A CASE STUDY EXPLORING HOW PROFESSIONAL EDUCATION PROGRAMS AT A MID-SIZED CANADIAN UNIVERSITY ARE CONCEPTUALIZING AND OPERATIONALIZING ENTRY-TO-PRACTICE COMPETENCE FRAMEWORKS

by

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Abstract

Entry-to-practice competence frameworks and competency-based approaches to professional education are becoming increasingly popular in Canada and on a global scale. Although competency-based medical education has the potential to inform approaches to the development and assessment of competence across professional disciplines, there are contextual factors which make medical education unique. To date, few studies have compared how university-based professional education programs are using competence frameworks to guide teaching/learning and assessment in their own professional contexts. Consequently, the purpose of this qualitative case study was to explore how professional education programs at a mid-sized Canadian university are conceptualizing and operationalizing entry-to-practice competence frameworks.

In Study 1, theoretical tensions between behavioural and integrated conceptions of competence were explored by comparing similarities/differences across ten professions’ entry-to-practice competence frameworks. In Study 2, an in-depth interpretive case study approach was used to explore how the assessment of competence is being operationalized in a highly resourced and work-integrated professional education program. Finally, in Study 3, an embedded case study was used to explore how nine different professional programs, with potentially fewer-resources and work-integrated learning opportunities, are approaching and perhaps problematizing the development and assessment of competence.

Taken altogether, the findings of Studies 1, 2, and 3 suggest that how competence is conceptualized and represented matters and has the potential to shape how competence is developed and assessed at the program level. While limited in scope given the use of a single university, the findings highlight: (1) diversity in the approaches to operationalization being used
across programs; (2) common attributes which can be used to classify the manner in which these programs operationalize the development and assessment competence; and (3) challenges with supporting academic faculty, who have academic freedom, to buy in to competence as a construct informing pedagogy and assessment. These findings can be used to inform policy and practice decisions about: (1) the role professional programs play in determining competence for entry-to-practice along professional pathways to licensure, and (2) programs’ intents for and approaches to operationalizing entry-to-practice competence frameworks in practice.
Co-Authorship

This multiple manuscript dissertation is composed of three studies. I would like to acknowledge the contributions made by collaborators in Study 2 and Study 3.


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... 

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Prologue

The Chronosystem\textsuperscript{1} Which Affects my Positionality as a Researcher

There are several significant life events which have shaped my worldview and thus my approach to conducting this research. For the purpose of situating my positionality as a researcher, I am bounding the chronosystem to my higher-education experiences which have shaped my ontology, epistemology and research interests.

My undergraduate education integrated biological and social sciences. I hold a Bachelor of Science with a Specialization in Biology and Psychology and a Bachelor of Education (Concurrent) with Intermediate/Senior qualifications in Biology and Chemistry. Being in the Concurrent Education program meant that I began taking professional courses in Teacher Education in the first year of my undergraduate studies. It was within my undergraduate studies that I began to develop an understanding of learning processes from various systems perspectives, including microbiological, physiological, behavioural, evolutionary, organizational, and pedagogical.

From my higher-education teaching and learning experiences, both as a student and classroom teacher, I have come to view learning as a dialectical process involving both nature and nurture. Our biological and psychological processes influence how we interact socially with others and these interactions shape our development and constructions of reality (Sameroff, 2010). I agree with Merriam’s (2001) and Knowles’ (1970) assertions that learning happens best when learners are interested in what they are learning, see practical value in how learning can be

\textsuperscript{1} Chronosystem: A system composed of significant life events that can affect adaptation
applied to real-life contexts, have opportunities to practice and demonstrate their learning in authentic contexts, and receive timely, constructive feedback on their performance.

Until the third year of my undergraduate studies, I had full-intentions of applying to Medical School upon completion of my undergraduate degrees. This was until I met my third-year Concurrent Education instructor who introduced me to the field of medical education. This instructor was a certified teacher, who also held a Doctorate of Philosophy in Education, and was employed full-time as an Educational Developer in Postgraduate Medical Education. She opened my eyes to alternative career paths in higher-education/professional education and became my first career mentor.

In the second semester of my third year of undergraduate studies, I approached my mentor to supervise a Special Directed Studies course. Together, we thematically analyzed interview data that she collected for a study exploring role modeling as a teaching strategy in general surgery. It was through this course that I was introduced to qualitative approaches to educational research in higher/professional education. That summer I was hired by the Office of Postgraduate Medical Education (PGME) to co-author a newsletter series intended to support awareness of the CanMEDS (2005) Physician Competency Framework.

The following year, I asked my mentor to supervise a second Special Directed Studies course with a focus on continuing our project and preparing a draft manuscript for publication. Throughout the fourth and final year of my B.Sc.(Hons) and into my B.Ed. year, I continued to work part-time for the Office of PGME as a co-author of the CanMEDS Newsletter Series. In this role, I was exposed to early thinking about Competency-Based Medical Education (CBME) and the challenges of assessing professional competence. It was during my B.Ed. year that I decided not to apply to Medical School, but to apply to Graduate Studies in Education.
During my Masters of Education program, I endeavoured to further hone my foundation in quantitative and qualitative research methods, as well as program evaluation. All the while, I continued to explore notions of competence within postgraduate medical education. For my Master’s thesis, I used qualitative methods to explore family medicine residents’ perceptions of uncertainty in their clinical decision-making. Through this work I have come to better understand the critical role of professional judgment in competent performance.

My current research interests lie primarily in development and use of assessment and evaluation to support learning within university-based professional education programs. My continued involvement in the implementation of CBME has fueled my interests in the assessment of competence from both conceptual and operational perspectives. Currently I am a lead Research Assistant for two projects. The first project is an 18-month Royal College of Physicians and Surgeons of Canada (RCPCS) funded study, which aims to develop practice-focused guidelines for operationalizing programmatic assessment. The second project is a developmental program evaluation exploring the first six months of CBME implementation in an Emergency Medicine program. Together, these projects have provided me with experiences to continue honing strong research partnerships within Postgraduate Medical Education and to learn from those who have first-hand experience with implementing Competency-Based Education (CBE).
Chapter 1
Introduction

The development and assessment of future professionals’ competence are defining features of professional education programs (Eraut, 1994, 1998; Gonczi, 1994). All professions have public statements about competence or occupational standards, which are often described as being two sides of the same coin: competence representing what a professional is required to be able to do in practice and occupational standards specifying what the public can reasonably expect from certified members of a profession (Eraut, 1994). The general public and those who work alongside newly licensed professionals need to know, with some degree of confidence, that graduates of a professional program have the requisite knowledge, skills, and abilities needed to practice safely and effectively in their chosen profession. The best way to know if learners are competent and thus ready for unsupervised practice is to assess them performing essential professional activities in authentic practice contexts (Gonczi, 1994, 2013; Uhlenbeck, Verloop, & Beijaard, 2002).

Within North America, competency-based professional education is a resurgent paradigm (Frank et al., 2010). Since the rise of Competency-Based Teacher Education (CBTE) in the United States in the late 1960s (Forzani, 2014), interest in operationalizing competency-based models in professional education has been quite limited; that is, up until the early 1990s when medical education started to define a profile of competencies essential to family and specialist doctors in Canada (Merenstein & Schulte, 1990). In the purest form, competency-based education differs from time-based models in that learners can, in theory, complete their programs in variable amounts of time, as long as they can demonstrate competence (readiness for unsupervised practice) (Frank et al., 2010). Despite the popularity of competency-based
education in European nations and Australia – particularly in Vocational Education (Gonczi, 2013) – professional education programs in North America have traditionally adhered to time-based models (e.g., the credit hour). This is problematic, given that completion of coursework and hours of supervised training are known to be poor proxies for the assumed development of competence (Fouad et al., 2009).

If CBE is Not New, Why is it Attracting Such Interest Now?

Accountability concerns are known drivers for educational reform (Alexander, 2000). At the heart of competency-based education movements are three closely-related accountability concerns: (1) Societal concerns about the safety and quality of services rendered by regulated professionals (whose education is partially funded by taxpayer dollars); (2) concerns about the length (and therefore cost) of professional training and the preparedness of professional graduates to adequately perform their professional activities (i.e., return on investment); and (3) concerns about the quality of learning opportunities being afforded to learners by professional programs (Tuxworth, 1989). The key features of competency-based education, which include: a focus on learning outcomes, an emphasis on skills/abilities, a de-emphasis on time-based education, and the promotion of learner centeredness (C-BEN, 2017; Frank et al., 2010), are thought to address each of these accountability concerns.

A Focus on Learning Outcomes

Time-based models of professional education have been criticized for not specifying and articulating the essential core professional activities to be acquired by learners before they graduate and begin unsupervised practice (Iobst et al., 2010). Competency-based education aims to be more transparent and accountable to learners, instructors, and the general public, by identifying the knowledge, skills/abilities, and related standards of performance expected by
learners at various stages of their professional education program (Shaw, Cassel, Black, & Levinson, 2009). Although the origin of educational objectives can be traced back to Ralph Tyler (1942), Outcomes Based Education (Spady, 1994) and Backward Design (Wiggins & McTighe, 2005) have informed contemporary approaches to designing curriculum according to intended learning outcomes.

**An Emphasis on Abilities**

It is not enough to say that learners know how to adequately perform the duties expected of their profession; they must be able to demonstrate their abilities in practice (Miller, 1990). To ensure that learners are ready for unsupervised practice, they must be observed while performing core or essential professional activities in real-life or 'authentic' practice settings. Observations of performance in the workplace have been described as being authentic assessments (Howley, 2004; Mueller, 2005).

**A De-emphasis on Time-based Education**

Competency-based education recognizes that learners progress at different rates due to myriad factors, including: motivation, confidence, ability to self-regulate learning, and quality of learning and feedback opportunities (McCombs & Whisler, 1997). For learners to progress through their professional programs at different rates, they need to have agency and support to manage their own learning (Bandura, 2001; Zimmerman, 2000).

**The Promotion of Learner-Centeredness**

Within competency-based education, learners are encouraged to adjust the time they spend learning tasks in particular stages of their program according to their learning needs (Carraccio et al., 2002; RCPSC, 2017). Hence faculty must take on the role of ‘a more capable other’ (Vygotsky, 1978) and work with learners to accomplish tasks that are within the
learner’s range of competence (Stalmeijer, Dolmans, Wolfhagen & Scherpbier, 2008). ‘More capable others’ can be defined as professionals who have been entrusted to supervise and scaffold learning opportunities and feedback for professional candidates.

**Is Now The ‘Right Place, Right Time’ for Competency-Based Education in Professional Education?**

While competency-based education holds potential to improve the quality, efficiency, and accountability of professional education, it may not be a viable educational approach for all professional programs. Some professional programs are bound to strict institutional policies and professional accreditation requirements which are based on the credit hour and therefore cannot accommodate learners progressing through programs at different rates (Wellman, 2005). Other programs may have more control of their education model, but may not have the financial and/or human resources to invest in change management, educational support personnel, and learning management/information technology platforms— all of which are often cited as being essential to implementation of competency-based education (Curry & Docherty, 2017).

Feasibility of operationalizing competency-based education (CBE) is a big concern, especially given the required financial investment and risk of failure posed by prior unsuccessful CBE movements. Many of the concerns contributing to the demise of the Competency-Based Teacher Education (CBTE) movement in the 1980s had to do with the operationalization of assessment and the capacity for learners and instructors to monitor and use large quantities of performance data to make high-stakes decisions about learners’ progress and promotion (Brinkerhoff, 1978; Dunn, 1980). For example, any assessment data that were
collected were in hard copy that had to be manually entered into a central computer database by administration assistants. Today, learning management software are being developed that enable learners and their instructors to document and visualize assessment data using personal electronic devices. Now that technology is becoming readily accessible, the new challenge becomes designing and implementing assessment tools, strategies, and systems that support learners’ development of competence and high-stakes decisions about readiness to begin unsupervised practice (van der Vleuten & Schuwirth, 2012).

**Resurging Interest in Competency-Based Education**

Interest in CBE has fluctuated over time; as the pendulum swings, interest rises in parallel with accountability movements and interest falls off when professional programs are faced with both conceptual and operational challenges (Dunn, 1980; Tuxworth, 1989). After CBTE lost steam in the United States in the late 1980s (Forzani, 2014), medicine has been the most recent profession to invest considerable resources into competency-based education with the introduction of the College of Family Physicians of Canada’s (CFPC) Triple C Competency Based Curriculum (Tannenbaum et al., 2011) and the CanMEDS Physician Competency Framework (Frank, 2005; 2015). The Royal College of Physicians and Surgeons of Canada (RCPSC), the accrediting body for specialist physicians in Canada, is currently facilitating the transition of all Canadian postgraduate medical education specialty programs to align with a competency-based model (termed, in Canada, Competence by Design) (Frank et al., 2015).

Other health professions (e.g., psychology, dentistry, etc.) and their accrediting and regulating bodies have been quick to recognize the investment the RCPSC and the Accreditation Council for Graduate Medical Education (ACGME in the U.S.) has made in CBE and the potential benefits of these approaches to the education of medical professionals.
Several Canadian professions have also developed their own competency frameworks guiding professional education (e.g., Clinical Psychology, Engineering, Nursing, Occupational Therapy, Social Work, Planning, to name a few); however, not all have facilitated the implementation of CBE within their accredited university-based professional education programs. For this reason, I am referring to these programs as being competency-informed rather than competency-based. While there is a body of literature that challenges the merit and feasibility of CBE (e.g., Norman, Norcini, & Bordage, 2014; Spady, 1977), professional programs’ views on competence and the assessment of competence are not as well understood. This represents an important gap in the empirical literature, given that professional programs are expected to articulate how they approach the assessment of competence for their professional accreditation.

**Purpose of the Investigations and the Research Questions**

The purpose of my dissertation is to better understand how professional conceptions of competence, professional context, and professional competence frameworks, may be influencing the ways in which professional education programs (PEPs) approach operationalizing the development and assessment of future professionals' readiness for practice. Three research questions guide my dissertation research:

1. What similarities and/or differences exist in the ways in which professional accrediting bodies conceptualize, describe and represent competence?

2. How is a highly resourced, highly workplace-based professional education program currently operationalizing the assessment of competence within their own professional context, using their own competence framework?
3. (a) How are other professional education programs, with potentially fewer resources and lesser emphasis on workplace-based training, conceptualizing professional competence and approaching the assessment of competence being put into practice? (b) What considerations and/or challenges are currently influencing their thinking about the assessment of competence?

Definitions and Key Terms

There are several key terms used in this dissertation. To avoid confusion, the following definitions will be used.

**Assessment:** The process and product of collecting, aggregating, interpreting, reporting, and communicating information (qualitative and quantitative) about a learner’s progress and achievement to inform: (a) the learner’s development of learning skills and competence, (b) the approach educators take to scaffold the learner’s development, and (c) high-stakes decisions about progress, promotion, or remediation (AERA, APA, NCME, 2014).

**Student, Professional Candidate, Trainee or Resident:** A learner in a professional program who is working towards program completion and certification/licensure by their professional regulating body (Universities Canada, n.d.).

**Competence:** The ability to carry out essential professional activities safely and effectively (Hager & Gonczi, 1996).

**Competency-Based Education (CBE):** An outcomes-based approach to education, whereby high-stakes decisions about a learner’s progress and promotion are based on aggregated evidence of demonstrated achievement of essential knowledge, skills, and abilities, as opposed to the amount of time spent learning in a given program (Gonczi, 2013).
**Professional Program Leadership:** Individuals holding informal or formal educational leadership positions within professional education programs who inform decisions about program design, implementation, and ongoing improvement.

**University-Based Professional Education Program:** A professional education program offered by a university and accredited by one or more professional regulating bodies (Universities Canada, n.d.).
Chapter 2

Literature Review

This chapter begins with a brief discussion of conceptual challenges in defining and assessing competence in professional education. Next, I discuss the approaches currently being used to assess competence in the professions. Then, I review empirical research comparing how professional programs are approaching the assessment of competence in practice. In doing so, I highlight the need for interprofessional research on the assessment of competence in professional education.

Conceptual Challenges with Defining and Assessing Competence in Professional Education

One of the major challenges with the assessment of competence is the definition of the term competence. In fact, competence has long been described as being a nebulous concept (Eraut, 1998; Short, 1984; Westera, 2001) and to this day, some confusion still exists over the fluid use of competence and its derivatives (competent, competency, and competencies) in professional educational discourse, policy, and practice (Pijl-Zieber, Barton, Konklin, Awosoga, & Craine, 2014). During the downturn of the Competency-Based Teacher Education (CBTE) movement, Short (1984) advanced four ‘normative conceptualizations’ of competence, representing (1) behavioural, (2) integrative, (3) standards-/milestones-based and (4) attribute-based conceptions:

1. Specific behaviours (e.g., behavioural objectives) needed to perform a task (satisfactorily);
2. Command of pertinent knowledge or skills such that a person can identify and make a judgment about what might be appropriate behaviour(s) or performance in a particular context and consideration of how to perform it effectively;

3. The qualitative degree or level of capability deemed sufficient in a performance (ranging from incompetence to competent; i.e., minimally competent, sufficiently or adequately competent, fully competent), such that one has some external standard and criteria (in addition to their own personal standards) to make judgments about how well someone performs during particular circumstances; and

4. A quality of a person or a state of being such that yes/no decisions can be made about whether or not a person demonstrates the characteristic attributes (i.e., holistic conceptual schemes) that are desirable in a member of a particular profession.

Taken individually, each conceptualization leaves some element of competence to be desired, thereby presenting important challenges when it comes to assessment. Challenges come with identifying and agreeing on the core or essential activities/behaviours of a professional, and accessing tacit knowledge (1), assessing the integration of competencies demonstrated through authentic performance (2) setting standards of competence (and agreeing on those standards) (3), and inferring or generalizing competence from personal qualities or performance in specific contexts (4) (Conway, Jeffries, & Chen, 2000; Norman, Norcini, & Bordage, 2014).

Like Short (1984), Eraut (1998) recognized the dissonance in conceptualizing competence as socially-mediated performance and individually-situated personal characteristics. When competence is conceived as being a socially co-constructed performance, “what is to count as competence results from negotiations, explicit or implicit, between employers, professionals, and clients” (including professional bodies, providers of professional
education and training, and the government) about what professionals should be able to
demonstrate in practice (Eraut, 1998, p. 129). Whereas, when competence is thought of as
being individually-situated, it represents a collection of personal (internal) attributes, or ways
of thinking or behaving, which are thought to be important to the profession, to generalize
across situations, and to endure over time. Examples of these personal ‘underlying attributes’
include having initiative, interpersonal understanding, and concern for order, quality and
accuracy (Spencer & Spencer, 1993).

Eraut (1994, 1998) suggested that confusion exists because both notions of competence
are important to professions and therefore need to be captured in their assessments. For
example, it is important for a teacher to be able to introduce a lesson and to have a critical
approach to practice and a flexible mind so that they can adapt and change their approach to
accommodate diverse learners and to integrate new technology. While assessments can be
based on observation of performance in particular practice contexts, they can also include
holistic judgments about personal attributes (e.g., that they take initiative, work well with
others, etc.). In an effort to address the confusion, Eraut (1998, p. 134) suggested referring to
the latter as “evidence of capability” rather than competence. Thus a person may possess the
capability to do more than they are deemed competent to perform through direct observation of
workplace performance (Eraut, 1998).

Gonczi (1994) also recognizes the relational nature of competence and explains how
problems can arise when professions conceptualize competence as either task-based behaviour
or general attributes. To illustrate his point, he used the case of CBTE in the U.S. in the 1970s.
During the CBTE movement, it was thought that if teachers could perform hundreds of discrete
tasks that were identified as being important to the teaching profession, then they would be
competent teachers. This inference is problematic for two reasons. First, from an operational perspective, it was not feasible to monitor, document, triangulate, or use assessment data from hundreds of tasks to make judgements about competence— without the use of technology. And second, it was found that strong performance on individual performance tasks did not relate to what experienced professionals identified as “good teaching” (Houston, 1974). Since the notion of competence as ‘task-based performance’ ignores capability (personal attributes underlying competence), such as the critical role of professional judgment in intelligent performance, this conceptualization is often criticized as being positivist, reductionist, conservative, and/or anti-theoretical (Gonczi, 1994).

Alternatively, inferring competence only from general personal attributes is equally as problematic (Gonczi, 1994). As an example, achieving a high score on a written test of subject and pedagogical knowledge does not guarantee that a teacher will be able to demonstrate competent performance across teaching contexts. Knowing ‘how to’ is, in essence, different than enacting practice in context (Miller, 1990). The ability to apply general attributes in circumstances different from those in which they were initially developed is known as “transfer.” Sampling of performance across time, settings, and complexity of tasks becomes important for judging reliable decisions about competence. Therefore, Gonczi (1994) advocates for the “integrated” or holistic notion of competence, which marries personal/ general attributes with task- and context-specific performance.

According to Gonczi (1994), competence is “conceived of as complex structuring of attributes needed for intelligent performance in specific situations” (p. 29). Included within this notion of competence is the idea that professional judgment is essential in order to decide which combination of knowledge, skills, and abilities are needed for certain tasks to be
performed in particular situations. The strength of this conceptualization of competence is that it allows for the possibility that there may be more than one way of practicing competently in a particular context, and that ethics, values, and reflective practice are important considerations when making judgments about performance. Therefore, according to the integrated conception, a competent teacher demonstrates the ability to employ a complex interaction of abilities in a number of contexts (Gonczi, 1994). A popular, and more recent, integrated definition of competence is the one advanced by Epstein and Hundert (2002) for the medical education community:

The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefits of the individual and community being served […] Professional competence is developmental, impermanent, and context dependent” (p. 226-228).

Competent professionals must have the acumen to initiate interventions appropriately and at the right time to help dependents (i.e., clients, children, patients) reach their goals.

In summary, competence is an inherently complex concept to assess because it includes multiple domains of ability (competencies) and represents the integration of competencies in practice; implies a set standard of ability, which can be challenging to determine and agree upon; and can only be observed through authentic performance, which is thought to be context dependent (Koens, Mann, Custers, & ten Cate, 2005). Despite these limitations, competence is a notion that resonates with professionals and their accrediting bodies. Table 2.1 provides a list of the standards of practice or competence frameworks for Canadian professions, as recognized by Universities Canada (n.d.).
As can be seen from Table 2.1, the majority of professions have competence frameworks. It is not clear from the literature if there are differences in how professional accrediting bodies conceptualize competence (i.e., as general personal attributes, task-based behaviour, or some integration of both). Further, the extent to which conceptualizations of competence and competence frameworks are potentially influencing the approach professional education programs are taking to assess future professionals' readiness for practice remains underexplored across the professional landscape.

Table 2.1. Standards of practice or competence frameworks for Canadian professional programs accreditation

<table>
<thead>
<tr>
<th>Profession</th>
<th>National or Provincial Professional Accредiting Body</th>
<th>Standards of Practice or Competence Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Agricultural Institute of Canada</td>
<td>Standards of Practice: (no title, 2012)</td>
</tr>
<tr>
<td>Architecture</td>
<td>Canadian Architectural Certification Board (CACB)</td>
<td>Standards of Practice: CACB Standards (2010)</td>
</tr>
<tr>
<td>Athletic Therapists</td>
<td>Canadian Athletic Therapists Association (CATA)</td>
<td>Competence Framework: Scope of Practice: Domains/ Core Areas of Competency (n.d.)</td>
</tr>
<tr>
<td>Audiology</td>
<td>Council for Accreditation of Canadian University Programs in Audiology and Speech-Language Pathology (CACUP-ASLP)</td>
<td>Competence Framework: Proposed Practice Competencies for Audiologists in Canada</td>
</tr>
<tr>
<td>Counselling</td>
<td>Canadian Counselling and Psychotherapy Association (CCPA)</td>
<td>Standards of Practice: Core Areas (2002)</td>
</tr>
<tr>
<td>Dentistry</td>
<td>Commission on Dental Accreditation of Canada</td>
<td>Competence framework: Competencies for a Beginning Dental Practitioner in Canada (2005)</td>
</tr>
<tr>
<td>Profession</td>
<td>Organization</td>
<td>Competence Framework</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Engineering</td>
<td>Engineers Canada</td>
<td>Standards of Practice: <em>Graduate Attributes (2016)</em></td>
</tr>
<tr>
<td>Environmental Public Health Professionals</td>
<td>Canadian Institute of Public Health Professions (CIPHI)</td>
<td>Standards of Practice: <em>Standards of Practice (n.d.)</em></td>
</tr>
<tr>
<td>Information Technology Professionals</td>
<td>Computer Science Accreditation Council (CSAC)</td>
<td>Standards of Practice: <em>Graduate Attributes (2011)</em></td>
</tr>
<tr>
<td></td>
<td>Information Systems and Technology Accreditation Council (ISTAC)</td>
<td>Competence Framework: <code>General and Technical Curriculum (n.d.)</code></td>
</tr>
<tr>
<td>Law</td>
<td>Federation of Law Societies of Canada</td>
<td>Competence Framework: <em>National Entry to Practice Competency Profile for Lawyers and Quebec Notaries (2012)</em></td>
</tr>
<tr>
<td>Medicine</td>
<td>Royal College of Physicians and Surgeons of Canada (RCPSC) and The College of Family Physicians of Canada (CFPC)</td>
<td>Competence Frameworks: <em>CanMEDS and CanMEDS-FM (Family Medicine)</em></td>
</tr>
<tr>
<td>Nursing</td>
<td>Canadian Association of Schools of Nursing (CASN)</td>
<td>Competence framework: <em>National Nursing Education Framework (2015)</em></td>
</tr>
<tr>
<td></td>
<td>College of Nurses of Ontario (CNO)</td>
<td>Competence framework: <em>Entry to Practice Competencies (2014)</em></td>
</tr>
<tr>
<td>Occupational Therapists</td>
<td>Canadian Association of Occupational Therapists</td>
<td>Competence Framework: <em>Profile of Practice of Occupational Therapists in Canada (2012)</em></td>
</tr>
<tr>
<td>Profession</td>
<td>Accreditation/Association</td>
<td>Competence Framework/Competency Framework</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>The National Association of Pharmacy Regulatory Authorities (NAPRA)</td>
<td>Competency framework: <em>Professional Competencies for Canadian Pharmacists at Entry to Practice</em> (2014)</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>Physiotherapy Education Accreditation Canada (PEAC)</td>
<td>Competence Framework: <em>Competency Profile for Physiotherapists in Canada</em> (2017)</td>
</tr>
<tr>
<td>Public Administration</td>
<td>Canadian Association of Programs in Public Administration (CAPPA)</td>
<td>Standards of Practice: <em>Student Competencies</em> (n.d.)</td>
</tr>
<tr>
<td>Speech-Language Pathologists</td>
<td>Council for Accreditation of Canadian University Programs in Audiology and Speech Language Pathology</td>
<td>Competence Framework: <em>Proposed Practice Competencies for Speech-Language Pathologists in Canada</em></td>
</tr>
<tr>
<td>Teaching</td>
<td>British Columbia Ministry of Education Teacher Regulation Branch</td>
<td>Standards of Practice: *Standards for the Education, Competence &amp; Professional Conduct of Educators in British Columbia</td>
</tr>
<tr>
<td></td>
<td>Ontario College of Teachers (OCT)</td>
<td>Standards of Practice: <em>Standards of Practice and Ethical Standards</em> (2006)</td>
</tr>
</tbody>
</table>
Approaches to Assessing Competence in Professional Education

How professional accrediting bodies conceptualize competence is thought to have an impact on how competence is assessed at the program level (Hager & Gonczi, 1996). Professional program accreditation plays an important role in ensuring university programs provide a curriculum, instructional opportunities and assessments that support future professionals to develop the expectations of competence set by the profession (Universities Canada, n.d.). The manner in which programs operationalize the assessment of competence is largely dependent on contextual factors, such as program leaders’ conceptualizations of competence, program resources (financial and human), the culture(s) of assessment that exist within a program, and existing university policies and regulations regarding assessment (Grus, Falender, Fouad, & Lavelle, 2016; Holmboe, 2017).

