. The difficulties start with finding the link to the InPlace platform. Organization of the practicum listings in no particular order, not being able to preview practicum posting information, or view the complete listing without having to download it as a pdf file, are some of the challenges that the students recounted, as can be seen in the following quote:

> "*I definitely think InPlace is a good tool to have for centralizing, especially practicum and thesis things. But I will say there were two things that kind of jumped out at me in terms of improvement, and that impacted my experience a little bit. The first one was just getting the link…"*
>
> *I do not know if anybody else had trouble finding the link to in place. It was somewhere on Avenue-to-Learn that is very convoluted and hard to get to. And just typing InPlace does not really work on Google because there are other InPlace set up for other institutions.*

"… And then the one other thing is just a technical thing about it. It is not really the tool itself, but, um, the list of practicums is what I find not very intuitive. There is no way of knowing which ones you have already clicked on, and um, it is not really in order. It is just sort of pasted as PDFs, and you have to keep downloading the pdfs. You cannot really just preview what the file is about for the practicum placement. And the organization of them is a little bit unclear."

Despite the challenges, students appreciated having the platform as a 'one-stop-shop for everything that has to do with practicum placements. They believe that the incorporation of InPlace is good for the MPH program. Overall, the platform has potential for improvement, and the students' suggestions for improving user experience are summarized in Table 3.

Table 3: Summary of students' suggestions for Improving the InPlace platform.

Suggested improvements	**Explanations for the improvement**
Videos clips that promote the use of the platform.	• Providing a short video clip of how to use the platform and its components will guide the users and prevent unnecessary waste of time trying to figure out the steps. This will help to improve the user experience. • There seems to be a very long gap between use. If the platform is used more to assign projects to students or track learning goals and practicum progress, continuous use will be promoted.
Accessibility of documents like in Avenue-to-Learn	• Since they are already familiar with Avenue-to-Learn, it would be nice for the accessibility of documents in InPlace to be similar to what is obtainable in Avenue-to-LearnA2L. For instance, if one could click on the job postings link, and the pdf opens in a different word tab, rather than being downloaded onto your computer directly, that would be a significant improvement.

Practicum postings.	• The postings are presented in a list that continues to grow. And it is hard to know which postings are new. It would be nice if a slightly more accessible version of each practicum posting is made available rather than having to download it each time. • The practicum names often include many acronyms that one cannot make sense of unless by clicking on the posting. It would be nice to have the acronym spelled out in the titles of the documents. • It will be nice to have a side tab beside each posting that contains information such as the application deadline and the core competencies associated with the different practicum opportunities.
Notification of information and deadlines	• In InPlace, one has to actually log every time to check if there's something new. Getting notification by email or, like in other apps, a bell icon when something like when a deadline is approaching or when a new practicum opportunity is posted will help prevent missing important deadlines.

3.6. Discussion

The SUS is a quick and reliable way to measure the usability of a web-based platform. One of the benefits of the assessment tool is that it produces a reliable result irrespective of sample size. With only fourteen participants in this study, the SUS result still demonstrated the ease of usability. Because the responses are converted to a scale of zero to hundred, the SUS score of 61.8 may be misinterpreted as above average, but this is not the case. Any SUS score below 68 is below average. This cutoff score is the average score from the analysis of over 500 SUS studies[6]. Although the InPlace platform SUS result indicates a below-average score, it is not too far from the cutoff score, which implies that there is room for improvement. The triangulation of data from the poll, focus group, and semi-structured interviews strengthened the reliability of the

SUS score. The data sets, although preliminary, were corroborative, and incorporating the suggested improvement ideas will help improve the overall usability of the platform.

One of the reasons for incorporating InPlace into the MPH program was to improve the management of the practicum placement process. However, the status of participants in the MPH program played a role in determining the level of interaction each individual has with the platform. The administrative staff had the most insightful interaction because of her day-to-day duties in the administration of the practicum process. One challenge the staff faced was learning how the platform is configured and how to use it in two interfaces: the administrative and student interfaces. The need to understand the technology-heavy interface is to have the capacity to troubleshoot minor issues in the student's interface from the administrative interface without waiting for support from the InPlace team.

Despite these challenges, the staff considered it a very useful platform with the potential to centralize paperwork submission processes. Since many students choose the practicum track, the platform can help with all the paperwork, including those from thesis students. And with its reporting capabilities, it could be an insightful planning and evaluation tool. It has helped identify the gaps in the process was one of the benefits the platform demonstrated. It has also improved communication to an extent, especially with the mandatory fields, ensuring that the possibility of having missing information is eliminated. The staff members were the first point of contact for the troubleshooting of the platform. This was also seen as an improvement in communication between students and staff. When one student encounters a problem with the platform, the staff sees it as an opportunity to reach out to all students with a detailed explanation of the

solution. This highlights the improvement in communication in two ways: it triggers communication points and eliminates the repetition of the same problem. The time saved in not having to go back and forth is in line with the findings of other studies on the use of similar platforms in higher education[3].