Within professional programs, assessment is known to serve multiple purposes. Assessment promotes learning, protects the public (by ensuring high stakes decisions about progress and promotion are robust [defensible and transparent]), and provides information about program efficacy (Kaslow et al., 2004; 2009; Norcini et al., 2011). It has been argued that assessment supporting multiple intended purposes (both formative and summative) requires a systematic and comprehensive approach (Gonczi, 1994; Schuwirth & van der Vleuten, 2011;
Thinking about assessment as an ongoing process that supports the development of competence presents a major conceptual shift for those involved in professional education. For many years, assessment was thought of as something done to learners at the end of learning to make high-stakes judgements about promotion or remediation. Increasingly, professional education programs are being required to take a more developmental approach to using multiple lower-stakes assessments to inform future professionals’ ongoing learning and to make higher-stakes decisions about progress and promotion (Koenen, Dochy, & Berghmans, 2015; van der Vleuten & Schuwirth, 2012).

**Medical Education: The ‘Gold Standard’ of Developmental Approaches to the Assessment of Competence**

Much of the recent conceptual thinking about the assessment of competence in the professions had been advanced by the Medical Education community. In 2005, van der Vleuten and Schuwirth challenged the medical education community to think about assessment as an instructional design problem that required a programmatic approach to construct a rich picture of residents’ developing competence. They argued it was time to move beyond thinking about assessment as a measurement problem that could only be addressed through psychometrics. From their perspective, reliability, validity, and educational impact were dependent upon purpose and context of an assessment and were not inherent qualities of any given instrument designed to measure individual competencies. They advocated for a shift away from the “1-competence–1-method” (p. 315) approach to assessment and advanced the idea of programmatic assessment. Based on the argument that competence is a multifaceted construct, van der Vleuten and Schuwirth (2012) argued that each assessment is inherently limited in the information that it can provide. This is because each assessment is bound to a specific point in
time, assessor, tool, and context. Therefore, an intentionally designed program of assessment is needed to construct patterns of learner performance across time, assessors, tools, and practice contexts. van der Vleuten and Schuwirth (2012) underlined the importance of considering assessment programmes holistically and examining how programmes function to meet intended purposes of assessment; thus drawing on thinking from the field of program evaluation.

According to van der Vleuten and Schuwirth (2012), a quality, “fit for purpose” (p. 211) assessment program would incorporate the following elements:

- Assessments of the multiple elements of competence (multifaceted construct)
- Credible standards of competence
- Authentic assessment opportunities in the workplace
- Appropriate and adequate sampling across judges, instruments, and contexts (i.e. multiple sources of information gathered on multiple occasions by multiple peoples using multiple assessment methods)
- Expert judgment as a basis for decision making
- Quantitative and qualitative information
- Promotion decisions based upon aggregated (triangulated) evidence
- Feedback mechanisms to ensure that high-stakes decisions regarding promotion do not come as a surprise to learners

With these elements of quality in mind, van der Vleuten and Schuwirth (2012) advocated for programmes of assessment that were deliberately constructed, centrally governed, and regularly evaluated and adapted.

There are now validated frameworks of principles for designing programmes of assessment on the front end (Dijkstra, van der Vleuten, & Schuwirth, 2010). There are also
criteria available for formatively evaluating programs currently in operation with the aim of program improvement (i.e. on the back end) (Baartman, Bastiaens, Kirschner & van der Vleuten, 2006). While there are guidelines being developed to support the implementation of programmatic assessment on the ground within Postgraduate Medical Education (McEwen et al., 2017), there is the possibility that they may not be relevant for use in other professional contexts (Rogers, 2003). How a professional program operationalizes programmatic assessment or alternative approaches to the assessment of competence will likely depend on myriad factors, including but not limited to: (a) how competence is conceptualized within the profession, (b) program requirements set by the professional accrediting body, (c) the vision of program leadership who make implementation decisions, (d) university regulations and policy regarding assessment, and (e) the financial and human resources available to the program (Pérez, van der Stuyft, del Carmen Zabala, Castro, & Lefèvre, 2016).

C-BEN’s (2017) Quality Principles for the Assessment of Competence

In response to a growing need for definitions of quality relating to competency-based education, the Competency-Based Education Network (C-BEN, 2017), a collective group of thirty colleges and universities working to address the shared challenges of designing, developing, and scaling competency-based degree programs, orchestrated a task force to develop Quality Principles and Standards for Competency-Based Education Programs. While C-BEN (2017) claims to have developed standards “universal enough to apply to all CBE programs, regardless of model variations” (p. 3), the group also recognizes the fluidity of the field and the role that context plays in local implementation: “We envision these universal principles and standards will be augmented by additional stackable principles and standards based on research as well as model-specific, programmatic features” (2017, p. 3). Similar to
van der Vleuten and Schuwirth’s (2012) notion of programmatic assessment, C-BEN’s (2017) fourth element of quality – “Credential-level Assessment Strategy with Robust Implementation” – addresses the concepts of authentic assessment, balanced purposes of assessment (formative and summative/Assessment for Learning and Assessment of Learning), constructive alignment, and sampling of performance in its principle:

Authentic assessments and their corresponding rubrics are key components of CBE, which is anchored by the belief that progress towards a credential should be determined by what learners know and are able to do. The overarching assessment strategy is comprised of assessments designed both to inform the learning journey (often referred to as “assessment for learning” or formative assessment) and to validate mastery (often referred to as “assessment of learning” or summative assessment). In CBE models, assessments are intentionally aligned to competencies and cognitive levels, and use a range of assessment types and modalities to measure the transfer of learning and mastery into varied contexts. Authentic assessments design and use/follow best practices for assessment professionals (p.18).

The 10 Standards related to C-BEN’s “Credential-level Assessment Strategy with Robust Implementation” can be found in Appendix A. Unlike van der Vleuten and Schuwirth’s (2012) notion of programmatic assessment, C-BEN’s Credential-level Assessment Strategy emphasizes the use of rubrics and fails to mention: (1) the role of expert judgment as the basis for decision-making, and (2) the triangulation of performance information to make high-stakes decisions about progress, promotion, or remediation. While C-BEN’s Standards are effective in unpacking what is meant by many of the concepts described in the above principle, the
Standards are vague in articulating what is meant a program’s “assessment strategy.” How a professional accrediting body conceptualizes competence (i.e., as potential capacity or demonstrated ability or some combination of both), chooses to represent their competence framework, and describes the assessment of competence (i.e., as a measurement or instructional design problem) will likely influence whether professional programs take a 1-competence–1-method approach or a programmatic systems approach to the assessment of competence.

**Empirical Research Comparing How Professional Programs are Approaching the Assessment of Competence in Practice**

There are large bodies of empirical research on assessment within individual professions. However, much published literature on the assessment of competence in professional education takes the form of commentary/conceptual papers discussing definitional and theoretical challenges within individual professions; including medicine (e.g., Frank et al., 2010), nursing (e.g., Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2014), professional psychology (e.g., Falender & Shafranske, 2012), and teaching (e.g., Uhlenbeck, Verloop, & Beijaard, 2002). Research comparing conceptions of competence has been limited to thematic analysis of published literature across professions in similar sectors (e.g., health professions education) (Fernandez et al., 2012). There is a need for empirical investigations comparing: (a) conceptions of competence across the grey literature (i.e., professional standards of practice and competence frameworks) and (b) how professional programs conceptualize competence and the assessment of competence being operationalized in practice across diverse disciplines.

Even though professional competence frameworks inform professional education, there is still confusion in the higher education sector about how to operationalize the assessment of
professional competence (Gonczi, 2013; Hatcher, Fouad, Grus, Campbell, McCutcheon, & Leahy, 2013). This is likely one of the reasons why there are few empirical comparative studies investigating how programs are approaching implementation across professional disciplines. In reviewing the literature, I was only able to locate two similar studies exploring what CBE can look like across disciplines. However, only one of the studies specifically compares how the assessment of competence is being operationalized across professional education programs.

The first study by Koenen, Dochy, and Berghmans (2015) presents phenomenological research aiming to describe variation in competency-based approaches to education from the multiple perspectives of curriculum coordinators, teachers, and students involved in three separate programs—Teacher Education, Management, and Information Computer Technology (ICT)/Media—across twenty-six educational institutions in Flanders and the Netherlands. Through conducting and analyzing semi-structured interviews, the authors were able to identify key features of Competency Based Education (CBE) and categorize each program’s approach to implementation according to these key features. Each program was classified according to one of four possible categories of expression of CBE and assessment. Categorization was based on the program coordinators' conceptions of competence, ranging from disconnected knowledge, skills, and attitudes (category 1) to fully integrated knowledge skills and attitudes (category 4). Table 2.2 describes key features (criteria) and descriptors for each category of implementation of CBE.
<table>
<thead>
<tr>
<th>Features of CBE</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of the student</td>
<td>Mainly passive</td>
<td>Moderately active (assessment: more passive)</td>
<td>Largely active</td>
<td>Mainly active</td>
</tr>
<tr>
<td>The role of the teacher (and externals)</td>
<td>Steering instructor, evaluator (and possibility of facilitator during internship) Advising externals</td>
<td>Steering instructor, evaluator and facilitator during internship Advising externals</td>
<td>Steering instructor – gradually more facilitating – evaluator and facilitator during internship and projects Externals with involvement in the final decision</td>
<td>Mainly facilitating coach and evaluator Externals with involvement in the final decision</td>
</tr>
<tr>
<td>(Self-)regulation</td>
<td>Mainly steering by the institution</td>
<td>Mainly steering by the institution</td>
<td>Combination of steering by the institution or self-regulation</td>
<td>Combination of steering by the institution or self-regulation At the end of the programme, mainly focused on self-regulation</td>
</tr>
<tr>
<td>Authenticity</td>
<td>- Realistic examples - Visual material - (Non-) fictive practical exercises and examples</td>
<td>+ - Own practical experiences of the student - Simulations and case</td>
<td>+ - Visits to companies - Performing professional</td>
<td>+ - Various (external and own) projects - Workplace learning</td>
</tr>
<tr>
<td>Features of CBE</td>
<td>Category 1</td>
<td>Category 2</td>
<td>Category 3</td>
<td>Category 4</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>- Small cases</td>
<td>- Integrated tests</td>
<td>tasks</td>
<td>- Study trip</td>
<td></td>
</tr>
<tr>
<td>- Speakers from the field</td>
<td>- Internship</td>
<td>- Projects</td>
<td>- Assessment (interviews)</td>
<td></td>
</tr>
<tr>
<td>- Internship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Didactical teaching methods (+internship)**

| - Lectures and assignments | + | + | + |
| - Guest lectures | | | |
| - Internship as finalisation moment: application of the theory | - Teamwork and seminars | - Projects and themed teaching methods | - Mainly projects |
| | - Small projects and themed teaching methods | - Portfolio | - (Semi-) authentic simulation |
| | | - Internship as a learning moment: application of the theory | - P.D.P. and learning interviews |
| | | - Internship as a finalisation moment: application of the theory | - Internship as a learning moment: starting point for research, students formulate their own learning goals |

**Function of the evaluation**

| - Product evaluation | - Product > Process evaluation | - Product > Process evaluation | - Process and product evaluation |
| - Summative (>formative) | - Summative > formative | - Summative/formative | - Summative/formative |

**Plurality of assessment**

| Subject-specific written and oral tests | + | + |
| Continuous assessment and the possibility of peer-assessment | + | + |
| + Case studies, portfolio, presentations, peer- and self-assessment | Peer- and self-assessment, P.D.P., portfolio, 360°-feedback, assessment (interviews) |

*Note. K, S, & A = Knowledge, Skills and Attitudes; P.D.P. = Professional Development Plans; + = same of the preceding category. This table has been reproduced with permission from Elsevier from Koenen, A., Dochy, F., & Berghmans, I. (2015). A phenomenographic analysis of the implementation of competence-based education in higher education. *Teaching and Teacher Education, 50*, 1–12.*
While Koenen et al.’s (2015) research is useful for highlighting key features that may distinguish programs in their approach to implementing CBE, Table 2.2 is limited in two ways. First, Table 2.2 is limited in its ability to clearly categorize programs based on degrees of implementation. Categories 1 and 2, and 3 and 4 are quite similar and distinguished mainly by quantitative modifiers. This makes it challenging to use Table 2.2 as an analytical rubric for making decisions about their category of implementation. Second, Table 2.2 is limited in its focus specifically on approaches to assessment. While assessment is not the only important component of CBE, it is an essential element for enabling students to progress through a program by demonstrating achievement of desired learning outcomes at their own pace. From C-BEN (2017) and van der Vleuten and Schuwirth (2010, 2012), we know that there is more to the assessment of competence than just purpose (formative versus summative), authenticity and plurality of assessment tasks. For example, intentional alignment to standards of competence, purposeful sampling of performance across practice contexts, and promotion decisions based on aggregated evidence, are also important. However, these key features of assessment are not included in Table 2.2.

The second study by Conway, Chen, and Jefferies (2000) presents a multi-case study comparing how competency-based assessment has been implemented in nursing and construction management—two diverse professional disciplines. This study used multiple methods of data collection, including: (1) interviews with program stakeholders about their experiences with assessment, (2) document analysis of student reflective journals and staff workshop data (both in relation to assessment), and (3) observations of how assessments of competence are conducted. Three themes emerged from this research. The first theme illustrates how the assessment of competence tends to make what is being assessed more explicit. But, to first make explicit what
is being assessed, professions must articulate what competence looks like and then identify the collection of evidence needed to support judgements about progress and the development of competence. The second theme highlights concerns about the subjectivity of assessor judgments, in that staff tended to use holistic/internal performance standards (e.g., "I know it when I see it") as a substitute for the collection of evidence about student performance. The third and last theme explains how both staff and students in the nursing program struggled with seeing the connection between performance criteria and the integrated conception of what it means to be a competent nurse. This suggests that perhaps not everything that can be readily assessed counts, and not everything that counts can be readily assessed. Taken altogether, the findings of this study illustrate some of the challenges associated with accurately and reliably assessing integrative competence.

**Highlighting the Need for Inter-Professional Research on the Assessment of Competence in Professional Education Programs**

Despite the growing popularity of competence frameworks amongst professions, and the common problem of professional programs needing implement competence frameworks for accreditation, professions appear to be working in isolation to figure out the best way to approach the assessment of competence (e.g., Falender & Shafranske, 2012; Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2014; Schulte and Daly, 2009; Uhlenbeck, Verloop, & Beijaard, 2002). Differences in accreditation requirements, pathways to licensure, institutional policies, and program resources may lead professional programs to think that their assessment challenges are unique to their own professional context (Pérez, van der Stuyft, del Carmen Zabala, Castro, & Lefèvre, 2016). Professional programs may work in isolation because they argue that their path to competency-based education is unique. Thus, there is a need for empirical investigations
comparing: (a) professional conceptions of competence across the gray literature (i.e., professional standards of practice and competence frameworks); and (b) how professional education programs are conceptualizing and approaching the assessment of competence in diverse disciplines. This research will help to identify similarities and differences in how the assessment of competence is being conceptualized, represented, and operationalized and so as to illuminate potential opportunities for collaboration and enhance learning and assessment across professional disciplines.
Chapter 3
Approach to Conducting the Research

In this chapter I explain the purpose of my dissertation, a conceptual approach for guiding my inquiry, as well as a methodological approach for conducting the research. Finally, I end this chapter with an overview of my multiple manuscripts.

Research Purpose

The purpose of this dissertation is to better understand how conceptions of competence, competence frameworks, and professional context(s) may be influencing the ways in which professional education programs approach the assessment of future professionals’ readiness for entry-to-practice. Three research questions will guide this program of study:

1. What similarities and/or differences exist in the ways in which professional accrediting bodies conceptualize competence?

2. How is a highly resourced, highly workplace-based professional education program currently operationalizing the assessment of competence within their own professional context, using their own competency framework?

3. (a) How are other professional education programs with potentially fewer resources and lesser emphasis on workplace-based training conceptualizing professional competence and the assessment of competence being put into practice?

(b) What considerations and/or challenges are currently influencing their thinking about the assessment of competence?
A Conceptual Lens for Conducting the Research

Research exploring how professional accrediting bodies and professional education programs conceptualize and operationalize the assessment of competence requires a sensitivity to the complexity of competence. For the purpose of my research, I will adopt Epstein and Hundert’s (2002, p. 226) definition of professional competence: "The habitual and judicious use of communication, knowledge, technical skills, reasoning, emotions, values, and reflection in daily practice for the benefits of the individual and community being served.” I have selected this definition because it is integrated and relational. It acknowledges that competence is developmental, impermanent and context dependent, and includes cognitive, affective/moral, and interpersonal dimensions.

A Systems Perspective

A systems orientation has been used to study complex real-world problems across a range of natural science and social disciplines, including: biology, ecology, anthropology, engineering, psychology, organizational behaviour, and education (Hummelbrunner, 2000; Patton, 2002). The origin of systems theory dates back to the work of Ludwig von Bertalanffy (1968): A German biologist who theorized about the nature and workings of systems in our universe. Table 3.1 describes key concepts related to systems theory (Von Bertalanffy, 1968).

Generally speaking, systems are whole entities which are thought to be greater than and different from their component parts. In this way, the performance of a system is not the sum of the independent effects of its parts; rather, it is the product of their interactions. This thinking aligns with the integrated conception of competence, which maintains that competent performance is not the sum of independent competencies (knowledge, skills, and abilities), but rather knowing when and how to employ a complex interaction of competencies to initiate
interventions appropriately (Epstein & Hundert, 2002; Gonczi, 1994). Naturally, it follows that the assessment of competence, from a systems perspective, would be seen as an instructional design problem requiring a ‘programmatic’ approach to developmentally make sense of emergent patterns of performance across professional practice contexts (van der Vleuten et al., 2012).

Table 3.1. *Important concepts related to systems theory*

<table>
<thead>
<tr>
<th>Key Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>An organized entity made up of interrelated and interdependent parts</td>
</tr>
<tr>
<td>Boundaries</td>
<td>Barriers that define a system and distinguish it from other systems in the environment</td>
</tr>
<tr>
<td>Homeostasis</td>
<td>The tendency of a system to resist change and maintain status quo</td>
</tr>
<tr>
<td>Adaptation</td>
<td>The tendency of a system to make the changes needed to protect itself and grow to accomplish its goal</td>
</tr>
<tr>
<td>Reciprocal Transactions</td>
<td>Mutual interactions that systems engage in such that they influence one another</td>
</tr>
<tr>
<td>Feedback loop</td>
<td>The process by which systems self-correct based on reactions from other systems in the environment</td>
</tr>
<tr>
<td>Throughput</td>
<td>Energy in the system to accomplish its goals</td>
</tr>
<tr>
<td>Microsystem</td>
<td>The system closest to the client</td>
</tr>
<tr>
<td>Macrosystem</td>
<td>A larger system that influences clients, such as policies and culture</td>
</tr>
<tr>
<td>Mesosystem</td>
<td>Relationships among the systems in an environment</td>
</tr>
<tr>
<td>Chronosystem</td>
<td>A system composed of significant life events that can affect adaptation</td>
</tr>
</tbody>
</table>

**Key elements of a systems perspective.**

The study of social systems focuses on communications/interactions (relations) between stakeholders comprising a system. According to this perspective, members of a profession,
professional accrediting bodies, higher education professional learning, universities, professional education programs, and learners can all be thought of as interrelated and interdependent systems each with their own component parts. Within each system, information is the vehicle through which communication occurs (Luhmann, Bednarz, & Baecker, 1995). Individuals make sense of information based on their own schema (mental representations), which are generated from prior attributions of meaning from prior experiences with social others (Kolb, Boyatzis, & Mainemalis, 2001). Learning is therefore an active process of constructing meaning from interactions with more knowledgeable others. Learning processes can take place at various system levels, including: individuals (e.g., student and teacher), teams, organizations, etc.

From a systems perspective, the unit of analysis is the system and its context, which includes all phenomena observed in a system (Patton, 2002). In an attempt to reduce complexity, only those elements which are essential to understanding how the system works are included in investigations (Hummelbrunner, 2000). Therefore, it is important to describe and delimit or put boundaries on the system(s) of interest. For example, if the system of interest was:

- the assessment of a future professional’s performance of a professional activity in a particular context, then it would be important for the assessment to be based on the essential behaviours and capabilities needed to perform the activity effectively, as well as the contextual variables that can impact interpretation of the performance;
- the assessment of a future professional’s competence, then it would be important for the assessment to be based on a collection of evidence of their ability to safely and effectively perform a set professional activities deemed essential for unsupervised professional practice across varied practice contexts;
• the program of assessment used to develop and make judgments about future professionals’ competence, it would be important to identify and describe the essential elements, and explain why they play an important role in the functioning of the whole system.

Given that this dissertation research will span all three units of analysis (i.e., individual low-stakes assessment informing ongoing learning, high-stakes summative decision-making about progress, promotion, and remediation; and programs of assessment), it will also be important to draw upon a developmental theory that represents the relationship between these three systems.

**Sameroff’s (2010) Unified Theory of Development**

Sameroff’s (2010) Unified Theory of Development provides a useful macro model or ‘framework’ for conceptualizing important systems at play in the development and assessment of future professionals’ competence; namely, social contexts, co-regulated learning, and development (i.e., personal change over time) (Figure 3.1). According to this framework, there is a relationship between overlapping social systems, systems of co-regulated learning, and development (the relative proportion of regulated learning by self and more competent others over time).
Figure 3.1. Sameroff’s Unified Theory of Development (2010)

Note. Sameroff’s Unified Theory of Development (2010) is a macro-model depicting co-regulation (distributed regulation of learning between the biopsychological self-system and that of more-capable others); overlapping social ecologies (the social context of collaborative learning between self and other regulators); and personal change over time (short periods of rapid change in the relative proportion of regulation by one’s self and others over time, followed by longer periods of modest growth or stasis). Reproduced with permission from Wolters Kluwer Health Inc. from Rich, J. V. (2017). Proposing a model of co-regulated learning for graduate medical education. Academic Medicine, 92(8), 1100-1104. doi: 10.1097/ACM.0000000000001583

Overlapping social systems (context).

Within Sameroff’s (2010) framework, the social context of collaborative learning is represented as concentric and overlapping social ecologies (adapted from Bronfenbrenner, 1986). Starting with the self-system (i.e., the innermost circle; composed of interacting biological and psychological processes), these progressively more peripheral social ecologies can represent the social groups that most immediately and directly impact the development of future professionals’ competence (e.g., peers, instructors, academic advisors, workplace supervisors, allied professionals, etc.). More peripheral and indirect influences on the regulation of future professionals’ development of competence may include, for example, program and institutional
policies and program enactment based on educational leaders' interpretation of regulations established by professional accrediting bodies.

**Systems for learning (development) through assessment and feedback.**

Within social ecologies, future professionals interact interdependently with others in their social systems. During collaborative work (i.e., when there is a shared problem-solving plane), future professionals and more experienced professionals (i.e., faculty members, upper-year future professionals) are thought to mediate one another’s metacognition and behaviour, including their development of competence and ability to independently self-regulate learning. As Shulman (2005, p. 53) said, “Professional education is not education for understanding alone; it is preparation for accomplished and responsible practice in the service of others.” Learning how to be a professional means having an active role negotiating opportunities to practice self-directing one’s practice and learning, while under the supervision of a more competent professional. It is through assessment opportunities that future professionals receive feedback on their developing competence and develop the capacity to self-regulate learning; which involves using feedback to negotiate future learning and assessment opportunities (Falender & Shafranske, 2012).

In professional education, self-regulated learning has commonly been defined as the ability to independently plan, manage, and reflect on learning opportunities in order to meet learning and client goals—which are often closely related (Brydges & Butler, 2012; Zimmerman, 2000). Self-regulation skills include the ability to monitor performance in action; retrospectively reflect on past practices; self-assess performance; identify knowledge, skills, and abilities that are below professional (or personal) standards of practice; and plan future learning opportunities to address identified gaps in competence (Zimmerman, 2000). Given that future professionals cannot learn everything they will ever need to know in their professional program, it is important that they are able to independently self-regulate learning in practice so that they can acquire or maintain the
competencies needed to practice safely and effectively throughout their careers (Kuiper & Pesut, 2004; Paris & Winograd, 2003; Sandars & Cleary, 2011).

Research suggests that future professionals’ capacities to independently self-regulate learning develops in tandem with their professional competence (Kennedy, Regehr, Baker, & Lingard, 2009), and that instructors play an important role in coaching future professionals’ self-regulated learning processes (Sargeant et al., 2011, 2017). Coaching has been defined as one-on-one conversations between future professionals and their supervisors, wherein supervisors facilitate the self-regulated learning of the learner through questioning, active listening, and appropriate challenge in a supportive and encouraging climate (Sargeant et al., 2017; Van Nieuwerburgh, 2012). Coaching facilitates learning by helping future professionals to interpret and make sense of learning expectations (Butler, Schnellert, & Cartier, 2008); think about learning tasks strategically (Butler & Cartier, 2004); and reflect on feedback about one’s current level of performance in relation to professional standards and personal learning goals (Hattie & Timperley, 2007; Molloy & Boud, 2013; Sargeant et al., 2010).

Central to notions of coaching is Vygotsky’s (1962, 1978) Zone of Proximal Development (ZPD) – the distance between a learner’s ability to perform a task with guidance and the ability to perform the task independently. When collaborating in a shared activity that learners cannot be trusted to do on their own, but can accomplish with guidance and feedback from more capable others, novices can be supported in developing knowledge and skills, including their ability to self-regulate learning (Vygotsky, 1978). Although models of coaching and self-regulated learning acknowledge the role that more capable others play in developing individuals’ capacity to self-regulate learning, none of them describe regulated learning as being a distributed, shared, or mediated process between individuals (i.e., self-systems) (Hadwin & Oshige, 2011). Given the
centrality of shared practice in future professionals’ workplace learning opportunities (Teunissen et al., 2007; Watling, Driessen, van der Vleuten, & Lingard, 2012) it is perhaps important to move beyond coaching to think of these interactions as mutual/reciprocal transactions affecting both learners and more competent others’ capacities to self-regulate learning.

**Systems of co-regulated learning.**

It has been suggested that fields of professional education expand their notion of self-regulated learning to acknowledge the role that co-regulated learning plays in the development and assessment of competence (e.g., Rich, 2017). Co-regulation is described as a transitional process whereby a future professional develops their capacity to self-regulate learning by engaging in common problem-solving planes with a more advanced other (e.g., Diaz, Neal, & Amaya-Williams, 1990; Gallimore, Dalton, & Tharp, 1986; Hadwin & Oshige, 2011; McCaslin, 2009; Sameroff, 2010). Models of co-regulated learning differ from models of self-regulated learning in that they focus on social transactions between self and other co-regulators and reciprocal mediation in the proportion of regulation by self and others over time (Hadwin & Oshige, 2011). Through reviewing portfolios with future professionals, co-interpreting their workplace assessment results and feedback, and helping these learners to set goals and plan future learning/assessment opportunities, faculty are thought to be simultaneously co-regulating future professionals’ development of professional competence and their capacity to self-regulate learning (Brydges & Butler, 2012; Rich, 2017).

**Summary**

While Sameroff’s (2010) Unified Theory of Development framework was not developed with professional education or the development and assessment of competence in mind, it does provide a useful systems framework for conducting my dissertation research. Sameroff’s (2010) integrated systems perspective on social contexts, co-regulated learning, and development
present a useful lens for investigating potential variation in the approaches professional education programs are using to operationalize the assessment of competence. Specifically, these micro models can help to identify similarities and differences in the approaches being used.

**A Methodologic Approach for Conducting the Research**

While systems thinking provides a lens to understand the integrated conceptualization of competence, the architecture of a competence framework, and a programmatic approach to assessment, it also has the potential to provide a methodological stance for this research. According to Patton (2002), research rooted in a systems perspective seeks to understand how and why particular systems function as they do, recognizing that programs and their component parts are systems influenced by interactions with other systems.

Qualitative inquiry facilitates the exploration of the qualitative differences in how and why systems are purposefully constructed the way they are and function as they do, paying particular attention to the context(s) in which the systems are embedded (Patton, 2002). Research questions are exploratory, and often focus on understanding the nature of the system from the perspective of those involved in the system. Systems research often begins with a qualitative description of the system in order to capture its component parts and to place the whole system within larger cultural, political, and economic ecologies (Sands, 1986). Researchers aim to understand the role or function component parts play in the whole system; thereby revealing why a system works the way it does. Inductive meaning making is used as a collaborative process of socially negotiating the researcher’s interpretations of the system with its stakeholders (Patton, 2002).

**Using a Case Study Approach to Conduct the Research**

Case studies are suitable research designs for studies that aim to develop an in-depth understanding of a real-life problem, paying particular attention to the contextual conditions that
are highly pertinent to the phenomenon under investigation (Yazan, 2015). In this research, the phenomenon of interest can be defined as competency-based or competency-informed approaches to education within and across university-based professional programs.

My constructivist epistemology aligns best with Merriam’s (2009) approach to designing and conducting case study research. Merriam’s approach has been described as being “neither [close] to Yin nor Stake’s; it is a combination of both approaches (Yazan, 2015, p. 141). The approach is pragmatic. Data collection emphasizes the important role the researcher plays as an instrument in the data collection process through thoughtful and reflective engagement in “effective interviewing,” “careful observation,” and “mining documents” to "make sense/meaning out of the data" (Merriam, 1998, p. 178). According to Merriam (2009), case study research is “an intensive, holistic description and analysis of a bounded phenomenon such as a program, an institution, a person, a process, or a social unit” (p. x).

According to Merriam (2009), the intent of the case study influences its form as being descriptive, interpretive, or evaluative. Whereas descriptive case studies focus solely on providing thick, rich description of a phenomenon, without guidance from theory, interpretive case studies use established theory to analyze and build theory about a phenomenon. Evaluative case studies go one step further than analysis to form judgments about the case. For the purposes of this research, I will adopt an interpretive approach so as to not only describe competency-based or competency-informed approaches and relevant contextual conditions, but also to expose important theoretical considerations. I will be careful to avoid making any evaluative judgments about the merit, worth, or significance of individual professional programs.

Taken altogether, this dissertation follows a qualitative case study approach in that it explores potential variation in competency-based or competency-informed approaches to
professional education across disciplines within one university. This means that all professional programs will be bound by the same macrosystem and mesosystem context.

**The macrosystem: professional education within Ontario, Canada.**

The macrosystem can be thought of as the largest and most distant collection of people who exercise significant influence on learners (Bronfenbrenner, 1986). It is composed of socio-political and economic systems which influence learners’ cultural patterns and values, beliefs and ideas about what it means to be a professional. In the Canadian context, the regulation of professions falls primarily under provincial authority (with the exception of airline pilots and air traffic controllers, who operate under federally regulated industries). Consequently, there can be differences in professional regulation across provinces. For the purposes of this research, I am bounding the macrosystem to only include those professions which have professional programs at Canadian universities. I have adopted Universities Canada’s (n.d.) definition of professional programs, which includes university-based programs in professional fields subject to accreditation by professional bodies at the provincial, Canadian, or international levels.

**The mesosystem and microsystems: a medium-sized Canadian University and its professional education programs.**

A medium-sized, Canadian, public university was selected as the mesosystem to conduct this research because of the number and diversity of professional education programs (microsystems) granting degrees at the undergraduate, graduate, and postgraduate levels. Prior to conducting the research, ethics approval was obtained from the health sciences and affiliated teaching hospitals’ Research Ethics Board, as well as the university’s General Research Ethics Board. In order to protect the confidentiality of professional program participants, it was agreed that the institution would not be named and that it would be referred to as a medium-sized Canadian university.
My multi-manuscript dissertation consists of three related and sequential studies exploring competency-based and competency-informed approaches to professional education and assessment from conceptual and representational (discourse and frameworks) (study 1) and operational perspectives (studies 2 and 3). The sequential order of this research was intentional in that emergent findings from studies 1 and then 2 were leveraged to inform study 3.

**Study 1 – Do Professions Conceptualize and Represent Entry-to-Practice Competence in Similar Ways? An Exploration of Competence Frameworks through Document Analysis**

In this study, I explored how different professional accrediting bodies conceptualize competence in their standards of practice or competence framework documents. The findings of this study helped me to answer Research Question 1: What similarities and/or differences exist in the ways in which professional accrediting bodies conceptualize competence? This paper has been organized into three sections. First, I reviewed the relevant literature highlighting tensions within competence as a concept for operationalization (i.e., borrowed from Chapter 2). Next, I compared similarities/differences across university-based professions with respect to (a) their core competency domains and (b) how their core competencies are related (i.e., structurally organized). Then, in light of the conceptual tensions described, I interpreted variations in the architecture of competence frameworks and discussed potential implications for operationalization at the program level.

**Study 2 – A Case Study of Programmatic Assessment: Using a Systems Lens to Improve the Production and Use of Performance Information**

In this case study, I addressed Research Question 2: How is a highly resourced, highly workplace-based competency-based professional education program currently operationalizing...
the assessment of competence within their own professional context, using their own competency framework? In this study, I applied systems theory (von Bertalanffy, 1968), the ‘two communities’ thesis (and related models from the evidence-based policy literature (Caplan, 1979; Lomas, 2000; Wingens, 1990) to unpack the relationships between component parts of a system of assessment designed to use low-stakes performance assessments to inform high-stakes decisions about the achievement of competence standards. My goals were to use these theories to: (a) advance a model that sheds light on the use and flow of performance information within a system of programmatic assessment, and (b) highlight where gaps and problems can potentially arise in practice. An understanding of how component elements of an assessment system function and contribute the workings and challenges of the system as a whole, can provide important guidance for those professional programs looking to implement or improve upon a developmental approach to assessing competence.

**Study 3 – An Embedded Case Study Exploring How Professional Education Programs are Approaching the Development and Assessment of Competence at a Mid-Sized Canadian University**

In light of the findings from Studies 1 and 2, the purpose of Study 3 was to investigate how professional programs within one university have approached the implementation of competence frameworks. The findings of this study enabled me to answer Research Question 3: (a) How are other professional education programs with potentially fewer resources and lesser emphasis on workplace-based training conceptualizing professional competence and the assessment of competence being put into practice? and (b) What considerations and/or challenges are currently influencing their approach to the assessment of competence? The ways in which professional education programs problematize competence are useful in: informing potential relationship(s)
between conceptualizations, representations, and operationalizations of competence; and determining whether or not it is appropriate or useful for professional programs to work together to solve common challenges with implementing competency-based teaching/learning and assessment.

**Three Sequential and Related Studies**

Study 1 provided a conceptual foundation to inform my purposeful sampling of cases in which to investigate operationalization in both depth (Study 2) and breadth (Study 3). Whereas Study 2 focused on exploring one competency-based program’s developmental approach to operationalization in depth, Study 3 focused on comparing and contrasting operationalization across programs and disciplines at one institution. The emergent findings from Study 2 helped me to better understand what a developmental approach to assessment can look like in a specific context. This understanding informed my approach to conducting Study 3. In Study 3 I used the micro models of Sameroff’s (2010) Unified Theory of Development as embedded units for identifying similarities and differences in the approaches professional programs are using to assess competence across professional disciplines.

**Prefaces and Transitions between Studies**

As an introduction to each study, I have included a preface explaining how the reader should approach reading each manuscript. In each preface, I articulated my intended aims for the study, as well as the intended audience and prospective journal for publication. I have also explained my rationale for purposeful sampling relating to the scope of each study. In the preface to Studies 2 and 3, I have highlighted how my findings from each prior study have informed my intentions for subsequent research.
Preface to Study 1

Across professions, there appears to be little agreement about what is meant by entry-to-practice competence. Minet, Parlier and de Witte (1994) said it well when they explained that “definitions [of competence] differ according to the interlocutor, the standpoint taken and the use of the notion of competency, to the point of being sometimes incompatible” (as translated by Martinet, Raymond & Gauthier, 2001, p. 47). My intention for Study 1 was to unpack a sample of entry-to-practice competence frameworks to investigate how professional accrediting bodies are describing and representing competence as a construct to inform implementation by professional education programs at Canadian universities. I have written this manuscript for a diverse audience, which includes all leadership involved in influencing professional education policy and practice at different systems levels. (e.g., members of professional accrediting bodies, higher education quality councils, schools of graduate and professional studies, centres for teaching and learning, decanal leadership teams and embedded teaching and learning units within professional programs). Prospective journals for this manuscript include, as examples, the International Journal for the Scholarship of Teaching & Learning, the Canadian Journal for the Scholarship of Teaching and Learning, or the Journal on Competency-Based Education. I have selected these journals because the findings of this study have implications for improving the design and delivery of professional education programs within higher/tertiary education. Although I have chosen to conduct this research in a Canadian context, competency-based professional education is an initiative that spans international borders (i.e., in order to promote the international mobility and licensing of trained professionals).
Chapter 4

Study 1 – Do Professions Conceptualize and Represent Entry-to-Practice Competence in Similar Ways? An Exploration of Competence Frameworks through Document Analysis

Abstract

Conceptually and historically, professional competence has been viewed as either tasks or behaviours to be performed in practice or as a holistic, integrated way of being. Across Canada, professional accrediting and provincial regulating bodies are shifting away from describing principles of practice guiding members of a profession, and moving towards more explicit delineation of the knowledge and skills needed for entry to practice. The purpose of this study was to compare how professional accrediting bodies represent competence. To conduct this research, I purposefully sampled current, publicly accessible entry-to-practice competence frameworks for ten diverse professional disciplines (Medicine, Nursing, Occupational Therapy, Pharmacy, Psychology, Social Work, Teaching, Engineering, Law, and Planning). The frameworks were analyzed through an iterative process using both content and inductive thematic analysis. The findings revealed that although professions describe similar core competencies that can be organized across ‘expert’ and supporting/intrinsic domains (including communication, interpersonal collaboration, ethics and professionalism, lifelong learning, and management), systematic differences exist in the organization of the competence frameworks. Professions organizing competencies according to ‘meta-competencies’ described competence as being more integrated with a central ‘expert’ role. In contrast, the professions without this organizing structure of meta-competencies described competencies as either behavioural-/performance-like lists of attributes or groups of knowledge, skills, and ethical/professional values. The manner in which competence is conceptualized and explicitly represented within
entry-to-practice competence frameworks has implications for the ways in which professional education programs think about competence and subsequently design and enact curricula, teaching and learning opportunities, and systems of assessment.

**Key words:** competence; competency-based education; competence frameworks; professional education; entry-to-practice; document analysis
Introduction

When we go to see a professional for a service, what are we looking for? In most cases we are seeking specialized care that we cannot provide ourselves or trust just about anybody to provide. And in going to see a professional we assume that they know what they are doing and have our best interests at heart. We implicitly expect professionals to be competent in the services they provide to society. But is it naïve for society to assume that professionals are competent? In theory, professionals are distinguished from non-professionals by: the ability to provide an essential social function; the achievement of a certain standard of specialized knowledge and skills, which can be used to address complex problems; a commitment to professional ethics developed through a period of professional socialization; freedom of judgment to make professional decisions and recommendations in practice; and high prestige and financial compensation (Hoyle & John, 1995). Even though the pathway to licensure differs across professions, a common requirement is successful completion of a professional education program. Is it reasonable to assume competence from professional program completion?

Within professional education, there has been increasing recognition of the importance of educational outcomes specifying the capacities and abilities we can expect from graduates who are ready to begin professional practice (Shaw, Cassel, Black & Levinson, 2009). These outcomes have been broadly referred to as “competencies” and include the knowledge, skills, and attitudes needed for licensure and registration within a given profession. Entry-level competencies are thought to serve multiple purposes: (1) Public protection, through explicit description of the requirements for registration and licensure to practice; (2) Professional protection, through a more explicit awareness of the expectations for safe and effective practice throughout a professional’s career; (3) Professional mobility, through assisting regulators in
clarifying and harmonizing standards of professional practice across provincial and national boarders; and (4) Educational accountability, through the delivery of government funded professional education that prepares graduates to successfully achieve professional practice standards upon entry-to-practice (Tuxworth, 1989).

Since the Canadian national Agreement on Internal Trade came into force in 1995, professional bodies have been trying to articulate the standard of competence for each profession to allow for international mobility. However, across Canada, each province and territory maintains control over the regulation and licensing of professions through their respective professional colleges. Even though all colleges or other regulatory bodies must communicate their standard of competence and make requirements explicit to registrants, they do not need to cooperate on a national scale or reach a national consensus. This complicates professional program accreditation, as some academic programs in professional fields are subject to accreditation by professional bodies at the provincial, national, and even international levels (Universities Canada, n.d.). For some professional programs, this means ensuring that their curriculum, learning opportunities, and assessment plan align with multiple conceptions of what entry-to-practice competence means.

One of the major challenges with professional entry-to-practice competence profiles and competency-based approaches to professional education is the very definition of the term competence. In fact, competence has long been described as a nebulous concept (Eraut, 1994; 1998; Short, 1984; Westera, 2001) and to this day, some confusion still exists over the fluid use of competence and its derivatives (competent, competency, and competencies), as well as what the standard of competence means (i.e., minimum proficiency or excellence) within and across professional education discourse, policy, and practice (Pijl-Zieber et al., 2014; Boyd et al., 2018).
For these reasons, competence has been contested as a viable approach to professional education (e.g., Norman, Norcini, & Bordage, 2014).

**Tensions within Competence as a Concept**

In the 1980s and 90s, in the midst of the downturn of the Competency-Based Teacher Education (CBTE) movement in the United States, Short (1984), Eraut (1994 and 1998), and Gonczi (1994) attempted to clarify what it means to be competent in a professional context. According to Short (1984), competence is a normative concept which represents a value choice between two opposing conceptions: the ability to perform a set of behaviours versus a desirable state of being. He argues that the first conception has a very limited range of usefulness and applicability. This is because competence is thought of as a thing or a set of acts that can be accomplished satisfactorily without any purpose, intent, thinking, or decision-making. Conversely, competence as a state of being is more holistic because it involves agency and professional judgment. According to this second conception, a person is either competent or incompetent. Either s/he/they have the integral, integrated dimensions of competence (including behaviours, performance, knowledge, skills, levels of sufficiency, intents, motives, attitudes, qualities, or states of being) or not. While this all-or-nothing conception of competence can also be thought of as reductionist, it does represent the high-stakes licensing decisions made by professional regulating bodies.

Similar to Short (1984), Eraut (1994, 1998) suggests that confusion exists because both notions of competence are important to professions and therefore need to be captured in their individual assessments and evaluation of competence. For example, it is important for a teacher to be able to introduce a lesson, have a critical approach to practice, and a flexible mind, so that they can adapt and change their approach to accommodate diverse learners and to integrate new
technology. While assessments can be based on observation of performance in particular practice contexts, they can also include holistic judgments about personal attributes (e.g., that they take initiative, work well with others, etc.). In an effort to address this confusion, Eraut (1998, p. 134) suggested referring to the latter as “evidence of capability” rather than competence. Thus, a person may possess the capability to do more than they are deemed competent to perform through direct observation of workplace performance (Eraut, 1998).

Like Short (1984) and Eraut (1994, 1998), Gonczi (1994) also recognizes the relational nature of competence and suggests that problems can arise when professions conceptualize competence as either task-based behaviours or general attributes/capacities to perform. Therefore, Gonczi (1994) advocates for the “integrated” or holistic notion of competent performance, which marries personal/general attributes with task- and context-specific behaviours. According to Gonczi (1994), competence is “conceived of as complex structuring of attributes needed for intelligent performance in specific situations” (p. 29). Included within this notion of competence is the idea that professional judgment is essential in order to decide which combination of knowledge, skills, and abilities are needed for certain tasks to be performed in particular situations. The strength of this conceptualization of competence is that it allows for the possibility that there may be more than one way of practicing competently in a particular context, and that ethics, values, and reflective practice are important considerations when making judgments about performance.

A popular, and more recent, integrated definition of competence is the one advanced by Epstein and Hundert (2002) for the medical education community: “The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefits of the individual and community being served […]
Professional competence is developmental, impermanent, and context dependent” (p. 226-228). According to Epstein and Hundert (2002) competent professionals must have the acumen to initiate interventions appropriately and at the right time to help dependents (i.e., clients, children, patients) reach their goals. Given the complexity of competence as a construct, it is reasonable to expect professions to conceptualize and represent competence in different ways.

**The Research Problem**

Despite competence being a complex construct, it is one that resonates with professionals and accrediting bodies. Nationally, we have seen an increase in the number of professional competence frameworks over the past decade. In order to achieve enhanced public accountability and professional practice mobility, professional accrediting bodies are revising their frameworks to be increasingly outcomes-based, specifying core professional competencies required for autonomous practice in a profession. This represents a shift away from defining principles of practice, or qualities guiding members of a profession, and movement towards more explicit delineation of the knowledge and skills needed for entry to practice. Given the conceptual confusion around competence as a construct, and the practical need for accrediting bodies to develop their own competence frameworks, the purpose of this study was to compare how competence is represented across professional disciplines. Specifically, this study seeks to answer the following research questions:

1. How similar/different are the professions with respect to:
   (a) their core competencies and
   (b) how the core competencies are related (i.e., structurally organized)?
2. To what extent is the theoretical tension between behavioural and integrated conceptions of competence conveyed within and between the entry-to-practice competence profiles?

**Methods**

Documents are social artifacts produced for a given purpose. Document analysis is the systematic procedure of finding, selecting, reviewing, and interpreting documents with the intention of uncovering meaning and discovering insights that are relevant to the research problem. The textual and graphic information contained within documents can provide context and understanding as to how particular groups of people think about particular phenomena and concepts (Bowen, 2009).

**Finding and Selecting the Documents for Analysis**

Current, publicly accessible entry-to-practice competence profiles for ten diverse regulated professional disciplines were purposefully sampled, including: Engineering, Law, Medicine, Nursing, Occupational Therapy, Pharmacy, Planning, Psychology, Social Work and Teaching (Table 4.1). These professions were intentionally chosen for three reasons: (1) they are familiar to the general public, (2) they represent professions from diverse disciplines and professional sectors, and (3), they are professions requiring completion of a university degree before application for registration/licensure. Given the tendency for professions to ‘look in the mirror’ (e.g., Forzani, 2014; Pijl-Zieber et al., 2014) or to compare themselves only to like professions within their sector (i.e., comparing across health professions) (e.g., Wu, Martin, & Ni, 2017), it was important to include a variety of frameworks from diverse disciplines within the sample for document analysis.
Data collection began by searching the Internet for entry-to-practice competence frameworks prepared and used by national or provincial accrediting professional bodies. To do this, the search string “competenc* AND [profession] AND Canada” was used. Upon finding an entry-to-practice competence framework, the accrediting body’s website was searched to locate the most up-to-date accreditation information and resources. For professions with provincial accreditation, the provincial college’s website was also searched to cross reference use/adherence to the same competence framework. The Ministère de l'Éducation, Gouvernement du Québec (MEQ) professional competency framework for teacher education was included in the sample because of its explicit reference to competencies for initial teacher educators.

Table 4.1. Entry-to-practice competence frameworks prepared by national or provincial professional bodies

<table>
<thead>
<tr>
<th>Profession</th>
<th>National or provincial Professional Body</th>
<th>Entry-to-Practice Competence Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>Engineers Canada</td>
<td>Graduate Attributes (2017)</td>
</tr>
<tr>
<td>Law</td>
<td>Federation of Law Societies of Canada</td>
<td>National Competency Requirements (2018)</td>
</tr>
<tr>
<td>Medicine</td>
<td>Royal College of Physicians and Surgeons of Canada (RCPSC)</td>
<td>CanMEDS 2015 Physician Competency Framework</td>
</tr>
<tr>
<td>Nursing</td>
<td>College of Nurses of Ontario (CNO)</td>
<td>Competencies for Entry-Level Registered Nurse Practice (2014)</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>Canadian Association of Occupational Therapists (CAOT)</td>
<td>Profile of Practice of Occupational Therapists in Canada (2012)</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Association of Faculties of Pharmacy of Canada (AFPC)</td>
<td>AFPC Educational Outcomes for First Professional Degree Programs in Pharmacy in Canada (2017)</td>
</tr>
<tr>
<td>Planning</td>
<td>Canadian Institute of Planners (CIP)</td>
<td>Competency Standards for the Planning Profession in Canada (2010)</td>
</tr>
<tr>
<td>Profession</td>
<td>Organization</td>
<td>Document</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Canadian Association for Social Work Education (CASWE)</td>
<td>Standards for Accreditation (2014) specifying Core Learning Objectives</td>
</tr>
<tr>
<td>Teaching</td>
<td>Gouvernement du Québec, Ministère de l’Éducation</td>
<td>Reference Framework for Professional Competencies in the Teaching Profession (2001)</td>
</tr>
</tbody>
</table>

**Reviewing and Interpreting the Documents**

The language within these ten documents was analyzed through an iterative process using both content and inductive thematic analysis (Bowen, 2009). Content analysis is the process of identifying meaningful and relevant passages of text and organizing the information into categories which help to answer the research questions. Inductive thematic analysis is the process of looking for reoccurring ideas that emerge from the relevant text. All documents were imported into and coded using a qualitative data management/coding software (NVivo for Mac, version 11.4.3). Analysis of each document involved successive rounds of skimming, reading, and meaning making; progressively moving from more superficial examination to close reading of text and word choice (Bowen, 2009).

**Content analysis.**

The first round of analysis involved reading each document and identifying/flagging relevant passages of text. Using a spreadsheet, relevant information about each profession and their national or provincial entry-to-practice competence framework was extracted and recorded. Profession information included: the name of the regulated profession; the name of the
professor accreditng body; the university-based program(s) accredited (i.e., Bachelor, Professional, Masters, Doctorate); and key requirements for professional certification. Information recorded about the entry-to-practice competence framework included: the title of the entry-to-practice framework; key language used to describe how competencies are organized within the document; and the inclusion of core competencies related to disciplinary expertise, communication, interpersonal collaboration, scholarship, life-long learning, professionalism, leadership, management, and advocacy. Core competencies were organized according to these nine categories because they are domains often described as being important elements of professional practice. When any of the above information was missing from a framework/document, the word ‘none’ was inserted as a placeholder.

Inductive thematic analysis.

Documents underwent a second round of more focused reading of the relevant content. During this phase documents were reviewed by line, phrase, sentence, and paragraph segments, paying close attention to subtle cues in the language used to describe competence throughout each document. Research questions, as well as my knowledge of the tensions between behavioural and integrated conceptions of competence (i.e., the conceptual framework), were used to identify units of meaning within the text (Merriam, 2009). Important ideas emerging from the text became the initial set of codes. Coding was a back-and-forth interplay with the data, checking codes and concepts between documents (Bowen, 2009). Like Bowen (2009), codes were compared by posing two questions: (1) “How is this similar to or different from what is described in X document?” and (2) “What ideas are mentioned across all documents?” (p. 37). This approach of looking for similarities, differences, and general patterns within and across data sources is consistent with the Constant Comparative Method used in grounded theory research (Glaser & Strauss, 1967). That said, the intention of this study was not to use insights from the
data to start to build theory. Rather, the aim was to better understand similarities and differences in the ways different professions conceptualize, describe and represent professional competence as a foundation for future research.

Findings

Eight of the ten professions in the sample followed entry-to-practice competence profiles prepared by national Associations or Federations (Table 4.1) and two were prepared by provincial regulating bodies (i.e., a professional college or provincial government). Provincial-level accreditation suggests potential disagreement about what constitutes competence across provinces and/or concerns regarding the adoption of a competency-based approach to professional education within the profession.