Limitations

The major limitation was the timing of the study. The configuration of the platform was still in progress and modifications were being made when issues were encountered. For this reason, the participants may not have had enough opportunity to master the platform. At the time of data collection, the students had not used the platform for much of the practicum-related things. Insufficient exposure to the platform may have affected the subjective assessment.

3.7. Conclusion

The findings of the students' perspective of the core competencies and the use of the InPlace platform in the facilitation of competence-based learning have demonstrated that there are competencies that may require new teaching methods to increase student's interest in learning them. One way could be having a system that helps the students track and access what they have learned and what they still need to learn to be ready for the workforce. Due to the small sample size and other limitations of this study, more research will be required to identify ways of incorporating an easy-to-learn system that embodies the suggested solutions.

3.8. References

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3.9. Appendix 3: Semi-structured Interview Questions.

1. Has the InPlace platform improved any of the following for you? Please explain how.
    - communication with students
    - practicum process
    - worships registration and management
    - Overall administrative work
2. How easy is it for you to navigate the InPlace platform?
3. What other improvements would you like to see within InPlace platform
4. Is there anything else you would like us to know based on your experience using the InPlace platform?
5. What is your overall opinion regarding the addition of InPlace platform to the MPH program?

CHAPTER 4: OVERALL IMPLICATIONS AND FUTURE RESEARCH

4.1. Research Implication

This research is novel because there has been little work done to document the students' perspective and evaluate the current PHAC core competencies, especially within the context of a post-pandemic public health world. In recent years, there has been unprecedented attention on the public health system at all levels. There is a growing momentum about what needs to change with regards to training the public health workforce. At the national level, the Canadian Institute of Health Research has been having some national dialogues on the future of the Canadian public health system with respect to the public health data system, public health workforce planning, and strengthening the academic practices interface in public health, among others. These dialogues are aimed at identifying and unifying priorities and strategies for a strong and responsive public health system that can tackle current and future challenges.[1,2] Since this is one of the first studies evaluating student's perspectives of the core competencies, the findings highlight significant contributions to what needs to change.

Implications of this research are more pronounced with respect to public health education. This study is one of the first studies exploring students' voices in modeling public health training. The MPH program at McMaster University is embedded in a department known for its strong traditional academic exposure to methodological approaches and practices of assessment and analysis. Most of the courses that the students take give the students the fundamental theoretical background in assessment

and analysis. The findings of students' perceived desire for the competencies have demonstrated that, even though the environment offers a lot of training and opportunities for assessment and analysis, there seems to be a lack of confidence in applying the learnings. Besides the theoretical background, the students may need more exposure to the hands-on practical component of data analysis. Therefore, modeling the MPH program to provide more practical opportunities will help improve the student's confidence. Since the participants mentioned that the assessment and analysis category is (1) data-intensive, (2) different for each project, and (3) has many components, it may be ideal to look for ways to make it desirable from these perspectives. Understanding the level of intensity of data analysis that students are comfortable with and gradually building on it may be one way of modeling an intensity-based learning approach. The overall principles of data analysis may be enough to carry out any assessment and analysis in public health, but the student's identification of the fact that it is not a one-size-fits-all kind of thing may necessitate a practical model of delivery that is both project and specialty-specific.

4.2. Future Research

Since two major limitations of this study are the timing, and sample size, conducting a similar study with large sample size and targeting data collection at the beginning of the program will give a more precise insight into the student's perception of the CCPHC and eliminate any impact of the COVID-19 pandemic. With all the recent attention to cultural competence as it regards to equity, diversity, and inclusiveness, further research may be needed to examine students' understanding of the diversity and inclusiveness competencies. Since data analysis is an integral part of public health on every level,

being confidently competent is a goal every aspiring public health practitioner should strive to achieve. Therefore, further research is also necessary to explore ways of improving student's desirability of the assessment and analysis competence category

4.3. Overall Conclusion

The findings of the students' perspective of the core competencies and the use of the InPlace platform to facilitate competence-based learning have demonstrated that there are competencies that may require new methods to facilitate students' learning. One of the new methods may include having a system that helps the students track and access what they have learned and what they still need to learn in order to be ready for the public health workforce. Due to the small sample size and other limitations of this study, more research will be needed to identify why the students' desirability of some competencies is rated low and what may be done to increase students' interest in those areas.

In terms of facilitating competence-based learning with InPlace platform, there remains room for improvement. Some benefits demonstrated in this study are the identification of the key communication points and the gaps in the administration of the practicum process. Both students and staff believe it is a good platform to have, especially as a one-stop-shop.

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