A brief summary for each profession and entry-to-practice profile is provided as a supplementary appendix. These summaries highlight how each professional body conceptualizes competence through the types of language/terms used to articulate scope of practice and the standard expected at entry-to-practice. A comparison of conceptions across professions’ entry-to-practice frameworks is presented. Illustrative examples, comparing behavioural and integrated conceptions of competence, and language communicating a tension between these two opposing conceptions, are provided. Finally, similarities and differences in the presence/absence of core competencies are identified and discussed.

Comparing Conceptions of Competence Across Professions’ Entry-to-Practice Frameworks

As illustrated in Table 4.2, the language used to describe competence and the standard of competence across professional entry-to-practice frameworks is inconsistent. While all professions agree that competencies include a set of specific knowledge/understandings and
skills/abilities, four of the professions also include attitudes/values (i.e., Medicine, Planning, Social Work, and Teaching) and one profession explicitly includes judgement (i.e., Nursing). Further, in describing the standard of competent performance, seven of the professions describe a “minimum expectation” of “safe and effective practice,” which includes being ‘ethical’ and ‘efficient’ (i.e., Nursing, Occupational Therapy, Pharmacy, Planning, Psychology, Social Work and Teaching). Whereas Medicine, Nursing, and Teaching use language suggesting criterion-referenced standards, Engineering explicitly describes a norm-referenced standard: “to a degree that would be acceptable by professional engineers who are familiar with undergraduate engineering education in Canada (Engineers Canada, 2017, p. 79). Law was the only profession that did not articulate a standard of competence as part of their entry-to-practice requirements.

Perhaps the most interesting finding was that six of the ten professions describe a relational architecture between meta-competencies (i.e., roles, competency categories, competency blocks) and component key and enabling competencies. And, of these six professions, Occupational Therapy and Pharmacy model their architecture on the CanMEDS 2005 or 2015 Physician Competency Framework (i.e., Medicine). Nursing, Social Work, and Teaching have their own architectural frameworks depicting an ongoing cycle of services, a layered pyramid, and a layered diamond of competencies, respectively. These architectures—overlapping petals (i.e., CanMEDS), cycles (i.e., Nursing), pyramids (i.e., Social Work), and diamonds (i.e., Teacher Education in Quebec)—reveal the extent to which competencies are perceived to be interrelated.

Engineering, Law, Planning, Psychology—the four professions without any relational architecture—demonstrate a more reductionist conception in which competence is described within lists of knowledge/understandings and skills/abilities and attitudes with little to no explicit relationship with one-another. This is with the exception of Psychology, which describes
Interpersonal Relationships as being the foundational or “basic competency [which] forms part of all the other competencies” (MRA, 2004, p. 8)

**Comparative examples illustrating differences in professional conceptions of competence.**

As an illustrative example, it is useful to compare how competence is described in nursing and engineering. According to the CNO (2014), “safe and ethical registered nursing practice requires the assessment, integration and performance of many competencies at the same time. It is also dependent on the specific practice context and client needs for which the competencies are to be applied” (p. 4) A registered nurse is said to use their “knowledge, skill, judgment, attitudes, values and beliefs to perform in a given role, situation and practice setting” (p. 11). Conversely, Engineering Canada (2017) requires graduates of a professional engineering program to “possess attributes under 12 headings: (1) A knowledge base for engineering; (2) Problem analysis; (3) Investigation; (4) Design; (5) Use of engineering tools; (6) Individual and team work; (7) Communication skills; (8) Professionalism; (9) Impact of engineering on society and the environment; (10) Ethics and equity; (11) Economics and project management; and (12) Life-long learning. Knowledge/understanding and skills/abilities are listed as separate items to be assessed “using assessment tools that are appropriate to the attribute” (p. 15) and competence is “a specified set of skills, values and competencies (attributes) to each and every graduating class” (Engineers Canada, 2017, p. 79). In nursing, competence is “conceived as a complex structuring of attributes needed for intelligent performance in specific situations” (Gonczi, 1994, p. 29) and is attributed to *individual performance*. Using professional judgement, nurses decide which combination of knowledge, skills, and abilities are needed for certain tasks to be performed safely and effectively in particular situations.
Likewise, in the context of teaching, the Ministère de l'Éducation, Gouvernement du Québec (MEQ, 2001) explains that:

Competent people, in the heat of the action, must be able to recognize the demands and constraints of the situation, identify the available resources and take action by incorporating, combining and orchestrating those resources in a way that is relevant to and effective for the situation at hand. Competency therefore lies in the ability to […] read a situation in a certain way, give it meaning and, where necessary, adapt, invent or improvise to deal with it (p. 49).

Yet even within those professions that appear to hold a more integrated conception of competence, and emphasize the role of professional judgement in knowing when to draw upon certain values, knowledge and skills, there is still evidence of reductionist thinking. Consider Medicine as an illustrative example.

According to CanMEDS 2015, as Medical Experts, physicians “integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centered care. Medical Expert is the central physician Role in the CanMEDS Framework and defines the physician’s clinical scope of practice” (p. 14). However, in describing the revisions made from the 2005 to the 2015 edition of the CanMEDS Framework, Frank et al. (2015) explain that “Concepts that are relevant to multiple roles will be articulated in the role where they are the most prominent. Although redundancy and overlap are accepted, and even expected, the framework itself will avoid repetition while ensuring the appropriate integration of roles” (p. 6). Frank et al. (2015) went on to explain how “areas of overlap between roles are minimized, resulting in a 3.5% decrease in the number of key competencies and a 29.4% decrease in the number of enabling competencies; although aspects of
a shared plan of care may pertain to more than one role, the competencies of a given role are written specifically for that role alone” (p. 10). This was in response to physician stakeholders who, during focus group consultations, “urge[d] [authors] to try and organize issues in one category only, to avoid duplication and repetition [because] this will assist with applying this framework, e.g. tracking data, creating templates, providing feedback, creating practice improvement plans, and [facilitating] Continuing Professional Development” (p. 11). This quote suggests that even when “competencies are integrated into a seamless whole and reflect the daily activities of the [professional]” (CanMEDS 2015, p. 28), reductionism inevitably comes with trying to accurately and reliably assess the capacity of the ‘whole’ professional to perform across contexts.

Comparing Professions Based on their Inclusion of Core Competencies

As illustrated in Table 4.3, each of the ten professions explicitly describe core competencies related to disciplinary expertise, ethics and professionalism. With the exception of Law and Psychology, professions describe communication, collaboration, lifelong learning and management competencies—some more explicitly than others. It is the inclusion of scholarship, leadership, and advocacy which seems to differentiate these professions. Medicine and Pharmacy, Engineering and Teaching, and Social Work and Nursing describe competencies within similar domains. Law stands out as having the fewest number of domains.

Within competence domains, professions describe similar competencies (Table 4.4). When professions describe disciplinary expertise, they are referring to the application of knowledge and skills to be able to assess clients so as to identify problems, recognize the limits of their scope of practice, establish an intervention/management plan for their client, perform procedures/deliver services, and attend to continuous quality improvement. Similarly, across
professions, competencies related to ethics and professionalism include the knowledge, skills, and attitudes needed to adhere to standards of practice/rules of conduct, be aware of social inequities and power differentials, make ethical decisions, demonstrate responsibility to clients, and contribute to professional regulation. Medicine, Pharmacy, and Psychology emphasize the competencies related to advancing knowledge through engagement-in and dissemination-of research. With the exception of Psychology, the health professions describe competencies related to advocating for individual clients and the needs of communities and populations. Where leadership was an explicit competency domain (i.e., Medicine, Pharmacy and Planning), competencies described leading a team, whereas in Nursing and Social Work, leadership competencies were embedded, and included coordinating services and supporting the team.
Table 4.2. Comparison of the language and relational architecture used to describe competence

<table>
<thead>
<tr>
<th>Profession</th>
<th>Descriptive Language</th>
<th>Standard</th>
<th>Relational Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td><strong>Graduate Attributes</strong>&lt;br&gt;Knowledge/Understanding and Abilities</td>
<td>“To a degree that would be acceptable by professional engineers who are familiar with undergraduate engineering education in Canada” (Engineers Canada, 2017, p.79)</td>
<td>None</td>
</tr>
<tr>
<td>Law</td>
<td><strong>Competency Requirements</strong>&lt;br&gt;Knowledge/Understanding and Abilities</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Medicine</td>
<td><strong>Roles, key competencies, enabling competencies</strong>&lt;br&gt;Knowledge, skills, and attitudes</td>
<td>Entrustment of professional activities through milestones, describing “the expected ability of a healthcare professional at a stage of expertise” (CanMEDS 2015, p. 7)</td>
<td>CanMEDS 2015 Framework: the central role of Medical Expert; supported by 6 intrinsic roles: Communicator, Collaborator, Leader, Health Advocate, Scholar and Professional</td>
</tr>
<tr>
<td>Nursing</td>
<td><strong>Broad competency categories</strong>&lt;br&gt;Knowledge, skills, ability, and judgment</td>
<td>“The demonstration of integrated knowledge, skills, abilities, and judgment required to practice nursing safely and ethically” (CNO, 2014, p.11)</td>
<td>Ongoing cycle of 5 broad Competency Categories with the client/recipient of nursing services at the centre of the circle</td>
</tr>
<tr>
<td>Occupational</td>
<td><strong>Roles, key competencies, enabling competencies</strong>&lt;br&gt;Knowledge, skills, and abilities</td>
<td>“Meet or exceed minimal performance expectation for safe and effective occupational therapy practice” (Canadian Association of Occupational Therapists, 2012, p. 15)</td>
<td>Adapted CanMEDS 2005 Framework: the central role of the OT as an expert in enabling occupation, surrounded by 6 supporting roles: Communicator, Collaborator, Practice Manager*, Change Agent*, Scholarly Practitioner* and Professional</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Educational Outcomes: Roles, key competencies, enabling competencies Knowledge and skills</td>
<td>“To provide safe, effective, efficient health care” (Association of Faculties of Pharmacy of Canada, 2017, p. 12)</td>
<td>Adapted CanMEDS 2015 Framework: the central role/identity of Care Provider; supported by 6 intrinsic roles: Communicator, Collaborator, Leader-Manager,* Health Advocate, Scholar and Professional</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Planning</td>
<td>Realms of competence: Functional and Enabling Competencies; each with sub-domains Knowledge, skills, and attitudes</td>
<td>“the capacities required of a planner to practice effectively, professionally, and ethically” (Canadian Institute of Planners, 2010, p. 6)</td>
<td>None</td>
</tr>
<tr>
<td>Psychology</td>
<td>Core Competencies Knowledge and skills</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Social Work</td>
<td>Competency blocks; each with families of key global competencies and sub-competencies Knowledge, skills, and abilities Core learning objectives Values, knowledge, and skills</td>
<td>“the competencies required to engage in safe and effective practice” (Canadian Council of Social Work Regulators, 2012, p. 6)</td>
<td>A pyramid with personal competencies (empathy, integrity, etc.) at the base upon which one builds general competencies (literacy, critical thinking, etc.), and entry-level professional competencies (organized into competency blocks).</td>
</tr>
<tr>
<td>Teaching</td>
<td>Categories of core professional competencies; each with a set of features and mastery criteria Knowledge, skills, attitudes</td>
<td>“a professional competency involves a successful, effective, efficient, recurrent ability to act” (MEQ, 2001, p.43)</td>
<td>Diamond with 3 levels: Foundations informing Teaching Act and Social and Educational Context, which inform Professional Identity</td>
</tr>
</tbody>
</table>

Note. * denotes adaptation from the CanMEDS Physician Competency Framework
Table 4.3. *Explicit reference to domains of competence*

<table>
<thead>
<tr>
<th>Discipline expertise</th>
<th>Communication</th>
<th>Collaboration</th>
<th>Scholarship</th>
<th>Lifelong Learning</th>
<th>Ethics and Professionalism</th>
<th>Leadership</th>
<th>Management</th>
<th>Advocacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Law</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Medicine</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>*</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Nursing</td>
<td>X</td>
<td>*</td>
<td>*</td>
<td></td>
<td>X</td>
<td>X</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Planning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Psychology</td>
<td>X</td>
<td>*</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Social Work</td>
<td>X</td>
<td>*</td>
<td>*</td>
<td></td>
<td>X</td>
<td>X</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Teaching</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Note. * denotes an embedded reference within a competency description*
Table 4.4. *Common competencies included within each domain*

<table>
<thead>
<tr>
<th>Competence Domains</th>
<th>Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discipline expertise</td>
<td>Assessment/problem identification and analysis; scope of practice/limits; establishing an intervention/management plan; performing procedures/delivering services; and continuous improvement of quality</td>
</tr>
<tr>
<td>Communication</td>
<td>Written and electronic documentation; reading/visual interpretation; oral speaking; listening and dialogue; interpersonal relationships</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Intra-professional; inter-professional; conflict management; handover of care; and trust</td>
</tr>
<tr>
<td>Scholarship</td>
<td>Advance knowledge/engage in research and dissemination</td>
</tr>
<tr>
<td>Lifelong Learning</td>
<td>Maintain and enhance competence/reflective practice; professional development; facilitate learning of others</td>
</tr>
<tr>
<td>Ethics and Professionalism</td>
<td>Adherence to standards of practice/rules of conduct; awareness of inequity and power differentials; ethical decision-making; responsibility to clients and society; contribution to professional regulation</td>
</tr>
<tr>
<td>Leadership</td>
<td>Contribute to system improvement of service delivery; vision; responsiveness and influence</td>
</tr>
<tr>
<td>Management</td>
<td>Manage daily professional practice (i.e., business and finances, project management, management of others; stewardship of resources; career planning)</td>
</tr>
<tr>
<td>Advocacy</td>
<td>Advocate for individual clients; advocate for the needs of communities and populations</td>
</tr>
</tbody>
</table>
Summary

The review of the 10 entry-to-practice competence frameworks revealed that although professions describe similar core competencies that can be organized across ‘expert’ and supporting/intrinsic domains (including communication; interpersonal collaboration; lifelong learning; ethics and professionalism; and management), differences exist in the extent to which different professions include leadership, advocacy, or scholarship competencies. Systematic differences also exist in the organization of the entry-to-practice competence frameworks. Professions that organized core competencies according to ‘roles’ or ‘meta-competencies’ (i.e., Medicine, Nursing, Occupational Therapy, Pharmacy, Social Work and Teaching) described competence as being more integrated and holistic. In contrast, the professions without this organizing structure of integrated meta-competencies (i.e., Engineering, Law, Planning and Clinical Psychology) describe competence as the sum of component parts; either behavioural/performance-like lists of attributes, or groups of knowledge, skills, and ethical/professional values.

Discussion

This examination of entry-to-practice competence frameworks across ten diverse professions offers important insights into our understanding of competence as a construct. There are two important findings of this research. First, this study suggests that even though professions are unique in their technical knowledge and skills, they are quite similar in the supporting/intrinsic domains that enable technical performance (i.e., communication; interpersonal collaboration; ethics and professionalism; lifelong learning; and management). Competencies within these domains, which are often described as being ‘professional skills’ or
‘soft-skills,’ are not to be taken lightly, as they are what enable professionals to provide human-elements to technical performance (e.g., Davies, McMeel & Wilkinson, 2015; Fransson, Gallant, & Shanks, 2018).

While there is merit to distinguishing professions based on their unique technical abilities for addressing different societal problems (i.e., education, urban and regional planning, social assistance, medical care, etc.) and for delineating scope of practice, there is also value in recognizing how professions are similar and interconnected (Susskind & Susskind, 2015). Knowing that competence integrates discipline-specific technical knowledge and skills with shared intrinsic/supporting competencies, may help persuade professions to consider how they might learn from each other when figuring out how to best approach the assessment of competent performance. This may encourage professions to look outside of their discipline when considering different approaches to assessment and to collaborate in addressing shared challenges. For example, professional programs may consider forming cross-institutional partnerships and research collaborations to investigate approaches to common challenges with assessing competence. It is important to recognize that these suggestions for collaboration are important yet controversial, given the longstanding conflicts and contests amongst the professional groups for status, power, and remuneration, ultimately contributing to hierarchical relationships amongst the different disciplines (Bucher, Chreim, Langley & Reay, 2016).

As a second key finding, this research also suggests that the conceptual tension between ‘integrated’ and ‘component’ conceptions of competence within professional literature (Eraut, 1994, 1998; Gonczi, 1994; Short, 1984) manifests as architectural differences amongst the entry-to-practice competence frameworks. Professions organizing competencies according to ‘meta-competency’ domains described competence as being more integrated within a central expert
role. More integrated architectures (e.g., overlapping petals [representing intrinsic/supporting domains] of the CanMEDS [2015] flower, which enable medical expert performance; CCSWR’s [2012] layered pyramid of personal, general, entry-level and advanced practice competencies; etc.) reflected a system in which competence was represented as being more than the sum of its component competencies. Whereas professions conceptualizing competence as being equal to the sum of its component parts represented competence as a collective list of competencies organized according to categories of knowledge, skills, and ethical/professional values. In these professions, the lack of relational architecture suggested a more fragmented conception of competence.

Hager and Gonczi (1996) suggested that how competence is conceptualized has implications for how competence standards are used and assessed in practice. This research goes one step further in suggesting that how competence is described and architecturally represented has implications for the ways in which entry-to-practice competency frameworks are operationalized by professional education programs on the ground, including the organization of curriculum, offering of teaching and learning opportunities, as well as their approach to the assessment and evaluation of competence. However, in looking to prior research to inform these hypotheses, there are no empirical studies investigating the relationship between conceptions, representations (frameworks) and operationalizations of entry-to-practice competence. This is not surprising given that competency-based approaches to professional education is an emerging field of educational research. Therefore, the findings from this document analysis of entry-to-practice competence frameworks provide a critical starting point for exploring the approaches diverse professional education programs are using to operationalize entry-to-competence frameworks in their own professional contexts.
Extrapolating Approaches to Operationalization

When competence is conceptualized as an integrated construct, competence should then be represented as a “complex structuring of attributes needed for intelligent performance in specific situations” (Gonczi, 1994, p. 29) for reasons of constructive alignment (Biggs, 1996). The related and supporting meta-competencies should work together to enable competent technical performance within and across professional contexts. It follows that the architecture of the entry-to-practice competence framework should reflect a relational system in which competence is more than the sum of its component parts. In operationalizing such a framework in practice, one would imagine a program with an integrated curriculum and authentic teaching and learning opportunities where professional candidates can practice using their professional judgment in contexts and applying relevant meta-competencies in concert to enable competent performance. Such authentic teaching and learning opportunities may include active participation in case studies, simulations, and work-integrated learning (e.g., co-op placements, practicums, or internships), in which candidates are directly observed and formatively assessed based on their demonstration of performance. High-stakes decisions about the achievement of competence standards would be made based on patterns of performance over time, as documented by multiple assessors though multiple low-stakes assessments across practice contexts.

In contrast, when competence is conceptualized as component parts, competence is likely represented as collective lists of knowledge, skills, and ethical/professional values. In operationalizing such a framework, one would expect that individual knowledge, skills, and ethical/professional values are mapped to individual courses, which focus on topics or groups of related knowledge and their practical applications. Complementary to these more theoretical/knowledge-based courses are supervised work-integrated learning courses (e.g., labs,
co-op placements, practicums), which focus on the development and assessment of more technical skills. Within siloed courses, assessment tasks and tools are aligned to focus only on the learning outcomes tagged to each specific course. High-stakes decisions about the achievement of competence are based on whether or not each student has passed all of the required courses for program completion.

These examples serve to highlight differences in the two extremes. In reality, most professional programs are likely a hybrid of integrated and component approaches to operationalization, combing courses and dedicated opportunities for more authentic learning opportunities and assessment in the field (i.e., field placements, internships, etc.). A combined approach likely reflects programs’ practical needs to abide by credit hour and service requirements set by accreditation and university policies. The credit hour is well known to be a barrier to innovation and change in higher education, including implementation of competency-based approaches (e.g., Armstrong, 2016; Lacey & Murray, 2015; Pichette & Watkins, 2018)

When Moving Forward, Remembering Not to Lose Sight of the Past

As we have learned from prior competency-based initiatives, most notably the failure of the Competency-Based Teacher Education movement in the United States, reducing a profession and thus a professional program to seemingly endless lists of ‘component’ knowledge and skills—simply because the behavioural indicators are more specific, observable and measurable—is problematic (Gitlin, 1981; Piper & Houston, 1980). It is challenging from a feasibility perspective to assess and monitor the development of so many individual behaviours, and the validity of what is being assessed is also called into question. Individual competencies measured in isolation do not guarantee that a professional candidate can integrate the competencies that are needed to deliver safe and effective services consistently across practice contexts. For this
reason, some professional programs are looking to develop learning outcomes in the form of Entrustable Professional Activities (EPAs), which represent what professionals actually do in practice and require the integration of multiple competencies (e.g., Chesbro, Jensen, & Boissionnault, 2017; ten Cate, 2013).

Conclusion: Limitations and Contributions

In summary, entry-to-practice competence profiles are documents produced by national and provincial accrediting bodies with the purpose of communicating a shared vision of the knowledge/understanding, skills/abilities, values, and judgments expected of graduates who have been granted the privilege of transitioning to more independent professional practice. The language and architecture used to represent entry-to-practice competence are important for creating a shared mental model of performance standards to be used by professional education stakeholders (i.e., students, educators, workplace supervisors, interprofessional colleagues, and clients) when making decisions about education, service provision, and client safety (Wu, 2017). The current work is limited by its focus on a small, purposeful sample of documents, which continue to evolve and be revised as professions’ conceptions of competence continue to take shape. Nevertheless, this study highlights the theoretical tensions in conceptualizing and representing competence as an integrated system or summation of component knowledge, skills, and ethical/professional values. This work provides a critical starting point upon which to launch future research investigating how professional conceptions of competence and entry-to-practice competence frameworks are informing operationalization within and across professional education programs.
Supplementary Appendix – Summary of Entry-to-Practice Competence Frameworks

Engineering

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the practice of engineering and licensure in Canada. The organization works to “promote greater understanding of the nature, role, and contribution of professional engineers and engineering to society” and “ensures the highest standards of engineering education, professional qualifications, and professional practice” (Engineers Canada, 2017, p. i). According to Engineers Canada (2017) competencies are Graduate Attributes needed to begin practice at the entry level. There are 12 Attributes that engineering candidates are expected to demonstrate “to a degree that would be acceptable by professional engineers who are familiar with undergraduate engineering education in Canada” (p. 79) by the time of graduation. The 12 Graduate Attributes include knowledge/understanding and several abilities under 12 separate headings: (1) A knowledge base for engineering; (2) Problem analysis; (3) Investigation; (4) Design; (5) Use of engineering tools; (6) Individual and team work; (7) Communication skills; (8) Professionalism; (9) Impact of engineering on society and the environment; (10) Ethics and equity; (11) Economics and project management; and (12) Life-long learning (Table S3.1).

Law

The Federation of Law Societies of Canada is the national coordinating body for Canada’s 14 provincial and territorial law societies, which regulate the legal profession in the public interest. The Federation “leads the development of high national standards of regulation to ensure that all Canadians are served by a competent, honourable, and independent legal profession” (About Us, 2018, para. 3). For entry to a bar admission program, “the applicant” must successfully complete an LL.B. or J.D. degree from a legal education program accredited
by the Federation, or possess a “Certificate of Qualification” from the Federation’s National Committee on Accreditation, and meet the “Competency Requirements.” The Competency Requirements include demonstrated “Skills Competencies,” “Ethics and Professionalism,” and “Substantive Legal Knowledge” (National Requirement, 2018). The Competency Requirements are described in Table S3.2.

**Medicine (Specialties)**

The Royal College of Physicians and Surgeons of Canada (RCPSC) is the national professional association that oversees the medical education of specialists in Canada. The RCPSC “accredits the university programs that train resident physicians for their specialty practices, and write and administer the demanding examinations that residents must pass to become certified as specialists” (About the Royal College, 2018, para. 3). The RCPSC defines competence as “the abilities needed to practice effectively within a defined scope and context” (p. 28) and competency as “an observable ability of a healthcare professional that develops through stages of expertise from novice to master clinician” (p. 7).

The CanMEDS 2015 Physician Competency Framework includes 7 “domains of medical practice”/“thematic groups of competencies” which are expressed as “physician roles.” According to the RCPSC, “While the roles are clearly synergistic and interrelated, they are also unique. In this way, a role can be described as a meta-competency” (CanMEDS 2015, p. 28). These 7 meta-competencies include: Medical Expert, Communicator, Collaborator, Leader, Health Advocate, Scholar, and Professional. Medical Expert is the central role of the CanMEDS Framework because “as Medical Experts, physicians integrate all of the CanMEDS roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centered care” (p. 14).
Each meta-competency includes a number of “essential abilities” known as “key competencies,” referring to the “knowledge, skills, and attitudes” of a physician and are described as “global educational statements” (Table S3.3). Each key competency includes several “essential components” termed “enabling competencies” (Table S3.4). Each Specialty Committee of the RCPSC “applies a discipline-specific lens to the CanMEDS Roles, key and enabling competencies, and milestones to reflect its unique practice” (CanMEDS 2015, p. 28). They do this through specialty-derived “stage-specific Entrustable Professional Activities (ssEPA)” describing the “tasks in a professional setting that may be delegated to a physician once competence in the task has been demonstrated.” Each ssEPA has milestones which provide “clearly defined targets to guide learning and assessment and mark the progression of competence throughout a physician’s [stages of training] and career” (p. 10).

**Registered Nurse Practice**

The College of Nurses of Ontario (CNO) is the regulatory body for nursing in Ontario and is responsible for “maintaining standards of nursing practice and education; enforcement of nursing standards; conducting continuing competence reviews; and establishing competencies that are required for nursing practice” (CNO, 2014, p.3). The Competencies for Entry-Level Registered Nurse Practice (2014) serve as the criteria that entry-level RNs must meet upon initial registration with CNO and entry to practice in Ontario. The Competencies are also used by CNO to evaluate baccalaureate nursing education programs to “ensure the curriculum prepares graduates to successfully achieve professional practice standards upon entry to practice” (p. 3). According to CNO (2014, p. 11), “individual competence is the nurse’s independent ability to use his/her knowledge, skill, judgment, attitudes, values, and beliefs to perform in a given role, situation and practice setting” and “competent is the demonstration of integrated knowledge,
skills, abilities and judgment required to practise safely and ethically.” The standard of safe and ethical practise is described as requiring “the assessment, integration, and performance of many competencies at the same time” and is thought to be “dependent on the specific practice context and client needs for which the competencies are to be applied” (p. 4).

The Competencies for Entry-Level Registered Nurse Practice (2014) are organized into a conceptual framework depicting an ongoing cycle of “5 broad competency categories,” including: Professional Practice and Accountability, Knowledge-Based Practice, Ethical Practice, Service to the Public, and Self-Regulation (p. 4). Within the framework, the client or “recipient of nursing services (e.g., individual, family, group, community, or population” is of central importance and has thus been placed in the centre of the ongoing cycle. Each “competency” is defined as “the knowledge, skills, ability, and judgment required for safe and ethical nursing practice” (p. 11). Competencies pertaining to Knowledge-Based Practice are said to “apply to the four areas of nursing care: Assessment, Planning, Implementation of Care, and Evaluation,” which draw on the “integration of nursing knowledge from the sciences, humanities, research, ethics, spirituality, relational practice, critical inquiry, and primary health care principles” (p. 6). For each of the five broad competency categories, the number of competencies and a sample competency have been summarized in Table S3.5.

**Occupational Therapy**

The Canadian Association of Occupational Therapists (CAOT) is the national organization providing “products, services, and learning opportunities that assist Occupational Therapists (OTs) in achieving excellence in their professional practice” (Who We Are and What We Do, 2016, para. 1). CAOT works on behalf of its members to provide: (1) advocacy to the government and health care decision-makers, (2) professional development and career
opportunities, (3) professional stewardship and safeguarding via the accreditation of occupational therapy programs, and (4) a community of networking and knowledge exchange (Strategic Plan, 2016–2019). The Profile of Practice of Occupational Therapists in Canada (2012, p. 1) “presents a model of practice that includes a wide spectrum of competencies, some of which may be expected for OTs at the beginning of their career, while others may be associated with more advanced levels of performance and expertise.” At entry-to-practice, OTs must be “competent” in that they “meet or exceed minimal performance expectations for safe and effective occupational therapy practice” (CAOT, 2012, p. 15). According to CAOT (2012), OTs may progress from competent to “proficient” in some roles with experience and professional development. Proficient OTs “have similar knowledge, skills, and abilities but perform with artistry of practice and professional sophistication” (p. 15).

CAOT (2012, p. 1) has adapted the CanMEDs 2005 Physician Competency Framework to reflect occupational therapy practice around 7 main roles: “the central role of the OT as an expert in enabling occupation, as surrounded by the six supporting roles, including communicator, collaborator, practice manager, change agent, scholarly practitioner and professional.” Similar to the CanMEDS (2005, 2015) Frameworks, each of the 7 roles contains a number of key and enabling competencies (Tables S3.6 and S3.7).

Pharmacy

Nationally, professional programs in pharmacy education are accredited by the Canadian Council for Accreditation of Pharmacy Programs (CCAPP). CCAPP endorses The Association of Faculties of Pharmacy of Canada’s (AFPC) Educational Outcomes for First Professional Degree Programs in Pharmacy in Canada 2017. The AAFP is the national non-profit
organization advocating for the interests of pharmacy education and educators in Canada (About AFPC, 2014, para. 1).

The AFPC (2017) Educational Outcomes (EOs) “focus on what graduate are able to do at the end of a Baccalaureate or Doctorate program that is the first professional degree in pharmacy. They signal curricular priorities and a framework for curriculum design without being overly prescriptive” (p. 4). Also drawing from the CanMEDS 2015 Physician Competency Framework, AFPC’s (2017) EO’s use the language of roles and key and enabling competencies (Table S3.8). At the heart of the EOs framework is the central role and “identity” of Care Provider, and “to provide the quality of pharmacy care required, graduates [must] approach pharmacy practice by skillfully integrating Communicator, Collaborator, Leader-Manager, Scholar and Health Advocate roles” (p. 2). However, unlike the CanMEDS 2015 Framework, the Professional role “is not among many roles; rather, it is the overarching ethos of the discipline of pharmacy — the spirit that guides graduates’ practice and their approach to practice regardless of the type of practice in the field of pharmacy” (p. 2).

Within each of the 7 roles, key competencies define “what graduates need to be able to achieve by the end of their program,” and are described as “measurable behaviours” reflecting the “knowledge and skill acquired during the program (p. 2). Enabling competencies “delineate specific sub-components of competencies that graduates need to achieve in order to attain the competency required at the end of the program” (p. 2). For the central role of Care Provider, sample key and enabling competencies have been provided (Table S3.9).

**Planning**

The Canadian Institute of Planners (CIP) is the national member-based organization that works to advance and raise the profile of the Canadian professional planning community through
the development of public policy positions, relevant program, products, and services (About Us, 2018). The National/Affiliate Membership Committee Task Force of the CIP has established national “competency standards” to support certification and accreditation standards (CIP, 2010, p. 4). Universities are directed to use the competency standards “when developing and reviewing planning curricular for the purpose of seeking an initial or renewal of accreditation” (p. 5). The competency standards represent “the minimal level of performance” expected of certified professional planners and “attempt to capture the various dimension that, when taken together, account for ‘competent performance.’ They describe the knowledge, skills, and attitudes required for practice by individual planners” (p. 6).

The competency standards include “functional” and “enabling competencies” which capture the scope and realm of practice of planning for an entry-level Registered Professional Planner in Canada” (p. 4). Whereas functional competencies “identify the common knowledge and skill base of all planners,” enabling competencies “identify the capacities required of a planner to practice effectively, professionally, and ethically” (p. 6). Table S3.10 summarizes the functional and enabling competencies, and the “constituent sub-domains” within each. For the functional competency Human Settlement, Table S3.11 provides a sample sub-domain and detailed description.

**Psychology**

The Canadian Psychological Association (CPA) is the national organizations which “supports education and training in psychology, the development and application of research, and the accessibility of psychological practice (CPAs’ Strategic Plan, 2013–2018). The CPA accredits training programs in professional psychology, but the accreditation, registration and licensure of individual practitioners falls under the responsibility of provincial governing bodies
(e.g., The College of Psychologists of Ontario). However; in 2001, Canada’s provincial governing bodies entered in a Mutual Recognition Agreement (MRA) establishing a common set of conditions for independent practice nationwide (Most recent MRA amendment, 2004). These conditions are described as “core competencies,” and are incorporated into CPA accreditation standards and used to evaluate applicants seeking entry to the profession through professional registration. Professional psychology programs must demonstrate how they “train [graduates] to the professional competencies” and the “means and mechanisms for evaluating the competencies to which students are trained” (CPA Accreditation Standards, 2011, p. 48). The MRA describes 6 Core Competencies, including: Interpersonal Relationships, Assessment and Evaluation, Intervention and Consultation, Research, Ethics and Standards, and Supervision; each including lists of specific “knowledge” and “skills” (Table S3.12). Interpersonal Relationships is described as the foundational or “basic competency [which] forms part of all the other competencies” (MRA, 2004, p. 8)

Social Work

The Canadian Council of Social Work Regulators (CCSWR) is the national body for provincial and territorial social work regulatory authorities. The CCSWR works to “respond to matters relating to licensure and/or regulation” such as “the development of national standards for the assessment of competence in social work practice” (Objects of the CCSWR, 2017). In 2012, the CCSWR developed an Entry-Level Competency Profile for the Social Work Profession in Canada. CCSWR (2012) view competencies as “a pyramid with personal competencies (empathy, integrity, willingness to learn, respect for persons, etc.) as the base upon which one builds general competencies (literacy, numeracy, facility with computers, critical thinking and problem solving).” Entry-level competencies are thought to “build upon the personal and general
competencies” (CCSWR, 2012, p. 10) and are defined as “the minimum knowledge, skill and abilities that a social worker must possess on the first day of professional practice regardless of their prior educational or professional preparation;” they are the “competencies that are essential for safe and ethical practice” (p. 11). CCSWR (2012, p. 41) describe six “competency blocks that present six primary areas of practice, including: Applying Ethical Standards, Conducting Assessments, Planning Interventions, Delivering Services, Improving Policies and Practices, and Engaging in Reflective Practice and Professional Development.” Each competency block is further divided into “families of key global competencies” which consist of “sub-competencies that describe a range of specific professional activities described in measurable terms” (p. 42). Table S3.13 summarizes the number of key global competencies and sub-competencies for each competency block. For the Applying Ethical Standards Competency Block, Table S3.14 provides a sample Global Competency and set of Sub-Competencies.

According to the CCSWR (2012, p. 5), the “competencies, which entail knowledge, skills, and abilities, may assist those with the authority to accredit educational programs, delineate reference points for admission to the profession, and as a basis for other competency and/or supervised practice evaluation tools.” Even though the Entry-Level Competency Profile (2012, p. 9) describes “minimum requirements for entry to the profession,” provincial competency profiles and standards of practice “take precedence over this document.”

The Ontario College of Social Workers and Social Service Workers, the provincial regulatory body, defines competence as “the ability to fulfill the requirements of professional practice.” Competence includes: “(1) possession of all the relevant educational and experiential requirements, and the ability to carry out professional duties and achieve goals while adhering to the values and codes of ethics of the profession; and (2). [...] having the capacity to understand
and act reasonably” (Code of Ethics and Standards of Practice Handbook, 2008). The minimum requirement for registration with the College is completion of a Baccalaureate of Social Work (BSW) obtained from a social work program accredited by the Canadian Association for Social Work Education (CASWE) or equivalent credentials.

The Canadian Association for Social Work Education (CASWE) is “a national, charitable, association of university faculties, schools, departments, and modules offering social work education in Canada” (About Us, 2018). CASWE Standards for Accreditation (2014, p. 2) specify 9 “core learning objectives” for students, “reflecting the values, knowledge, and skills that social work students are expected to acquire and demonstrate upon completion of the social work program” (p. 10). CASWE (2014) accredits both Baccalaureate and Master-level degrees in social work, and the core learning objectives are used as “points of reference for both BSW and MSW programs” in designing and delivering their curricula and field education (p. 10). The number of component values, knowledge and skills listed within the 9 core learning objectives are summarized in Table S3.15. Table S3.16 provides the component values, knowledge and skills listed under Core Learning Objective 1.

**K-12 Teaching (Education)**

Similar to registered nursing practice, the teaching profession does not have a national association for provincial and territorial teacher regulatory authorities. This may be because of distinct differences that exist between the K-12 education systems in each province and territory (Gambhir, Broad, Evans, & Gaskell, 2008). In Canada, each provincial/territorial Ministry/Department of Education establishes standards for the teaching profession and accredits Initial Teacher Education (ITE) programs. In Ontario, for example, the Ontario College of Teachers (OCT) outlines “ethical standards, standards of practice, and the professional learning
framework describing what it means to be a member of the teaching profession in Ontario (Professional Standards, 2006). As another example, the Ministère de l'Éducation, Gouvernement du Québec (MEQ, 2001) has a framework of 12 core professional competencies for the Teaching Profession. These competencies are used by Faculties of Education to develop ITE programs, by the Comité d'agrément des programmes de formation à l'enseignement (CAPFE) for program accreditation, and for teacher certification. As a reminder, the MEQ professional competency framework for teacher education was included in the sample because of its explicit reference to competencies for initial teacher educators.

According to MEQ (2001, p. 43), a “professional competency is applied in a real-life professional setting; follows a progression from simple to complex; is based on a set of resources; is based on the ability to mobilize resources in situations requiring professional action; involve a successful, effective, efficient, recurrent ability to act; is part of intentional practice; and is a project, an ongoing pursuit.” The Reference Framework for Professional Competencies in the Teaching Profession specifies, for each of the 12 core professional competencies, “a competency statement, the meaning of competency, the features of the complexity and the level of mastery student teachers are expected to have attained by the end of their initial teacher training” (p. 43). The features “relate to the professional actions implicit in teaching, rather than the subject-specific, pedagogical and didactic knowledge required” (p. 53). The 12 core professional competencies are grouped together to form four “interdependent categories,” which “are not an ordered set of operations, but steps that have an impact on one another and that change as the elements involved are taken into consideration” (p. 53). These four interdependent categories include: Foundations, Teaching Act, Social and Educational Context, and Professional Identity (p. 55). The number of features and mastery criteria for each of the 12 core
competencies are summarized in Table S3.17. Table S3.18 provides the features and master criteria listed under core competency 1 (as a sample).
Preface to Study 2

In Study 1, the findings suggest that how professional programs conceptualize, describe, and represent competence within their competence framework has potential implications for how professional programs operationalize the assessment of competence in practice. Whether professions view competence as being more than or equal to the sum of its component parts will likely influence how competence is described and represented as either an integrated system or list of separate knowledge, skills/abilities, and attitudes. My intention for Study 2 was to investigate, in depth, how a self-proclaimed competency-based professional education program with an integrated conception of competence and competence framework is operationalizing the assessment of competence.

I intentionally chose to conduct this research in a Postgraduate Medical Education Program (PGME) for three reasons. First, from my findings in Study 1, I knew that speciality medicine holds an integrated and developmental conception of competence. Competence is represented as an integrated framework of physicians’ roles, competencies, and speciality specific milestones that are thought to develop over stages of training through practice and assessment of stage-specific Entrustable Professional Activities (ssEPAs). Each ssEPA integrates several specialty specific milestones, which are derived from CanMEDS competencies. Second, I knew from my literature review that PGME is often referred to as being the gold standard for taking a more developmental/systems-oriented approach to viewing assessment as a ‘program’ that integrates formative and summative purposes (Koenen, Dochy, & Berghmans, 2015; van der Vleuten & Schuwirth, 2012). Third, I knew that in comparison to other professional programs, PGME is known to be highly resourced (both financially, and with regards to educational support) and
highly workplace-based. Residents develop competence primarily through supervised, paid practice in hospitals and primary care settings.

In educational research, purposive sampling/investigation of information-rich cases with ‘high’ manifestations of important contextual considerations is preferred to ‘low’ manifestations. ‘High’ cases provide researchers and readers opportunities to consider what is possible while also inviting comparisons when interpreting the findings within the limitations of other local context(s). Therefore, my intention for conducting this research in a highly resourced, highly-workplace based competency-based medical education program was to illustrate what is currently possible in terms of operationalizing a system of assessment that aims to integrate formative and summative purposes.

Unlike Studies 1 and 3, I have intentionally chosen to write Study 2 for the medical education community for three reasons. First, given that medical education is viewed as being the gold standard for pioneering implementation of competency-based education and assessment in Canada (Pichette & Watkins, 2018), medical education journals are often read by leadership in other professional disciplines who are looking to develop their programs to become increasingly competency-based. Second, in order to gain access to conduct this research in a competency-based PGME program, I first needed to establish my credibility as a researcher and build trusting relationships in a specific speciality program. To do this, I negotiated a position as the project manager for a developmental program evaluation of competency-based medical education (CBME) implementation in an Emergency Medicine PGME program. In return, I invited members of this project to be co-authors of Study 2 of my dissertation. Third, I would argue that the conceptual lens and framework I have used for this study (from the field of knowledge use) will enhance understanding of the complexity of using low-stakes assessments to inform high-
stakes evaluative judgments of achievement within medical education. Medical education journals encourage ‘cross-cutting edge’ research, which adopts conceptual frameworks from other professional fields to inform contemporary approaches to medical education practice, policy, and research. Therefore, through this research, I will be making a novel contribution to the field of medical education scholarship. This study has the potential to be read by a diverse audience of leadership, thus influencing professional education policies and practices at different systems levels (e.g., members of professional accrediting bodies, higher education quality councils, schools of graduate and professional studies, centres for teaching and learning, decanal leadership teams and embedded teaching and learning units within professional programs).

Prospective journals for this manuscript include, as examples, Academic Medicine, Medical Teacher, or in a special issue of the Journal of Evaluation in Clinical Practice. This specific journal currently has a call out for papers for a special issue on competency-based education. Of specific interest are papers “examining conceptual issues of CBE, measurement, evaluation of implementation of CBE program/initiatives, and outcomes” (CBE Thematic Issue 2020, p. 1).

Declaration of Researcher Reflexivity

To increase transparency, I will be frank in acknowledging the potential conflict of interest that exists in my dual roles as: (1) Project Manager for a developmental evaluation of implementation of CBME in a Canadian Emergency Medicine Program, and (2) the Primary Investigator of Study 2 of my dissertation—a case study investigating the system of assessment in the same Emergency Medicine program. Of importance, the nature of these projects differ in their purposes. The purpose of the evaluation was to generate a novel and reproducible approach to rapid evaluation of CBME implementation, using the Core Components Framework of CBME (Van Melle, 2019) and the Emergency Medicine program as an example. By looking at both the
evaluation process and short-term program outcomes, this project contributed early evidence of fidelity of CBME implementation (i.e., the degree to which the program was implemented according to the intended model). This evidence is intended to inform ongoing local program implementation in this particular EM program, as well as national program development and implementation planning by the national EM Specialty Committee.

In contrast, the purpose of this study was to build theory and advance conceptual thinking about the flow of performance information within a system of programmatic assessment, identifying where gaps and challenges can potentially arise in practice. An understanding of how component elements of a system of assessment function and contribute to the workings and challenges of the system as a whole is important for advancing a model of programmatic assessment in action. Such a model has the potential to advance practices, policies, and research. For example, knowing what a system of assessment can look like in practice can assist other professional programs in reflecting on their own approach to the development and assessment of competence. Identification of challenges associated with this given model can inform the development and refinement of assessment and evaluation policies and practices, as well as future research investigating alternative systems for developing and assessing competence.

I will also be explicit in mentioning how common it is for individuals in small-to-medium-sized institutions and programs to simultaneously hold multiple roles. Likewise, it is quite common for evaluations and research to be conducted by the same people, for different purposes, concurrently. It takes time to establish buy-in and trust with participants in an evaluation and in an in-depth case study, and because of the time/resource investment, it is ethical to maximize return on investment by the evaluator/researcher and the participants involved.
Chapter 5

Study 2 – A Case Study of Programmatic Assessment in Action: Using a Systems Lens to Improve the Production and Use of Performance Information

Abstract

Programmatic assessment has been identified as a systems-oriented approach to combining the multiple purposes for assessment within Competency-Based Medical Education (CBME) (i.e., formative, summative, and program improvement). While there are well-established principles for designing and evaluating programs of assessment, few empirical studies model and critically interpret what a system of programmatic assessment looks like in practice. This study aims to use systems theory and the ‘two communities’ metaphor to interpret a model of programmatic assessment and to discuss strengths and challenges with the given approach to operationalization.

An interpretive case study approach was used to investigate how programmatic assessment is being operationalized within one competency-based residency program at a Canadian university. Qualitative data were collected from residents, faculty, and program leadership via semi-structured group and individual interviews conducted at nine-months post CBME implementation. A secondary analysis of program evaluation data collected from stakeholders three- and nine-months post CBME implementation was also performed. Data were analyzed using an abductive approach; paying close attention to the production, use, and flow of performance information through the system of assessment.

This model of programmatic assessment suggests that systems of assessment are ‘virtuous cycles’, in which any weak link can influence the co-dependent cycles of knowledge production and use. Low-stakes formative decisions about residents’ learning and high-stakes summative
judgments about residents’ progression, promotion, or remediation are only as ‘solid’ (i.e., trustworthy) as the information upon which they are made. For programmatic assessment to meet its intended aims, program stakeholders require a systems perspective regarding how their assessment practices contribute to the greater whole.

This study has identified important opportunities for improving the operationalization of programmatic assessment through targeted, multi-stakeholder collaborative approaches to resident and faculty development.

Key words: Programmatic assessment; competency-based medical education; graduate medical education; systems theory; case study; qualitative
Introduction

Meaningful assessment systems are critical to the implementation of Competency-Based Medical Education (CBME) (Lockyer et al., 2017). Assessment facilitates learning and the development of competence, protects patients by ensuring high-stakes decisions about the achievement of competence are defensible and transparent, and provides information about the efficacy of residency training programs (Bok et al., 2013; Norcini et al., 2011; Schuwirth, van der Vleuten & Durning, 2017; van der Vleuten et al., 2012). In order for these three purposes to be balanced and realized in practice, it has been argued that CBME requires a programmatic approach to assessment (Schuwirth & van der Vleuten, 2011; 2012; Driessen et al., 2012). Further, it has been argued that an ongoing system of programmatic assessment requires significant human and financial resources and a set of principles and procedures governing the coordinated assessment efforts of multiple program stakeholders (Norcini et al., 2011). This is especially important in smaller programs in which faculty members can have multiple assessment roles (e.g., frontline supervision, advisors/coaches of learning, competence committee members, as examples).

Programmatic assessment has been defined as a deliberately designed system by which assessment information about trainees’ competence development is captured, combined, interpreted, communicated and acted upon to inform formative decisions about learning, summative decisions about the achievement of competence standards, and ongoing decisions about program improvement (e.g., Schuwirth & van der Vleuten, 2011; Schuwirth & Ash, 2013). It has been argued that CBME requires a programmatic approach to assessment in order to make valid and reliable inferences about a trainee’s development of competence over time, across
assessors, assessment tools, and practice contexts (Cook, Brydges, Ginsburg & Hatala, 2015; Harris et al., 2017).

While there are well-established principles for designing and evaluating programs of assessment (e.g., van der Vleuten et al., 2012; Wilkinson & Tweed, 2018), few empirical studies model and critically interpret what examples of programmatic assessment actually look like in practice (e.g., Chan & Sherbino, 2015; Li, Sherbino & Chan, 2017; Perry et al., 2018). There is a need for models illustrating how the component parts of a program of assessment contribute to the strengths and challenges of the system functioning as a whole. Conceptual models from the knowledge translation literature, such as the ‘two communities’ metaphor, can provide a useful lens for understanding the ‘messy complexity’ and interdependency that exists in using low-stakes formative assessment evidence to inform high-stakes summative/evaluation decisions about the achievement of competence standards. Systems theory (Von Bertalanffy, 1968) provides a useful lens for conceptualizing this tension and the relationships between interrelated and interdependent parts of a program of assessment.

**The ‘Two Communities’ Metaphor**

According to the ‘two communities’ metaphor and related models (Caplan, 1979; Lomas, 2000; Wingens, 1990), a fundamental gap often exists between those who produce evidence and those who use the same evidence for decision-making. This gap is thought to exist because of cultural and functional differences between the two communities who may have little opportunity to interact and communicate (Lomas, 2000; Wingens, 1990). Within CBME programs, individuals responsible for conducting low-stakes frontline formative assessments often do not know how the information will be used at a later point in time to make high-stakes summative/evaluative decisions about the achievement of competence standards. Their goals and
values will be focused on producing and documenting evidence in a format that works for them and their trainees’ learning in that particular moment in time. Academic Advisors and Competence Committee members may struggle with interpreting and using the same documented information for different purposes (i.e., to co-regulate trainees’ personal learning plans and make high stakes decisions about trainees’ remediation, progress, or promotion). It is possible to see how evidence of trainees’ performance documented in the workplace as entrustment scores and formative feedback may not meet the needs of Academic Advisors or Competence Committee members who are looking for patterns of performance across practice contexts (Hauer et al., 2015).

**Systems Theory**

Systems are organized entities made up of interrelated and interdependent elements (i.e., components, entities, members), which continually influence one another in order to achieve system goals (Von Bertalanffy, 1968). All systems have inputs, outputs, and feedback mechanisms for homeostasis and adaptation. When subjected to new influences and goals, there is a tendency for the current system to resist change and maintain the status quo (Kim & Kankanhalli, 2009). However, in order to protect itself from dissolution, systems will grow and change to adapt to new inputs and goals (Von Bertalanffy, 1968). One could hypothesize that with implementing novel approaches to programmatic assessment as a core component of CBME (Van Melle, 2019), the current assessment system in motion would initially resist change because of cultural norms (Kim & Kankanhalli, 2009). However, with the input of new assessment roles, expectations, and a learning management software (as examples), it would be expected that the system would adapt.
The Research Purpose

The dual purposes of this research were: (1) to apply systems theory (Von Bertalanffy, 1968), the ‘two communities’ metaphor, and related models from the knowledge translation literature (Caplan, 1979; Lomas, 2000; Wingens, 1990), as an analytical lens to interpret the relationship(s) between components of a system of assessment; and (2) to advance a model that sheds light on the flow of performance information within a system of programmatic assessment, highlighting where gaps and problems can arise. An understanding of how component elements of an assessment system function and contribute to the workings and challenges of the system as a whole, has the potential to advance practice, policy, and research. For example, knowing what a system of programmatic assessment can look like in practice can assist other professional programs in reflecting on their own approach to the development and assessment of competence with CBME or CBE more generally. Identification of challenges associated with this given model can inform the development and refinement of assessment and evaluation policies (at the program and institutional levels), as well as future research investigating alternative approaches to operationalizing a system of assessment.

Method

Study Design

In this study, authors adopted a qualitative, interpretive case study design to better understand how a highly-resourced competency-based residency training program is operationalizing programmatic assessment at a medium-sized Canadian University. Case studies are suitable research designs for investigations that aim to develop an in-depth understanding of a real-life phenomenon, paying particular attention to the contextual conditions that are highly pertinent to the phenomenon under investigation (Merriam, 2009; Yazan, 2015; Yin, 2008). In
contrast with descriptive case studies, which focus solely on providing a description of a phenomenon without guidance from theory, interpretive case studies use established concepts to analyze and build understanding about a phenomenon (Merriam, 2009). Merriam’s (1998; 2009) interpretive approach to designing and conducting case study research was used because it follows a constructivist paradigm (Yazan, 2015). This approach emphasizes the important role the researcher plays as an instrument in the data collection process through thoughtful and reflective engagement in effective interviewing, careful observation, and mining documents to construct meaning from the data.

The Case (Bounded System) and Macrosystem

According to Merriam (2009, p. x) case study research is “an intensive, holistic description and analysis of a bounded phenomenon such as a program, an institution, a person, a process, or a social unit”. The case for this study was an Emergency Medicine Postgraduate Medical Education program at a mid-sized Canadian institution. This specific program was purposefully selected because of its recent (i.e., within one year) investment in implementing Competency-Based Medical Education (CBME). Thus it is within the context of CBME implementation that programmatic assessment will be examined. Research investigating models of programmatic assessment in action will contribute to our understanding of what systems of assessment can look like within a CBME context. This understanding is important for other institutions and graduate medical education programs who are planning, implementing, or refining their own system of assessment.

This particular five-year residency program accepts five residents per year, with 25 residents in the process of completing their training at any point in time. Residents are supervised by 35 faculty members at two university hospitals. All residents are assessed in the
workplace on average one-to-two times per shift using an electronic portfolio platform which includes several assessment tools, including a supervisor form, a procedure form, a narrative field note, and a longitudinal Periodic Performance Assessment. Based on the model of Competence By Design, as developed by the Royal College of Physicians and Surgeons of Canada (Frank, Snell, & Sherbino, 2015), each assessment tool is aligned to a stage-specific Entrustable Professional Activity (ssEPA), and includes a global entrustment scale and open text box for narrative comments. Mapped to each ssEPA are milestones which mark the progression of competence development in each CanMEDS (2015) role. Faculty in leadership roles overseeing this system of programmatic assessment include the Program Director, CBME Lead, and Director of Assessment and Evaluation for Postgraduate Medical Education. Definitions for each of these terms are described in the supplementary appendix.

In this program, each resident is assigned to one of four Academic Advisors, who each advise five residents—one resident from each cohort. Academic Advisors are clinical faculty members who meet with assigned residents on a quarterly basis in advance of Competence Committee meetings. In this program, the same four Academic Advisors, plus the Program Director and CBME Lead (who serves as Chair) comprise the Competence Committee. In advance of an Academic Advisor meeting, each resident and their Academic Advisor review the resident’s electronic portfolio and prepare a written Summary of Progression form. Each resident also drafts a stage-specific Personal Learning Plan to share with their Academic Advisor. During meetings, residents and Academic Advisor discuss the resident’s progression within their stage of training and explore trends within and across ssEPA assessments. Each resident and their Academic Advisor are required to sign-off on their Summary of Progression form, which the Academic Advisor presents at the quarterly Competence Committee meeting. During
Competence Committee meetings, each trainee’s progression is reviewed and discussed by members of the Committee. Feedback from the Competence Committee is summarized and documented within the residents’ e-portfolio and outcomes are shared with the resident via an email from the Program Director.

Data Collection

This study specifically focuses on programmatic assessment within a CBME program and models the interdependent cycles of knowledge production and use. Our research was conducted at the same time as a developmental program evaluation (Hall et al., 2018). The purpose of the evaluation was to generate a novel and reproducible approach to rapid evaluation of CBME implementation, using the Core Components Framework of CBME (Van Melle, 2019) and the Emergency Medicine program as an example. By looking at both the evaluation process and short-term program outcomes, the evaluation contributes early evidence of fidelity of CBME implementation (i.e., the degree to which the program was implemented according to the intended model). This evidence is intended to inform ongoing local program implementation in this particular EM program, as well as national program development and implementation planning by the national EM Specialty Committee. Findings from the program evaluation will be published as a separate study.

Semi-structured individual and group interviews.

Prior to commencing data collection for this research, ethics approval was obtained from the institution’s review board for Health Sciences and Affiliated Teaching Hospitals. All program participants—including program leadership, residents, and faculty—were invited, via email, to participate in either an individual or group interview. Program leaders participated in individual interviews, whereas faculty and residents participated in group interviews.
For participants’ convenience, interviews were scheduled immediately following data collection for the program evaluation. Interviews were conducted at nine-months post CBME implementation over a three-week period in late February/early March of 2018. Consent was collected twice in order to ensure that each person could make an informed choice about participation in the program evaluation and/or this research. Interviews focused on exploring program participants’ perceptions of their system of programmatic assessment, including the learning/assessment relationships that exist between program stakeholders and tensions in the use of performance information for formative and summative purposes. Interview questions were designed to uncover challenges and opportunities with the program’s current model of programmatic assessment. Interviews took up to an hour and were audio-recorded and moderated by the principal investigator (JR). In reviewing the commentary for accuracy verification, JR followed-up with individual participants via email or in person to check the accuracy of specific statements. All audio-recordings were transcribed verbatim by a professional transcription agency and checked for accuracy by JR.

Use of program evaluation data as a secondary data set.

The secondary data set included transcripts of interviews and focus groups completed with program stakeholders at three and nine months post CBME implementation. The evaluation interview and focus group questions were different from those used in this research study. Questions focused on exploring stakeholders’ perceptions of the extent to which the Core Components of CBME (Van Melle, 2019) were being implemented as intended. Given that programmatic assessment is one of the Core Components of CBME, it seemed relevant to also include this data (with permission from the evaluation team). Table 5.1 provides a summary of data collection methods and participants for the primary and secondary data.
Data Analysis

The primary and secondary data were analyzed using an abductive approach (Given, 2008); paying particular attention to the assessment roles, structures, and processes being used for formative development and summative assessment of competence. Within qualitative research, abduction is used to make logical (i.e., plausible) inferences about how things work in the real-world. Denzin (1978) explained that abduction works from consequences (i.e., problems) back to cause or antecedent and requires a combination of data-based inductive analysis and theory-derived deductive analysis. Following Magnani’s (2009) ‘model-based’ abduction, which argues the importance of logical models in externalizing systems of human reasoning, data analysis involved using systems theory (Von Bertalanffy, 1968) and the ‘two communities’ metaphor (Caplan, 1979; Lomas, 2000; Wingens, 1990) as an analytical lens to represent and explain the challenges associated with a particular model of programmatic assessment being used in practice.

NVivo software (version 11.4.3, by QSR International) was used to annotate and code the dataset. The goal of the first round of reading was to annotate recurring themes emerging from the data. These ideas formed the initial list of codes which were applied to units of meaning in the second round of closer reading. Where new ideas emerged from the data, additional codes were created in vivo. In the third round of reading, the data assigned to each code was checked for internal homogeneity and external heterogeneity, meaning that data assigned to the same code had similar meaning, and different meanings from data assigned to other codes. At this point, the principal investigator worked closely with co-authors to generate categories and themes based on relationships amongst codes. Systems theory (Von Bertalanffy, 1968) and the ‘two communities’ metaphor (Caplan, 1979; Lomas, 2000; Wingens, 1990) informed the
discussions and interpretations of the data. Concept mapping was used as a tool to generate visual representations of conceptual links observed between coded sections of the data (Burgess-Allen & Owen-Smith, 2010). Representative quotes from each of the themes were selected by the authors for inclusion in the findings. Wherever possible, quotes from the primary data set were preferred and selected for inclusion in the findings. Upon completion of the draft manuscript, a select sample of key participant informants were invited to review the draft and to provide feedback. Salient feedback was subsequently incorporated into the manuscript.

**Findings**

Research participants included residents from each postgraduate year, front-line faculty, the Program Director, CBME Lead, Academic Advisors and Competence Committee members (Table 5.1). Table 5.1 reports the number of participants according to their designated role within the system of programmatic assessment. At nine months, everyone who participated in data collection for the program evaluation also participated in this research. It is important to reinforce that faculty hold multiple roles within this program (e.g., the same clinical faculty member can provide workplace-based assessments, be a designated Academic Advisor and member of the Competence Committee). Given the small size of the program, efforts have been made to protect the confidentiality of participants. Each faculty member [F] and resident [R] has been assigned a participant number so as to avoid signaling gender. With the exception of the abbreviations provided in Table 1, it is important to note that a resident’s participant number does not indicate their year of training (i.e. R3 = resident participant 3). The findings presented are organized around themes representing challenges with the documentation, use, and flow of performance information (i.e., knowledge) within the system of programmatic assessment.
Table 5.1. Summary of data collection methods and participants for the primary and secondary data

<table>
<thead>
<tr>
<th>Data collection (post CBME implementation)</th>
<th>Program Evaluation Data (secondary data)</th>
<th>Research Data (primary data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Interview</td>
<td>Program Director (N=1)</td>
<td>Program Director (N=1)</td>
</tr>
<tr>
<td></td>
<td>CBME Lead (N=1)</td>
<td>CBME Lead (N=1)</td>
</tr>
<tr>
<td>Group Interview</td>
<td>R1s (n=3)</td>
<td>R1s (n=4)</td>
</tr>
<tr>
<td></td>
<td>R2–5s (n=5)</td>
<td>R2–5s (n=6)</td>
</tr>
<tr>
<td></td>
<td>Faculty (n=8)</td>
<td>Faculty (n=6)</td>
</tr>
<tr>
<td></td>
<td>AAs/CCs (n=3)</td>
<td>AAs/CCs (N=4)</td>
</tr>
</tbody>
</table>

Note. R1s = first year residents; R2–5s = residents in postgraduate years 2–5; AA/CC = Academic Advisors who are also members of the Competence Committee.

**Challenges with the Documentation of Performance Information (i.e., Knowledge Documentation)**

Knowledge of resident performance is generated through direct and indirect observation of patient care. When “patients are the substrate for learning” [F1], the number and heterogeneity of case presentations were perceived to constrain opportunity for learning through performance assessments. Residents and Academic Advisors were aware of their program’s assessment plan and the target number of assessments residents were expected to obtain per stage-specific EPA. All residents agreed that the bulk of the responsibility for initiating direct observation and assessment was left to them. This tension between expectations and opportunity was concerning for residents because they feared being held back from progression to the next stage of training because of insufficient evidence of performance.

Several frontline faculty rationalized that while they are comfortable directly observing residents and orally coaching for improvement, they are quite uncomfortable documenting
constructive feedback and entrustment decisions (i.e., performance information) in situ [F3-F6]. As one faculty member explained,

I’m happy to give a pixel about something I’ve observed, and I’ll give a bit of constructive feedback around the interaction, but sometimes the larger issues that are buzzing in my head are not represented in that because I’m uncomfortable with my judgement. I’m not confident because I haven’t seen that resident enough times or observed the behaviour over enough different domains that I think it’s a consistent thing that needs addressing [F3].

Concerns over the accuracy and generalizability of judgements were thought to contribute to faculty providing residents with more feedback orally than what is documented in their online assessment forms.

A few faculty members also expressed concerns about the implications of documenting constructive feedback for themselves personally in a small residency program [F1, F2, F5, F6, F7]. As one faculty member explained, “Our reappointments rely on resident evaluation to some degree, and so we put ourselves on the line if we give negative feedback and it’s not well received” [F7]. In an effort to avoid “the potential for constructive feedback to come back and bite you, or cause problems for you on a personal level” [F7], faculty reported choosing not to document this information, but to share performance concerns anecdotally through hallway conversations with program administrators [F1, F2, F5, F6, F7]. Whenever information about resident performance fails to be documented, this knowledge is lost. This is problematic in a system of assessment that uses performance information from low-stakes formative assessment to inform high-stakes summative decisions about the achievement of competence standards.
The Process of Using Low-Stakes Formative Assessments to Inform High-Stakes Summative Decisions (i.e., Knowledge Use)

Documented evidence of resident performance is intended to be interpreted and used by residents, Academic Advisors, and Competence Committee members to both formatively guide ongoing learning and to inform high-stakes decisions about progress, promotion, or remediation.

Use by residents.

In theory, residents are expected to reflect upon performance information housed within their electronic portfolio to guide ongoing learning and to generate quarterly iterations of their Personal Learning Plan to be shared with their Academic Advisors. The first year residents [R1-R4] agreed that while their e-portfolio “forces you to check in on where you’re missing evidence [i.e., performance information]” [R1], Personal Learning Plans force you to think about and articulate “bigger long-term goals” [R2]. As an example, one resident shared their goal of increasing efficiency in the number of patients cared for on a given shift [R2]. As a group, upper year residents [R5-R10] reported being less invested in reflecting on their performance information to generate their Personal Learning Plans and perceived the requirement to be a ‘make work’ activity. This difference in engagement likely reflects residents’ tenure in the program, given that more senior residents had previous assessment experiences prior to CBME implementation.

Use by Academic Advisors.

In advance of quarterly meetings with their assigned residents, Academic Advisors are expected to review each residents’ performance information as well as their Personal Learning Plan in order to summarize a resident’s achievement to date and to guide their learning progression. All academic Advisors described themselves as having dual and potentially conflicting roles as ‘mentors/advocates’ for residents learning and ‘evaluators’ of their progress.
As one Academic Advisor explained, “if residents don’t see you as their advocate and their confidant, then there’s information you’re not going to get that’s critical for their development” [F8]. Compared to the Academic Advisors, frontline faculty were more bothered by Academic Advisors “blurring between the lines of coach, teacher, and mentor” [F3]. According to one frontline faculty, “I would want my Academic Advisor identifying problems and working with me towards a goal, but the assessor of whether I’ve met that goal or not to be someone external to that process” [F3]. In comparison to faculty, all residents perceived their Academic Advisors to be more involved in monitoring their learning progress and achievement than mentorship. First year residents [R1-R4] agreed that Academic Advisor meetings are “a good chance to check in to make sure that you’re on the right track and to bring up things that you’re worried about. I think it would be a nightmare to check in your third year only to realize ‘Oh, I’m actually where I was supposed to be in second year’” [R1]. Across participants, there appears to be a lack of clarity in the role of the Academic Advisor and whether or not there is a tension in Academic Advisors using residents’ performance information for formative and summative purposes.

**Use by the Competence Committee.**

During Competence Committee meetings, each resident’s progress is discussed in relation to their achievement of competence standards. Each Academic Advisor takes the lead on sharing the Summary of Progression for a given resident and opens the conversation up to the committee for discussion. During discussion, the chair navigates the resident’s electronic portfolio projected on a large screen for everyone to view the available performance information. As a collective group, the Competence Committee must decide, using the available evidence, whether they support or oppose the recommendation put forth by the Academic Advisor and their resident.
Each resident can be promoted to the next stage of training, continue to progress within the same stage of training, or be put on an enhanced learning plan (for remediation). According to one Competence Committee member, “The committee is there to monitor for bias and make sure that the recommendation is solid. We review some of the data, discuss it together, and make sure the data is good and that it supports the recommendation” [F9]. Following the Competence Committee meeting, the Program Director reviews each resident’s Personal Learning Plan and Competence Committee recommendation and sends a follow-up email to the resident confirming their high-stakes decision (i.e., progress, promotion, or remediation) and relaying next steps in learning.

Challenges and Opportunities to improve the Documentation, Use, and Flow of Performance Information (K*) within the System of Assessment

The documentation of performance information was described as the linchpin of the system of assessment. As one member of the Competence Committee explained: “No matter how you visualize the data, you can only use what you have. We need to start considering the mechanisms by which we improve the data that goes into the system so that we can make better decisions” [F9]. Several challenges and related suggestions were shared by faculty to improve the quality of data that is entered into the system, to close learning loops, and to make more accurate and reliable high-stakes summative assessment decisions about progress, promotion, and remediation.

Improving the documentation of performance assessments (i.e., system inputs).

The first suggestion was for the Competence Committee to give front line faculty assessors feedback on the quality of performance information they are documenting during workplace-based assessments. This would be in addition to the feedback provided by residents on faculty
evaluations. According to one frontline faculty, it would be important to know if the Competence Committee “didn’t find your comments useful, or could tell that you’re not doing direct observation, or would like for you to complete the assessment a little bit differently” [F8]. Faculty development in assessment was described by one participant as a “big piece missing” that would contribute to the system as a “whole” [F9]. This was noted despite well attended faculty development sessions pertaining to assessment, prior to implementation of the new system of programmatic assessment.

The second suggestion for improving data inputs was to designate dedicated assessors. Limiting the pool to those who have been identified as “good assessors” would help to “reduce the noise and increase signal”, according to one faculty member [F10]. According to another frontline faculty, this role would be ideal for “experienced faculty who are near retirement and phasing out of a lot of clinical shifts” [F6]. Another option would be to reduce Academic Advisors’ clinical loads and have them “on the ground consistently with a few residents over a longitudinal period of time” [F3]. As one faculty member explained, “what’s missing is an individual, longitudinal perspective to capture growth in residents’ performance” [F9]. Longitudinal exposure to residents’ performance would enable faculty members to “adequately figure out where residents are at and provide personalized feedback on where they need to go next” [F9].

**Closing learning loops.**

Academic Advisors noticed that no one is “closing the loop” [F11] with residents’ Personal Learning Plans (PLP). As one Academic Advisor explained, “Residents are coming up with learning goals, but we don’t ever circle back and see that they’ve done anything about them” [F11]. The perception that supervisors are not tracking or following through to help them reach
their personal learning goals may be why the upper year residents described their Personal Learning Plan as a ‘make work project’ [R5-R10]. This concern was echoed by another frontline faculty who stated, “I don’t see their Personal Learning Plans, so I don’t know what they are working on” [F6]. Academic Advisors recognized that moving forward, it will be important for them to ‘circle back’ and say “Okay, last time we talked about doing this and this. How did that go?” [F11].

**Faculty and resident development focused on sharing system insights.**

Academic Advisors and Competence Committee members recognized that having a central role in using residents’ performance information to make formative and summative decisions has shaped their ability to provide better workplace-based assessments (i.e., system inputs). Through reviewing residents’ performance information prior to Academic Advisor meetings, making a recommendation as to their progression, and then discussing the evidence supporting their recommendation with the Competence Committee, Academic Advisors/Competence Committee members perceived themselves to become more aware of what data they need to make defensible high-stakes assessment decisions. As one of the Competence Committee members explained, “I’m sure all the Academic Advisors do a better job of completing EPA assessments and giving focused feedback. When you know what you’re looking for on the back end [i.e., for decision-making], you do a better job on the front end” [F9]. Academic Advisors and Competence Committee members were in agreement that sharing their systems-level insights as to what evidence (performance information) is needed to guide residents’ ongoing learning and to make high-stakes progression decisions would make for valuable faculty and resident development sessions on how to improve the functioning of the system of assessment.
Discussion

The findings of this study offer important and novel insights into the implementation of CBME by representing the challenges associated with a model of programmatic assessment in action. Research describing how the components of an assessment system work together to achieve its intended aims will contribute understanding to the literature on programmatic assessment within the context of CBME, as well as the literature on approaches to competency-based assessment for wider CBE audiences. This study found that within a system of programmatic assessment, knowledge about postgraduate trainees’ performance was generated iteratively and longitudinally. Knowledge is produced through interactions between trainees and those who observe, assess, and document their performance during practice. Performance assessments are a product of a transaction between people, at a particular point in time, within a particular context, for a given purpose. The findings of this study highlight that when this knowledge is used by Academic Advisors and Competence Committee members, it is interpreted through the lens of those who will use the performance information for a different purpose (i.e., to co-regulate learning through the generation of Personal Learning plans and to make summative decisions about progress, promotion, or remediation) — which differs from the purpose in which the information was initially produced (i.e., to guide learning in the moment).

Brookhart (2001), Biggs (1998) and Black (1998) have written about the relationship between summative and formative assessment. They have argued that developmental models of education do not represent formative and summative assessment as being mutually exclusive. Summative assessment decisions, when criterion-referenced, can inform the needs of the learner. However, they do not discuss the challenges of using the aggregation of low-stakes (formative) assessments to inform high-stakes (summative) decisions. Gruppen et al. (2018, p. S19) have
argued that within a model of CBME, “the same assessment data can be used for either formative or summative judgments […] However, summative judgments and decisions generally require greater amounts of higher quality assessment data than do formative judgements.” What has yet to be discussed are issues surrounding how much high-quality data is needed for individual workplace-based assessments to remain ‘low-stakes’.

The ‘two communities’ metaphor (Caplan, 1979; Lomas, 2000; Wingens, 1990) was useful for explaining the tension between formative use of the data by residents, faculty, and Academic Advisors, and summative use of the data by the Competence Committee. Specifically, this study highlights the challenges that can arise when knowledge producers (i.e., frontline faculty assessors) and knowledge users (residents, Academic Advisors, and Competence Committee members) aren’t in direct communication about what information is useful and needed for decision-making by all users in the system. Prior research on assessment within CBME has focused separately on the challenges of workplace-based assessment and competence committee decision-making. For example, it is well known that what is documented in workplace-based assessments is limited by numerous factors, including (but not limited to): translation of qualitative performance observations into quantitative entrustment scores (e.g., Gingerich, Regehr & Eva, 2011); faculty capacity to provide/resident capacity to receive honest, constructive, criterion-referenced feedback regarding areas for improvement and next steps (Ramani et al., 2018); and time pressures to complete the assessment (Reddy et al., 2015). It is becoming increasingly well known that Competence Committees struggle with making group decisions about how information will be synthesized to inform fair decisions about advancement or remediation (Colbert, French, Herring & Dennefer, 2017; Hauer et al., 2015). This study serves to address a much needed gap in linking these two streams of medical education research
by exploring some of the challenges in the relationship between low-stakes and high-stakes uses of performance information within a system of assessment.

The findings of this study highlight that within CBME a system of programmatic assessment is more than the sum of its parts. For programmatic assessment to fulfill both formative and summative functions, each stakeholder would benefit from a systems perspective regarding how their assessment practices contribute to the greater whole. As a model, Figure 5.1 demonstrates how programmatic assessment acts like a ‘virtuous cycle,’ (Lomas, 2000) in which any weak link can influence the co-dependent cycles of knowledge production, documentation and use. Faculty supervisors have a critical role to play in co-regulating trainees’ learning in the moment and documenting performance information that can serve multiple users and purposes. An intermediary who has an important role to play in bridging cycles of knowledge production and use is the Academic Advisor, who co-regulates the ongoing collection and interpretation of resident performance information, as well as periodic high-stakes decisions by the Competence Committee (Rich, 2017). It is the Academic Advisors who directly see how performance information is being used to inform lower-stakes decisions about ongoing learning and higher-stakes decisions about progress, remediation or promotion. Therefore, Academic Advisors are in a privileged position to see how the parts of the assessment system contribute to the functioning of the whole and can identify what elements are (not) functioning as intended.
Figure 5.1. A model of programmatic assessment

Note. This model of programmatic assessment demonstrates a ‘virtuous cycle,’ (Lomas, 2000) in which any weak link (i.e., in assessment roles, structures, or processes) can influence the co-dependent cycles of knowledge (K*) production and use. Double-headed arrows depict interactions between program stakeholders and directional triangles depict the flow of knowledge/performance information. Even through the Program Director and CBME Lead are members of the Competence Committee in this model, they also oversee the program as a whole, including the system of programmatic assessment. Abbreviations. Personal Learning Plan (PLP), Electronic Portfolio (EP), and Academic Advisor (AA)

The key to fostering a well-functioning system of programmatic assessment is collaborative resident and faculty development considering the processes by which program stakeholders collaborate to produce and use performance information to guide learning and make high-stakes decisions about progress, promotion, and remediation. Considering the documentation of performance information in relation to how this information will be used to make decisions is critical. Assessment data/evidence of performance must serve the information needs of the intended users (Patton, 2012). Thus, it is important for the intended users (i.e.,
residents, Academic Advisors, and Competence Committee members) to provide ongoing feedback as to how the performance information being documented can better suit their needs.

Faculty development has been described as the “missing link” in operationalizing CBME and programmatic assessment (Gruppen et al., 2018; Holmboe et al., 2011). However, from a collaborative perspective, multi-stakeholder development is desperately needed. Collaborative multi-stakeholder development would include all those involved in operationalizing programmatic assessment: faculty; trainees; allied healthcare professionals; and program assistants. Drawing on evidence-based principles guiding collaborative approaches to evaluation practice (Shulha et al., 2016), collaborative multi-stakeholder development in programmatic assessment would attempt to: (1) clarify motivation for collaboration; (2) foster meaningful relationships; (3) develop a shared understanding of the system of assessment; (4) promote appropriate participatory processes; (5) monitor and respond to resource availability; (6) monitor assessment processes and quality; (7) promote evaluative thinking; and (8) follow through to realize use.

Implementing and sustaining a system of assessment, such as the one described in this program, requires substantive human and financial resources and buy-in from program stakeholders. Specifically, resources and supports are needed for faculty and resident development, dedicated Academic Advisors and Competence Committee members, a learning management software, as examples. Thus, assessment culture and feasibility need to be considered when making decisions about the extent to which a model like this would work in other CBME programs.
Limitations

This study has several limitations associated with boundaries. First, this case study offers an interpretation of a system of assessment being operationalized in one postgraduate training program in a single institution. Therefore, caution should be exercised when attempting to extrapolate findings across program contexts. Second, in an attempt to represent program stakeholders’ experiences with operationalizing programmatic assessment, the study is limited by both the size of our sample, as well as the accuracy of participants’ self-reports. However, triangulation of participants’ self-reported experiences with program documents enhanced credibility of the findings, as did member checking of researchers’ interpretations by study participants. Third, a single researcher collected and thematically analyzed all data. However, triangulation, collaborative interpretation of findings, and member checking enhanced reliability of the findings.

Conclusions

The reality is that lower-stakes decisions about residents’ ongoing learning and higher-stakes judgments about residents’ progression, promotion, or remediation are only as ‘solid’ (i.e., trustworthy) as the information (knowledge) upon which they are made. Medical educators interested in implementing, sustaining, or developmentally improving upon their system of programmatic assessment should consider collaborative approaches to addressing weak links between cycles of knowledge production and use. When assessment roles, structures, and processes of individual system components are understood in relation to how they contribute to the functioning of the system as a whole, the entire system’s efficiency and effectiveness can be improved. In applying systems theory and the ‘two communities’ metaphor, the findings of this
study highlight significant opportunities to improve the operationalization of programmatic assessment in practice.

**Supplementary Appendix – Key Terms**

**Academic Advisors:** Faculty members who are directly responsible for supervising and supporting trainees with their progression through residency training. This role involves meetings with assigned trainees at regular intervals to: (1) conduct summative reviews of performance information; and (2) review, discussion and facilitate the creation and implementation of personalized learning plans. This position is allotted academic protected time.

**CBME Lead:** A faculty member who, in collaboration with the Program Director, guides the transition and implementation process for competency-based medical education at the program level. This position is allotted academic protected time.

**Competence By Design (CBD):** “CBD is an initiative to implement an enhanced model for Competency-Based Medical Education in residency training and specialty practice in Canada (p. 4). […] CBD is a move away from credentialing physicians solely on the basis of time spent on rotations and activities in favour of ensuring achievement on the basis of attained milestones of competence (p. 12). […] The CBD initiative breaks down specialist education into a series of integrated stages, starting with transition to discipline and moving through [foundations of discipline, core of discipline, and transition to practice] (p. 12–13) (Frank, Snell & Sherbino, 2015).

**Competence Committee:** A designated group of faculty members who regularly meet to review trainees’ progress and make decisions about promotion and the need for enhanced learning plans, remediation and probation for those trainees whose progress has been flagged. The Competence
Committee is an independent decision-making sub-committee of the Residency Program Committee. This position is allotted academic protected time.

**Global entrustment scale:** “Rating scales used by supervising physicians to make entrustment decisions about the degree to which [s/he/they] trust the resident to complete the same skill/activity independently” (Gofton, Dudek, Barton, & Bhanji, 2017, p. 8).

**Longitudinal Periodic Performance Assessment:** “Assessment tools intended to document the consistency of resident performance across multiple performance domains for CBME cohorts; in effect, gathering performance information formerly collected with the In-Training-Evaluation-Reports (ITERs)” (McEwen et al., 2018)

**Milestones:** “CanMEDS Milestones illustrate the expected progression of competence from novice to mastery associated with each enabling competency. CanMEDS Milestones assist learners, curriculum designers, and clinical teachers to determine where a person is situated in their progress towards competence. These Milestones

**Narrative field note:** An assessment tool that is an open text form for supervisors and residents to document narrative feedback on a resident’s observed performance (i.e., strengths, areas for improvement, and next steps) (Gofton, Dudek, Barton, & Bhanji, 2017).

**Procedure form:** An assessment tool that is used to document a resident’s performance on specific technical procedures (or part of a procedure) in order to facilitate developmental feedback (Gofton, Dudek, Barton, & Bhanji, 2017).

**Stage-specific Entrustable Professional Activity (ssEPA):** “Tasks in a professional setting that may be delegated to a [resident] physician once competence in the task has been demonstrated. They incorporate multiple CanMEDS Milestones from various CanMEDS roles [and] allows for
authentic, work-based assessment that is targeted at the daily tasks of physicians” (Frank, Snell & Sherbibo, 2015, p. 28).

**Supervisor form:** An assessment tool that is used by a supervising physician to document a resident’s performance on a stage-specific Entrustable Professional Activity, using a global entrustment rating scale and open text box for narrative feedback (i.e., to document strengths, areas for improvement, and next steps) (Gofton, Dudek, Barton, & Bhanji, 2017).
Postscript to Study 2

The findings of Study 2 provide important guidance to competency-based professional education programs looking to use multiple low-stakes assessments to inform ongoing learning and decisions about learners’ achievement of entry-to-practice competence standards. In Study 2, the system of assessment was built on the assumption that each individual performance assessment provides limited information about a learner’s achievement of competence because of limitations in sampling (i.e., any one assessment can provide limited information about one performance, from one assessor, at one possible point in time, in a specific context). In order to confidently infer whether or not a professional candidate has met the standard of competence and can reliably perform across multiple contexts (i.e., transfer), a program needs to have access to multiple points of assessment to look for patterns in performance. This echoes Hager and Gonczi (1996, p. 16) who suggested that “the assessment of competence will inevitably be based on inference from a sample of performance.” The more representative the sample, the more accurate the inference.

For a system of assessment to effectively fulfill its intended formative and summative functions, I suggest that each stakeholder would benefit from a systems perspective regarding how their assessment responsibilities contribute to the functioning of the whole system. From the findings of Study 2, I found that an important intermediary who, by nature of their role, is privy to a systems perspective is the Academic Advisor. I found that Academic Advisors have a significant role to play in bridging and making sense of the flow of information between communities responsible for producing and using residents’ performance information (i.e., knowledge). In this system, it was the Academic Advisor who co-regulated the ongoing collection and interpretation of resident performance information, as well as periodic high-stakes
decisions by the Competence Committee. In other words, it is the Academic Advisor who directly saw how performance information was being used to inform lower-stakes decisions about ongoing learning and higher-stakes decisions about progress, remediation or promotion based on the achievement of competence standards.

Within this system of assessment, Academic Advisors were in a privileged position to see how the parts of the assessment system contributed to the functioning of the whole and could more easily identify which components were (not) functioning as intended. Thus they may be an important resource for leading educational development efforts to improve tensions within the system of assessment. For example, Academic Advisors may be able to provide specific guidance to faculty and learners who may not realize the unintended consequences of failing to document honest assessments of learners’ performance. Similar to the findings of Curry and Docherty (2017), this study would suggest that considerable financial and human resources are needed to support all assessment stakeholders (i.e., learners, faculty supervisors/assessors, academic advisors, competence committee members, program leadership) in understanding how their combined efforts contribute to the functioning of a system of assessment, which aims to serve multiple purposes (i.e., formative, summative, and program development).

However, the reality is that not all professional programs are ‘competency-based’, entirely workplace-based, or have the resources to implement a model of programmatic assessment similar to the one described in Study 2. I make a distinction between programs that are informed by a competence framework and those that self-proclaim to be competency-based. Where competency-informed programs may demonstrate alignment to their competence framework in order to comply with professional accreditation standards, competency-based programs include all of the following elements: (1) competencies embedded in the curriculum, (2) robust formative
and summative assessment, (3) recognition of prior learning, (4) variable timelines to achieve fixed outcomes, and (5) a credential signifying achievement of a minimum standard of competence (Pichette & Watkins, 2018). Given that assessment is the means through which programs monitor learners’ progress and make decisions about the achievement of competence, one would expect competency-based programs to have a more robust system of assessment than competency-informed programs.
Preface to Study 3

Study 2 focused on exploring, in depth, the challenges associated with one competency-based program’s system of assessment. The aim of Study 3 was to compare and contrast this model from Study 2 with how other professional programs are approaching the development and assessment of competence, given their own conceptualization of competence, entry-to-practice framework, and program context (i.e., pathway to licensure, focus on workplace-based learning, program resources). From the published literature, it was unclear as to how programs from other disciplines compare in their approaches to operationalization and whether or not they are experiencing similar assessment challenges.

The same medium-sized Canadian institution was purposefully selected as the case in which to conduct Study 3 for two reasons: (1) to control for institution-wide assessment and evaluation policies and initiatives, and (2) to illustrate what could be considered as ‘typical’ approaches being used by professional programs at an average-sized Canadian university. When inviting educational leadership from professional programs to participate, it was important to include representation from ‘competency-based’ and competency-informed programs. It was also important to recruit participants from disciplines that represent competence as being an integrated system and from disciplines that represent competence as being the summation of component parts (using the results from Study 1).

Like Study 1, Study 3 was written for a diverse audience, which includes all leadership involved in influencing professional education policy and practice at different systems levels across professional disciplines (e.g., members of professional accrediting bodies, higher education quality councils, schools of graduate and professional studies, institutional centres for teaching and learning, embedded teaching and learning units within professional programs,
decanal program leadership, and program faculty). In order to provide context for each professional program included in my sample, I have written case descriptions. These case descriptions explain how each program conceptualizes competence, operationalizes the development and assessment of competence, and describes challenges associated with their current approach. Given that these data provide important background information, but cannot be included in the manuscript, I have decided to include a data chapter as a prelude to Study 3. In the future, these data can be used as a springboard for writing tailored manuscripts targeted to discipline specific educational journals (e.g., *The International Journal of Engineering Education, Nurse Education in Practice, Journal of Legal Education*). Prospective interdisciplinary journals for Study 3 include *Assessment and Evaluation in Higher Education, Educational Assessment, Evaluation and Accountability*, or the *Canadian Journal of Higher Education*. These journals are aimed at higher education practitioners and policy makers, irrespective of discipline.
Chapter 6

Data Chapter Informing Study 3

This data chapter contains narrative case descriptions for nine professional education programs at one medium sized Canadian University. Within each program, I applied a template approach (Crabtree & Miller, 1999) to look for patterns emerging across participants’ interviews with regards to how they perceived their program to: (1) conceptualize competence, (2) operationalize the development of competence, (3) operationalize the assessment of competence, and (4) problematize the assessment of competence. This template of categories served to organize the data within a case for subsequent inductive analysis.

Following a close-reading of all interview transcripts within a case (i.e., program), a focused coding approach (Glaser, 1978) was used to assign meaning (a label) to segments of data (i.e., more than one word or line of text). In comparing and contrasting the focused codes emerging within a category (i.e., 1-4 above), I was able to identify themes (i.e., shared ideas) in the data. These central ideas have been described in the case descriptions. Each case description follows the same template, describing the themes for 1-4 in the same order. Wherever possible, the goal was to keep the central ideas “close to the data” (Charmaz, 2006, p. 59) by using direct quotes from participants (i.e., using the language of participants) when writing the case descriptions. This is important given that the case descriptions are the data for subsequent analysis in Study 3.

In an effort to de-identify participants’ gender, I have decided not use pseudonyms. Instead, I refer to participants by the order in which they were interviewed. For example, the third participant interviewed is cited as P3. Interview 4 was a group interview with two
participants: A and B (P4A and P4B). Case descriptions are listed in alphabetic order by program discipline.

**Business (BCom, and Master’s degree programs, e.g., MBA)**

According to the research participants from this program, competence is conceptualized—across business programs at the undergraduate and graduate levels—as the “knowledge and skills” (P9, P14A) that people need to “do the work they are required to do” “across multiple situations” (P14A), and to be “prepared for their career” (P9): “So if someone wants a career in finance, for example, you need to be able to do these things” (P9). The business market is thought to be the major driving force dictating the competencies students need to develop at various points in their career. Therefore, a focus of the business school programming is “to also support corporations and students as they come back to us and say, ‘I need education around this.’ So that’s why we have our not for credit executive education wing which delivers one week of content on the new hot topics” (P9).

Participants explained that unlike other professional programs, “business is probably the only profession that you don’t necessarily need to have gone to school for” (P14A) or have obtained a degree to practice. Business is not a licensed profession. However, participants explained that their programs still undergo professional accreditation in order to obtain “seals of approval” in other provinces and international jurisdictions:

It's pretty much table stakes in our world of business education, that's what students and businesses look for, that seal of approval. […] And then we also have accreditations that are every five years in specific other provinces and countries like China, nine states in the US and four countries in South America […] We have to come in under their rules (P9).
Given that professional accreditation is not mandatory, participants explained that there are “no required competencies in the world of business that are dictated” (P9). That said, in order to meet standards for quality assurance, they still have to be explicit in documenting and mapping assessments and course learning objectives to program and degree-level expectations (P9, P14A, P14B). There was a shared sentiment that curriculum mapping and constructive alignment were “mind-numbing and hair pulling” processes (P14A), which “they have been doing in business education for decades” (P9). It was thought that the only difference now was that “they are applying a terminology to it” (P9): “So we didn't know we had performance-based competencies. We were just doing this because it was the thing to do. So a lot of [this process] is a bit of validation or affirmation of what we've always been doing” (P9).

According to these participants, students develop the ability to “think strategically, communicate effectively, present ideas in a coherent and logical manner, work effectively as a team member and be an effective leader” (P9) by successfully completing a set of required courses that are driven by market demand. As one participant explained, “If employers come to us and say, ‘it’s great you have those courses but we don’t care’, we’ll pull the course […] and redevelop” (P9). It was explained that across programs, successful program completion meant that students must obtain a grade of B (78%) or greater “with the exception of one or two courses” (P9, P14B): “For our accreditation, we basically need to have 80% of the students achieving 78% or higher, and if we don't, we have to have a plan in place to up that” (P14A). According to participants, this plan often involves offering students “pre-program boot camps”, “coaches that work with student teams on issues of non-academic performance”, and “team tutors or faculty support” for targeted student remediation (P9). Given that students are paying up to $100,000 for their degree, “they are very vocal as to when they come up against a course
that’s not going well […] We’ll get them tutors, spend extra time with the faculty members and do what we can to get them through the program” (P9).

The assessment of competence begins with admissions: “We’re not going to graduate someone that's not going to meet our standards […] we’re going to do really good job at the entrance level. Our retention rate for almost all programs is 90% or more” (P9). At the undergraduate level, the admissions process involves meeting an academic cut-score and multi-rater assessment of each candidates’ written Personal Statement of Experience. At the graduate level, applicants are assigned an admissions officer who ensures “they have all the required documents and they meet all the minimum standards coming in. And then every student has a personal interview with program leadership to ascertain their fit and qualifications for the program […] and then the decision is made as to whether or not to admit based on that information” (P9).

Besides being very sure about who they let into their programs, and providing multiple remediation efforts, the participants explained they “will not put candidates out on the market who do not meet the minimum requirements” (P9). Across programs, it was thought that “the methodologies for assessment vary from course to course based on the desires of the faculty member and the suitability of assessment for a particular topic. So it's anywhere from cases, memos, presentations, capstone projects, mid-term exams, final exams. That’s pretty much it” (P9). Faculty hold control over the types of assessment used within individual courses. “With academic freedom, we cannot dictate how they must do this” (P9). That said, it was thought that most topics within courses lend themselves to authentic case studies “of scenarios they will come up against in their organizations moving forward” (P9). The case studies require students to work as a team and engage in “peer-to-peer learning” to figure out “what are the important facts
and what are the red herrings or shiny thing off in the distance” and to prepare “narratives in the form of written memos and oral presentations” (P9). Even though the quality and amount of feedback that students receive on their exams and assignments was described as being very faculty dependent (P9, P14A, P14B), participants did not perceive there to be a challenge with winning academic appeals. This is because any faculty or program level concerns about students are thought to be “well-documented” by multiple people involved, starting with faculty members and team coaches, and moving up to the Dean’s Office, if necessary (e.g., if there was a Departure from Academic Integrity).

Participants agreed that while it’s “easy to know if you’re competent or not in quantitative tasks, like crunching the numbers […] it’s harder to assess whether qualitative skills, like leadership or critical thinking, are transferrable across contexts” (P14A). These qualitative skills were thought to be challenging to assess for three reasons. First, these skills are often developed and assessed through team-tasks and accreditation requirements state that “we have to be able to say that every student can do this” (P9). Second, because students often have choice in the case they pursue, and their approach to the case, grading becomes more subjective without rubrics and rater training. Third, because of academic freedom and limited time, faculty are hesitant to seek help in developing rubrics and other assessment tools or methods. According participants, it is not an uncommon response for faculty to say, “I know what an A paper is. I don’t need to give you a rubric” (P9, P14A). This has led to accreditation requirements being used as a stick for ongoing and targeted faculty development efforts. As one participant explained, “the approach we take with faculty is to say, ‘let’s take what you’re doing right now and make it more efficient’ by using technology to support the processes of grading and reporting” (P14A).
Clinical Psychology (MSc and PhD C. Psych)

Within this clinical psychology program, competence is conceptualized as a collection of foundational research and practice ‘skills’ that are needed to work with different age groups and populations. According to one of the participants, “there’s several different skills that are considered competencies to be a psychologist: Assessment, consultation, intervention, research, supervision, ethical practice, and integrity in relationships” (P19). As the other participant described, it is the integration of clinician and research scientist skills that make someone competent:

That hyphen of clinician-scientist is really one that tries to help our students understand how to use their clinical skills through the science of human behaviour and the science of practicing psychology. And the research and science that we do, is informed by the clinical experiences and work that we have with our patients (P18).

Students are thought to be aware of the “core competency domains they are to be developing skills in” (P19) through exposure to the clinical program website, program manual, course syllabi, and practicum assessments. As one participant explained, “We just had a review of all of our graduate classes [for accreditation] to make sure that our core competencies are covered and our learning objectives are clearly stated. […] We did a syllabus review of all of our classes, so each part of the assessment is mapped to a core competency” (P18). Whereas didactic instruction is the main mode of delivery for both theoretical (i.e., statistics, ethics, etc.) and applied courses (e.g., assessment courses, therapy courses), dialogic case review was perceived to be the approach to developing competencies during the six, four-month practicum placements. According to one of the participants, students can struggle with “breaking away from traditional
ways of learning and studying for exams” when figuring out how to learn as an “apprentice” on practicum (P18). For some, this “shift in mindset and learning skills” presents a challenge for developing the suite of skills through workplace-integrated learning opportunities.

Competence is assessed through graded course assessments (e.g., multiple choice tests, essays, observations of clinical skills, oral presentations, etc.), defense of an empirical master’s thesis, six pass/fail practicum assessments, two comprehensive exams (one written research paper, and one oral case presentation), one pass/fail year-long internship and defense of an empirical doctoral dissertation. Practicum and internship assessments require clinical supervisors to complete a standardized form at mid-term and end-of-term, which “covers a number of core clinical competencies that we need to see students develop” (P18). For each core competency, students are assessed on the scale “needs improvement to novice, intermediate, advanced, and ready for autonomous practice” using “three to five behavioural anchors for each skill level” and provided with written comments (P19). With each subsequent practicum, students are expected to “take on cases that are more complex, starting with assessment, then doing some treatment, and then perhaps some program evaluation or administrative skills” (P18). When performance concerns are identified at mid-term they are flagged by the Practicum Coordinator and discussed with the supervisor and student. If needed, a remedial plan is established in consultation with the Director of Clinical Training. Once a year, the Director of Clinical Training reviews each student’s final practicum assessments and “assessment of competency in research and science” (P18) completed by the faculty supervisor to generate an annual evaluation report for the Graduate Coordinator in Psychology and School of Graduate Studies.

Normally, the first written comprehensive task (Comp 1) is completed at the start of students’ second year of the PhD program and the second oral comprehensive exam (Comp 2) is
defended before they start the third year of the PhD program. For Comp 1, students are required to write an empirical paper of publishable quality on a topic that is separate from their PhD research. Options include collecting and analyzing their own data, analyzing data collected by another lab, or conducting a systematic review or meta-analysis. For Comp 2, candidates are “presented with a clinical case and given thirty to sixty minutes to prepare how they would approach assessment, intervention, and ethical dilemmas, using a theoretical framework. They are then given an hour to present their case to a committee of four or five people who evaluate it” (P19). The evaluators include the director of the clinical program, two core faculty members, and two practicum supervisors from the community. Candidates are evaluated on the process through which they “identify key elements of the case”, “approach the differential diagnosis” and identify and discuss relevant “contextual constraints” (P18).

Successful completion of the program requires students to pass all of their required courses, practicums, internship, comprehensive exams, and theses defenses. Following program completion, graduates must complete one year of supervised, semi-autonomous practice, and pass a “breadth of psychology” (P18) knowledge-based multiple choice exam, an ethics exam, and an oral case exam in order to be licensed by the College of Psychologists of Ontario.

With competence being conceptualized as the ability to integrate scientific research and clinical skills, one participant explained that it can be difficult to evaluate student progress based on separate assessments of “how scientific you are being in your practice and how clinical you are being in your research” (P18). It was perceived that greater weight was given to assessments of research skills because, as a program, “we are much more research- or science-minded than we are clinically minded” given faculty members’ focus on research at the university. As one participant explained, “It can be a challenge to give weight to how much value you place on any
one student’s progress and achievements as a function of their research and clinical practice” (P18).

Participants agreed that with regards to individual assessments, there is a hesitation by faculty and clinical supervisors to document honest, constructive feedback—especially for professional skills—for several reasons. First, it can be challenging to provide honest feedback to students who aren’t receptive. Some students “don’t communicate an openness to learning and present themselves as knowing what they think they need to know” (P19). Similarly, as the other participant explained, “it is often received as an insult on the person’s character—who they are, or their personality—if they struggle to interact socially with others, for example” (P18). For students who aren’t receptive to feedback, there is a tendency to “blame the person giving the feedback” (P19) for having an issue with the student. Second, it was thought that faculty are hesitant to document honest feedback because they want to give learners the benefit of the doubt. Assessors don’t know how the information will be used to inform high-stakes decision-making and they don’t want the information to have unintended negative consequences for the student. As one participant explained there’s a tendency on the part of assessors to not want to “rock the boat”:

Recognizing that there’s individual difference in how long it takes people to learn things, or where their starting point is. I think people are generally uncomfortable with giving bad news. I think that’s a big part of it. I think if somebody progresses further, then it becomes even more uncomfortable, ‘well nobody else has raised any concerns—that I actually know of—so I shouldn’t rock the boat. I’ll just continue on’. I think people perceive documentation as taking a lot of time and
potentially the person might argue with that documentation and that’s stressful, so it’s easier to not do anything (P19).

While it may be easier to not ‘rock the boat’, it was thought that the decision to “let the graduate go off and say, ‘I was trained by so and so’ would make the supervisor/ assessor feel very uncomfortable” (P19).

Participants explained that making accurate and reliable high-stakes decisions about progress, promotion, remediation and academic appeal becomes challenging when people are uncomfortable with documenting when students are struggling and there are no formal opportunities to share and discuss students’ performance as a group. Participants agreed that there would be a panic and struggle to collect sufficient documentation to support an academic appeal. According to one participant, people only come together to collect evidence “at times of crisis, when people are like, ‘what’s going on? This student is really not doing well! What do we do?’ And then it’s like, ‘oh yeah, I noticed that, too, I just didn’t say anything. I noticed that, too, but that was two years ago and I thought that would sort itself out’” (P19). It’s usually closer to the end of a student’s program “when the expectations increase and it becomes more obvious that they’re not meeting them” (P19). Without sufficient evidence of repeatedly failed remediation efforts collected over time, it was thought to be challenging to effectively counsel students out of the program or win an academic appeal.

**Engineering (BASc)**

Engineering program participants conceptualized competence as “a combination of technical and professional knowledge and skills” (P11). Whereas technical components include “declarative knowledge, as well as procedural problem-solving, investigation, and design skills” (P3), professional abilities “are what enable you to function effectively in an engineering
workplace” (P11). The standard of competence required for entry-to-practice was described as a graduate having the technical and professional abilities to “work with people who are practicing engineers” and “be useful in engineering practice contexts” (P11). Participants explained that according to their pathway to licensure, engineering graduates “don’t come out of our programs ready to practice independently”. While graduates are expected to graduate with “a knowledge-based profile that they can apply in novel situations to tackle open-ended, complex problems” (P1), they are not yet ready “to make complex decisions without a licensed engineer looking over their shoulder” (P11). As one participant explained, “our pathway to licensure relies on the fact that you go and get a recognized degree in engineering and then you get an appropriate amount of work experience and write an ethics exam and then you are then deemed competent.” (P1)

Entry-to-practice competence is thought to be developed through successful completion of a set of required courses, each with learning outcomes that have been mapped to the 12 Graduate Attributes (Engineers Canada, 2016). As one participant explained, “on the first day of orientation, we say that the goal is to ensure that you graduate with these 12 Attributes. We tell them to the students. And in the course syllabi, we talk about how the course contributes to developing those attributes. And in many cases, we will actually talk about which indicators we focus on” (P3). However, participants agreed that there is “variation in the degree to which instructors are conscious of and deliberately developing the attributes” (P3). As one participant explained, “some faculty don’t see that as their role and consequently pay lip service to the idea of the Graduate Attributes that are outside of the technical sphere” (P11). Since faculty are hired and rewarded for their research grants and contributions, it was thought that some may have limited knowledge of the abilities that are needed in professional practice contexts.
Consequently, it becomes challenging for these faculty to design authentic, rich performance tasks for students to practice developing competencies in concert. While it is possible to offer engineering students work-integrated learning opportunities (i.e., co-op placements and internships), participants explained that government policy “can restrict the kinds of programs you can run and make attractive to employers” (P11).

Indicators for specific Graduate Attributes are mapped to components of assessment tasks within each engineering course. Effort is made to align the type of assessment task to the Graduate Attribute. As one participant explained:

We recommend that instructors think carefully about an efficient and effective way of measuring each indicator. If we are trying to assess oral communication, you are not using an exam for that, you are using an oral presentation. If you are trying to measure design skill, you are probably measuring it on a design project. What we try to do is have the students demonstrate competence in an activity that as well as possible emulates professional practice. So many of our professional skills are measured in the context of a design project, or a complex problem, open-ended client-based problem. Many of the knowledge-based things would be assessed in traditional final exams. (P3)

Across participants, the most commonly cited assessment tasks include knowledge-based exams, oral presentations, written design reports, and written lab reports. It was explained that competence for entry-to-practice is assumed when students pass all of their required courses and meet the minimum Grade Point Average for graduation.

Participants identified several limitations of their current approach to ‘measuring’ competence indicators in isolation. As one participant explained, “measuring their
communication skills here, their design skills over here, and their knowledge over there, doesn’t involve putting students in an authentic context where they are asked to demonstrate the range of skills required to be a competent engineer” (P3). The challenge is “tearing down the old silos to say, ‘great, how do we use these [attributes] in concert” (P1) and then designing authentic performance tasks that assess students’ ability to integrate attributes to solve ill-defined, complex problems.

For now, participants explained that the program is focusing on improving the validity and reliability of specific tools to assess indicators associated with a given Graduate Attribute. There is currently “a lot of noise in the data” (P3), and even though faculty have been encouraged to “add assessments in order to measure a given indicator multiple times” (P3), participants perceived “confidence in the data to be limited” (P11). For this reason, the program is reluctant to aggregate assessment data to make high-stakes decisions about students’ achievement of competence for entry-to-practice. As one participant explained:

Preventing a student from graduating when the data is fairly noisy would be quite problematic. […] So the approach that we’ve taken, which is based on what the accreditation board has set, is that we are using performance indicators as a way to identify program quality, recognizing that it will take us quite a few years before we get to any kind of reliable and valid measures of students’ learning in the program (P3).

Currently, student level data is still “distilled down to single mark per course” (P11). According to one participant, “there's no information on the transcript that allows us to know how well they've performed on those individual aspects. […] So even if a student walked into my office and wanted my advice on their development on the various attributes, I don't have access to that
Participants were aware that restrictions in the reporting and sharing student performance information limits their ability to coach students’ development of competence for entry-to-practice.

**Law (JD)**

Participants from this Juris Doctor (JD) program agreed that even though the Federation of Law Societies of Canada (2018) has a competence framework for legal education, competence “is not a term that lawyers use”. As one participant explained, “I don’t think the legal profession would define competence. […] They’re not going to understand what those terms are” (P10). According to the other participant, “Competence doesn't hold that same meaning in the legal profession. Why? I don't know. But to me, competence signals barely getting by […] A shade shy of being disbarred is a competent lawyer” (P17). It was thought that if you had to identify the skill that is essential to being a lawyer, it’s “legal analysis” or the ability to “think like a lawyer”: “distilling the principle from case law to figure out how it applies to a new set of facts in a different context” (P17). In differentiating incompetence from competence, one participant explained, an incompetent lawyer would see and apply the law as “black and white,” whereas an competent lawyer would take the time to “ask the right questions and think outside the box” (P17). It was thought that society is increasingly expecting “a higher standard of practice” from lawyers, in that they are also “have cultural competency, the ability to speak in plain language, and the ability to communicate complex legal ideas in ways that people can understand them” (P10).

In discussing the standard for entry-to-practice, participants made a clear distinction between being “ready to practice” and being “licensed to practice” (P10). Even though the JD program is considered to be a professional program within a professional school, participants
agreed that students are not ready to practice by the time they graduate. Participants explained that there is “still a huge learning curve afterwards” (P10) that happens in the required articling period and the first few years in practice. This is because JD programs not set up to be a “technical training ground for lawyers”:

We’re not set up for that. We’re scholars. So how do you bill a client or send a letter? That is not what we’re doing here. We’re using the law to help train legal professionals to […] do the mental gymnastics to step back and go, ‘where would I find information to help people with that question, and how would I use it, and how would I pitch it?’ (P17)

According to participants, this distinction between being ready and licensed to practice is associated with tensions between students, law schools, and lawyers who “don’t see eye to eye” on the purpose of law school. Whereas students and employers think students “are going to learn how to fill out legal forms,” law schools think that students “should know what the law is and how to use it, first” (P17). Even within a law school, participants perceived faculty to have different aims for law school: “Whereas some think their job is to open up the law as an area of academic enquiry and thought training […] others will say their job is to impart a sense of using the law for social justice […]. Yet others will say their job is to help students to use legal materials to navigate results for a client […] and a small minority will think that it’s a training ground for lawyers who will practice law”. With so many different aims, participants perceived it to be difficult to “fit a standard set of competencies over that kind of thinking” (P17).

Participants perceived the Federation’s decisions to implement a competence framework as a national requirement for JD programs to be a response to determining substantial equivalency for foreign trained lawyers and a “window dressing” (P17) for a common curriculum across
Canadian law schools. As one participant explained, there has always been an unspoken list of “courses we think every law student should take” […] what they’ve done is simply describe courses without using the course name […] ‘let's not call it the course name but let's talk about the things you would do which everybody knows - wink, wink - is that course’” (P17).

Consequently, there was little change at the program level because “it's just saying the same set of courses and curriculum we've always done […] So when this came out we just went ‘Check, check, check, check, check, check everything's fine’. […] literally nothing changed pre or post at this institution” (P17).

Within this JD program, students are thought to “learn how to flip arguments, deal with legal materials, and conduct research” through a curriculum organized around subject matter and theoretical knowledge. As one participant explained, courses organized around areas of legal practice are “the substrate” for developing students’ capacity to approach “big problems” and “think like a lawyer”. Even though a course outline might say, “you’re going to learn criminal law […] what you’re really learning is how to use those concepts to help your future client […] it’s not about what the rules are because the law’s not static” (P17). Participants agreed that dominant approach to teaching in their program is lecturing combined with Socratic questioning, in which faculty will “talk for hours” and “ask questions, bouncing from person to person” (P17). However, participants explained that there is one exception in their program, and that’s clinical legal education courses where law students “have the chance to meet real clients under the supervision of clinical lawyers and work on real things and apply what they’ve learned in law school to real people’s problems” (P17). In these instances, students are thought to be “learning actual competencies” by “doing the actual job they’re going to do” (P17). Nevertheless, it is
possible for some students “go all the way through law school and never step into a courtroom, never hear a client’s problem, nothing” (P10) because these clinical courses are electives. It was thought that faculty shy away from integrating simulated workplace learning opportunities in their on-campus courses because a large percentage of them have never practiced law and are “pure academics” (P17). Therefore, their comfort level is “being legal scholars” and “teaching the way they were taught” (P10). Yet, it was thought that “there might be one student a year who doesn’t go into professional practice. How’s that for a mismatch?” (P17). According to one of the participants, if faculty could get past “thinking it’s dirty in a law school to talk about the practice of law, we’d quickly learn that there’s remarkable windows of cooperation of legal practice and legal scholarship that we could exploit for learners’ sake” (P17).

Participants explained that in order for students to graduate with their JD degree—prior to taking the Bar Admissions Exams (barrister and solicitors) and completing their one-year articling period—they must successfully pass all of their required courses. Within courses, open-book final exams count for a significant portion of students’ final grade. As one participant explained, “For 150 years in the common-law world, the standard method of assessment for law schools in Canada and the US has been the one-hundred percent final exam […] You want to talk about competency, that's the sole measure. You get an A with no description as to why, or a D, and you go on with your life” (P17). Faculty are thought to rationalize and defend this approach in legal education for two reasons. First, because the skill of legal analysis takes time to develop over the course of a semester, any assessments leading up to this point are thought to not be representative of students’ ability at the end of the term. Second, the high-stakes nature of preparing for a heavily weighted final exam is thought to be “the closest corollary we’ve got to preparing for a trial or hearing. You might prepare eight months for being on your feet for three
hours of the Supreme Court of Canada. You’ve got to get used to that kind of heat and getting your ducks in order and being organized and finding the materials you've got” (P17). That said, participants explained that faculty are increasingly being encouraged to also include grades for participation and scaffolded practice reasoning assignments into their assessment plans “to give students little bits of feedback” (P17). As one participant explained, “if students don’t participate and practice their learning will not progress” (P17).

According to participants, final exams and graded course assignments take the form of a written response to a “fact pattern”, in which students must “explain how the law relates to that set of facts and advise their client or tell me how the court will rule on a case” (P17). Similar to what is done in Bar Exams, some faculty have started using multiple choice assessments to “test the skill of taking legal materials and predicting what’s going to happen in a scenario with a new set of facts” (P17). Developing multiple choice questions that require students to make decisions “in those shades of grey” was thought to be very time consuming and expensive. However, these assessments were perceived to provide a “truer measure” of legal analysis in that “the students’ writing isn’t getting in the way” (P17).

Participants identified two major challenges with assessment in their program: human capital and the capacity to change. They thought that faculty are reluctant to invest their time in developing and grading formative assessments or designing multiple choice items that deviate from fact-pattern, 100% finals. It was thought that part of this has to do with workload, and the other part has to do with “looking beyond the mirror” (P10). As one participant explained, “the law school is trying to introduce multiple forms of assessment. But you can imagine that every time you do that it doubles the workload of the faculty member” (P17). Also, when trying to find approaches to addressing these demands, participants thought that law faculty tend “to ask other
lawyers” (P10) who have been educated the same way, instead of looking outside to see what other professional programs are doing.

Nursing (BScN)

Within this undergraduate nursing program, participants conceptualized competence as “the knowledge, skills, and abilities to do the work that is needed to care for patients every day” (P2). Whereas knowledge was thought to include “the understanding of disease entities—right down to the cellular level—and drug interactions” skills were described as “critical thinking, decision-making, prioritizing, knowing when to consult with somebody else or if you need to inform your manager that your workload is too much for the day” (P2). Abilities were depicted as what enables a nurse “to do the skills”; referring to “cognitive ability” and “physical skills to start an intravenous pump,” (P2) for example. Participants described communication skills and professional judgment as being equally as important as technical skills. As one participant explained, “how you talk to a 40-year-old professional is different than how you talk to an 88-year-old who is a little cognitively impaired, and again very different from how you approach a child whom you are about to give a needle to. It’s very different. But I would say that it does fall under that umbrella of knowledge, skills, and abilities” (P2).

Participants perceived competencies, as written by the regulatory bodies, to be “hard to deal with” because they are “action based” and “minimum standards” for care (P7). They explained that in integrating theory- and practice-focused courses each year, their program aims “not to teach to the national regulatory exam,” but to “educate at a high standard to meet the healthcare needs of Canadians” (P7). However, there are negative outcomes for both students and the program if they don’t pass the national exam. Participants explained that students can’t become licensed until they “pass all of their required courses and then pass the licensing exam”
Similarly, the program can be put on probation “if our first-time pass rate falls below a certain level” (P2). For this reason, the national exam was thought to be “high stakes” for both students and the program. For accreditation, participants explained that they must also document “for every single competency, that each one is taught in at least three different places in the curriculum, where they are taught, how we evaluate them, and what the course is about” (P2). In reflecting on the time that goes into curriculum mapping for accreditation, both participants described the process as a “cumbersome” and “overkill” “make work project” that takes time away from faculty or program development.

Participants perceived students to develop competence through an intentionally sequenced curriculum, which includes a combination of theory, lab, and clinical courses. In theoretical courses, students are thought to focus on learning the philosophy of nursing, for example. Whereas in clinical labs, students are given opportunities to practice their patient assessment and communication skills in a non-therapeutic/simulated setting before they begin clinical placements in hospital and community care environments. Participants explained that while some of the more authentic assignments in theory-oriented courses can help students to practice applying their knowledge (e.g., nursing care plans), clinical courses were described as “gold star” (P7) learning opportunities. This is because students are given responsibility for applying their critical thinking in caring for real patients. For example, if a student were to “make an error, such as a medication error, they then have to fill out an incident report […] and they have to learn to take responsibility for the consequences of whatever the error is” (P2).

Participants perceived clinical instructors to have an important responsibility for role modeling professionalism and developing students’ skills in critical thinking through dialogic questioning and getting students to articulate their clinical decision-making. When students don’t
meet the learning objectives of their clinical placements in second year, they “go into remedial with a different clinical teacher” (P2) and “are offered extra clinical days” (P7) and “an official learning plan” to “see if we can help them overcome whatever it is that they’re not yet doing” (P2) to pass the course. Learning plans “identify areas that the student really needs to work on and provides them with key resources” (P2). When students “demonstrate that they are doing really well” they are thought to be “given more complex patients to look after, and clinical teachers are much more hands off with them” (P2).

In order to successfully complete this undergraduate nursing program and qualify to write the national exam, students must pass each of the required courses. For students who fail courses and have to retake them, this may extend the length of their program to five years. Participants explained that with the number of students in each cohort year, it is possible to know and “remember in your head” (P2) the students who have struggled and who you want to keep tabs on. It was thought that students are given “daily feedback” from clinical instructors and “weekly evaluations” as to whether they have “‘partially met’, ‘met’, or ‘not met’ the required competencies” through assessments completed as part of their clinical courses. These assessments include direct observation by clinical instructors, chart reviews, as well as the collection of multi-source feedback from staff nurses. Students are also expected to self-appraise their performance by reflecting on their written feedback and explaining how they are addressing areas for improvement. According to one of the participants, “clear documentation” (P2) is needed to help students to be aware of performance and learning progress and to support the faculty in any potential academic appeals.

According to the participants, factors related to the nature of competence, students themselves, and program resources make competence challenging to assess. Given that nursing
graduates can care for multiple populations in varied subspecialties and care environments, participants thought that it is “hard to know that students have the knowledge, skills, and abilities they need for every setting” or “the personality” (P2) to cope with the workplace environment(s) they may choose to work in one day. Participants agreed that “what people tend to call the soft skills” or “the art of nursing” is more difficult to measure” (P7). As one participant explained, take communication skills for example: “You might be able to say to a student ‘maybe you could have tried this when you spoke to the person,’ but this doesn’t mean the student was necessarily wrong […] There are often multiple ways to interact in certain situations” (P7). According to the other participant, noticing and communicating when “there’s something that’s not quite right” (P2) with a students’ intrinsic competencies (i.e., their communication skills, or professionalism) can be challenging news to break to students who “have never failed at anything and have always been told that they are very clever and very good” (P2).

For the students who lack insight and self-awareness as to their inability to “deal with uncertainty”, “make decisions for themselves”, conduct themselves in a professional manner, the challenge becomes finding ways to effectively “counsel them out of the program” or ensuring the program has enough documented evidence to win an academic appeal (P2). Participants explained that while they try to provide students with opportunities for remediation, the reality is that they are “restricted in the amount of time and places we can be in any clinical placement” and restricted in the clinical instructors we have “role modeling” and assessing students’ competence. When instructors don’t demonstrate the expected competence standards, participants explained that it becomes challenging to hold students to the same expectations.
Occupational Therapy (MSc OT)

Within this Occupational Therapy program, participants conceptualized competence as “having the knowledge, skills, and attitudes that enable skilled performance as a practitioner” who “enables peoples’ occupation” (P5). As one participant explained, even though competence in Occupational Therapy is “artificially broken down” and represented as roles, it is really multifactorial: “it is based on attitudes, like the way people view the world and themselves in it; it’s based on knowledge; it’s based on skills; and it’s also based on having the ability to sustain or continue learning over and over again” (P12).

According to both participants, central to competence—from a licensure and regulatory perspective—is “a commitment to practice; being able to be a reflective practitioner so that you are critically thinking through, ‘Do I actually have the skills to do this with somebody and to work with this type of problem?’” This requirement for self-regulated learning supports the vision of competence as being the “minimal level of awareness one needs to do no harm” to clients (P12). As one participant explained, the pathway to licensure for Occupational Therapists is predicated on the expectation for capacity to self-regulate learning:

And in fact, the way our regulatory college works is that they will give everybody their credentials at basic levels, saying that you are an entry level practitioner, and that’s just based on the fact that we, the school, have said that yes, they have completed all of their requirements and have met the entry level requirements for practice. And then they pass an exam—a national certification exam—and the college then says, ‘ok, you are good to go’. As long as you don’t have any legal infringements or that sort of thing. And then once they have given them that blanket entry, it’s really up to the therapists themselves to self-regulate (P5).
Within this Occupational Therapy program, students are thought to develop competence through an intentionally designed curriculum of graduate courses and four field work placements, each 6-8 weeks in length (30 weeks total). To meet accreditation requirements, participants explained that their program must “map out the curriculum in terms of the objectives for each course, how those objectives relate to competencies and Practice Profiles, and how these frameworks relate to each other. [...] We take material straight from those standards and then embed them as learning objectives in our courses” (P12).

Participants explained that within these courses, students are given opportunities to develop competencies through authentic tasks, such as scaffolded case-based discussions, client interviews, reflective journaling, team-based business pitch competitions, and the creation of a portfolio. Through these in-class learning experiences and instructor feedback, students are thought to “reflect on what skills they have acquired and what skills they have yet to acquire in terms of the Professional, the Communicator, the Collaborator roles, and so on” (P12). During field work placements, participants explained that faculty help to co-regulate students learning and development of self-regulated learning skills by requiring that they “set learning goals and then appraise whether or not they have met those goals. And then set future goals that emerge from their appraisal” (P5). This, too, is thought to help students develop attitudes/values related to continuous, lifelong learning and the skills they need to be reflective practitioners.

Participants explained that for on-campus ‘academic’ coursework, “we use many different means of assessment— all geared to whatever the course is and what the desired learning outcomes are” (P5). For courses that are “geared towards the testing of knowledge and theory [...] we tend to use multiple choice exams and bell-ringers, for example”. Whereas for courses “that are about application”, Objective Structured Clinical Exams (OSCEs) and written long-
answer questions are used to assess whether students can “interpret a clinical problem” and “articulate their knowledge about how they would choose between different models when approaching a clinical problem” (P5). As one participant explained, “we follow the Ideas, Connections, Extensions (ICE) model” and try to develop assessments that get at “the subtleties of their thinking”: “So I’m always [asking] “How would you respond to this? Seeing this client and this happens, how would you respond to it? Tell me why and why you think doing that would lead to the outcome you think you're going to get.” So I'm trying to see what goes on in their head” (P12).

According to one of the participants, it is in “field work settings where rubber hits the road and you can see whether or not students can integrate all of their classroom learning and do the things they need to do as working clinicians, [...] such as appraising evidence and analyzing what they are doing in practice” (P5). During field work placements, students are evaluated by their fieldwork preceptors and expected to complete a self-appraisal form. The Competency Based Fieldwork Evaluation (CBFE), which is “built off the Essential Competencies” is used to “assess students’ performance across a bunch of domains and to give them feedback” (P5). Participants perceived the field work assessments to be useful for flagging students in difficulty, in that preceptors can see “how the knowledge is translating to practice”. Behavioural issues related to professionalism (e.g., absenteeism, tardiness, cheating, off-task/on social media) were thought to be indicators of incompetence, which could be spotted through in-class participation and practicum assessments.

Participants explained that because competence “is a very nuanced thing, it is difficult to assess and to be able to say [with confidence] ‘Yes. They are good enough at that” (P5). Competence was thought to be ‘nuanced’ because there are often multiple correct approaches to
enabling the occupation of a client and no two clients will present in the exact same way. For these reasons, assessing students’ ability to transfer and apply their knowledge to new contexts—are required to use their judgment and think critically—becomes the goal. According to one participant, designing and conducting assessments that “gets into people’s heads” to assess their ability to think critically “takes a lot of work to set up and a lot of work to grade” (P12). With increasing class sizes and “not many more resources”, there is a risk of faculty burnout. According to the other participant, the potential for burnout is compounded by the fact that multiple assessment opportunities are often needed “to actually figure out, ‘does this person have the competency or don’t they?’” It was thought that because “every assessment method has its limitations” and student performance isn’t consistent across assessments, you need “paper and pencil tests” and “live assessments” where students have to “think on their feet to come up with a solution”. This participant went on to explain that because “we don’t have really good ways of assessing the competencies, what we do more than anything is red-flag those who are really missing it, or who really—maybe attitude wise—just don’t have it. These are the students who are skipping classes and doing the minimum in teamwork”. Often incompetence is easier to spot that competence. In reflecting on those who are often ‘flagged’, it was thought to be those “who are weak academically and cannot pass all of their courses” and those “who have really poor judgement” and do “goofy things” in the clinical setting (P5).

According to one participant, the challenge that comes with a two-year program is knowing when to make high-stakes decisions about progress and remediation for students who have been flagged. It was explained that in field work, for example, a preceptor:

might identify issues, and then we invite the student in and give a lot of remediation and help […] When they go to their last placement, the requirements
are that they should be practicing close to entry level. […] Yet students who need a lot of remediation don’t necessarily get there. And then what are you going to do? It’s June of their last year, are you going to fail them? You should from a technical point of view, but these are people’s lives and you second guess yourself. ‘We should have done it earlier.’ But then earlier we were saying, ‘Well, why don’t we give them a chance’. (P12)

This participant went on to explain how the timeliness of decisions impacts the program’s ability to win academic appeals. Before, when the program was an undergraduate degree, “we used to win academic appeals” and ever since the program became a two-year Master’s program, “it doesn’t happen anymore” (P12).

**Postgraduate Medical Education (Certificate of Program Completion)**

Participants from postgraduate medical education programs conceptualized competence as being “complex” and “integrated”. Competence was described as “the abilities, knowledge, skills, and attitudes,” (P13) which “help describe what it is that we do as physicians” (P15). It was thought that because “many of the things physicians do are a combination of multiple CanMEDS roles,” competence represents “the integration”: So competencies, along with context and human factors, combine to create performance. And so we're actually most interested in performance because that takes into account the patient [and their complexity], the day, the location, the time and a physician’s competencies” (P15).” The ability to demonstrate performance across different context was thought to be essential to competence: “the more I see transfer, the more confident I am in that individual’s competence” (P13).

From a quality assurance and political standpoint, competence was also described as “the minimum standard” of performance for a given scope of practice. As one participant explained,
“it’s the Royal College’s [i.e., the accrediting body’s] role to define the low-bar, the bottom, the minimum standard [for a medical speciality], whereas it’s up to the medical educators to support residents in striving for excellence” (P15). According to participants, this is the reason why the Royal College still “puts value in [high-stakes] national exams, because they’re standardized […] and arm’s length from the postgraduate program” (P13).

According to participants, the Royal College’s objectives for requiring residency programs to implement a competency-based approach to medical education were twofold: “to achieve quality assurance in our graduates” and to improve residents’ learning experience, in the process. They explained that the “granular” architecture of the CanMEDS framework, and the “granular” approach to operationalizing the development of competence through stage-specific Entrustable Professional Activities (EPAs) and milestones, are both important to novice professionals: “When you’re trying to help someone learn the profession, develop the qualities and the skills that they need to operate, particularly junior learners need to understand at a very granular level how [competence] is built up. They haven’t gotten to the point where they can lump a bunch of things together” (P8). Participants explained that according to this model, residents are thought to develop competence through stage-specific required training experiences, in which they are given increasing responsibility for providing patient care and competency-focused instruction by supervising physicians. For each stage of training (i.e., Transition to Discipline, Foundations of Discipline, Core of Discipline, and Transition to Practice) a set of EPAs and milestones (“building blocks” of EPAs), are thought to provide a framework to support learners, their supervisors, and residency program leadership in “monitoring the development of residents’ competence over time” through “ongoing low-stakes assessment” (P13).
Participants explained that in order to provide residents with individualized feedback and coaching, they need to be directly or indirectly observed while providing patient care. Across postgraduate programs, residents and faculty can initiate “low-stakes assessments”, in which residents are assessed by supervising faculty or more senior residents on their performance of a targeted stage specific EPA. This assessment requires the assessor to “watch a resident do something and convert their observation into a description and judgment. And it’s that translation from what’s really an observed experience into something that is written in language [and summarized as a numerical entrustment score]” (P8). Participants explained that in theory, milestones are intended to be used as a “zip file” (P15) of behavioural performance anchors assessors can open up when they need help with identifying “the part of the EPA that the resident was exceptional at, mediocre, or falling behind in” (P8). This information is intended to help the assessor in giving the resident feedback about strengths, areas for improvement, and next steps. For each EPA, the documented performance information is later interpreted by Academic Advisors and Competence Committee members who monitor and make high-stakes decisions about resident progress, promotion, or remediation. Whereas Academic Advisors have a formative role in supporting residents to interpret and use their performance data to guide ongoing learning and assessment opportunities, Competence Committees have a summative role in using the information from low-stakes assessments to periodically evaluate each resident’s progress.

Participants explained that because competent performance is “complex”, “integrated” and “more than the sum of its parts”, assessment of competent performance is “incredibly messy” (P13). Participants perceived physicians, as a group, to have an “obsession with unidimensional scales to judge complex behaviour” (P8) and to prefer the “precision” associated with
“measuring” (P13) constructs using psychometrically validated instruments. As an example, one participant explained how many external factors can play into a resident’s entrustment score for a point-of-care assessment on a single EPA: “It’s very difficult to make entrustment decisions for a resident who cared for a patient who is complex, acutely ill, and at high risk for complications no matter how high the integrity, conscientiousness, insight might be for their level of training” (P8). Instead, it was thought that in order to make “trustworthy” decisions about a resident’s development of competence:

We need to make value judgments based on rich narrative data on the readiness of that resident to proceed. Numbers really don't help us with those decisions much and so I’ve really come to view assessment in largely qualitative terms for that reason. The data analytics movement; like what they’re capable of showing, I think, is actually quite impressive. I’m just not convinced that those beautiful graphs actually translate into behavioural changes and accurate competence decisions (P8).

That said, obtaining rich qualitative evidence of residents’ performance was thought to be challenging because of physicians’ perceived discomfort with subjectivity in their professional judgment. It was thought that faculty are “nervous to document poor performance” for two reasons: (1) “They are often worried about what the implications are, not so much even for themselves, but for the learner” (P13); and (2) “it’s uncomfortable to tell learners when the problem with their performance has to do with their integrity, or conscientiousness [for example]” because it’s perceived as “making a value judgment on their character”. According to one participant, “I’m constantly having to remind faculty that they are experts in their field and their judgment is based in expertise and experience and is valuable performance information”
Participants thought that without this honest documentation, “we are failing to fail” (P13) and risking patient safety by “putting incompetent trainees out into the world” (P15). With these challenges in mind, participants agreed that “there’s no one perfect” way to operationalize the assessment of competence: “There’s many different models and finding what fits a program their culture will take time to operationalize” (P13).

Teacher Education (BEd)

This pre-service teacher education program conceptualized competence as being the ability to “think like a teacher” (P4B) and “professionally carry yourself in relation to others” (P6). While participants agreed that it was important for teacher candidates to be able to “do the things that a teacher is expected to do” (P4A), all individuals explained that competence “isn’t just about the doing, it’s about the thinking, so that in their own practice they’ll be able to look at their students’ learning, rather than just thinking about themselves” (P4B). This ‘thinking’ also includes the ability to independently self-regulate learning. As one of the participants explained, “effective teachers are reading the classroom all the time” (P4B) so as to identify what’s working, what is (not) working, and “what you don’t know how to do” so that you can change and learn how to adapt your professional practice.

For teacher education, these participants thought that the Ontario College of Teacher’s standards of practice and ethical standards (OCT, 2006) help to “pull apart what is so intertwined so that we can see the parts” (P6). They explained because effective teachers make “teaching look easy” (P4A, P6), it is important for beginning and experienced teachers to have “signposts for which we can be reflective and do our own professional development to get better at certain elements” (P6). While they thought it was useful to have behavioural indicators as illustrative
examples of competencies, these participants cautioned against competencies being reduced to hundreds of “mechanistic behavioural objectives” to be assessed.

In this pre-service teacher education program, competence and teacher candidates’ awareness of the standards of practice are thought to be developed through course outlines, modeling and deconstructing teaching practice, structured opportunities for students to practice self-regulating their professional learning and an electronic portfolio. It was explained that “for accreditation, each course syllabi must (a) inform our candidates about the standards of practice and (b) help them to understand conceptually what they will be learning that relates to it […] and how this learning will be assessed” (P6). Participants agreed that it was up to individual instructors as to how explicit they are in referencing the OCT standards of practice when discussing course expectations or deconstructing their own professional practice. For example, in reflecting on his own teaching, one participant expressed a need to be more explicit in “identifying for [teacher candidates] the ways in which I’m competent and how I came to be competent” (P4A).

More commonly, it was thought that course instructors support teacher candidates in developing competencies, including their ability to self-regulate learning, through professional learning plans, where they have choice regarding the topic of their assignment. As one of the participants explained, “because I can’t teach them everything there is to know about students with exceptionalities, for example, I work on structuring the assignments so that they can focus on areas of interest and encourage them to learn about something for which they know nothing, or something that is really concerning” (P4B). Participants also explained that their program is in the process of introducing an electronic portfolio where students will have the opportunity to “decide what counts as evidence to meeting a standard” (P6). One participant described the e-
portfolio as serving the dual purposes of process learning for teacher candidates and accountability for program-level accreditation:

I don’t care about the actual product. I care about the process that went into the product. The thinking that went into them articulating their practice and what counts as evidence […] In locking the e-portfolio template to the standards of practice for accreditation purposes, it also gives teacher candidates a formal structure and reminds them of where they are with competencies (P6).

Participants agreed that competence is largely determined through teacher candidates’ interim and summative practicum assessments, which are completed by associate teachers in the field and faculty liaisons who go out into schools to observe each candidate teach a lesson. They explained that what is being assessed on practicum closely aligns to the OCT standards of practice and that expectations “for each practicum round are laid out in the practicum handbook with very clear descriptions of ‘this is what they should be capable of doing’” (P6). When discussing the standard required for entry-to-practice, participants explained that is “only on the last practicum that teacher candidates must have checked off ‘meets expectations’ in every category.” One participant went on to explain how successful completion of the B.Ed. program marks the start of teacher candidates life-long professional learning in the field:

The B.Ed program, as a professional program, does not create teachers, finished, end of story. We are part of a journey that includes the New Teacher Induction Program (NTIP) and Additional Qualifications (AQs) and long-term professional development. We are setting them on the journey and part of that journey is to be reflective etc. on your practice. (P6)
Participants identified several challenges in operationalizing the assessment of competence. Specifically, they identified several ‘needs’ for: assessing ‘integrated’ competence; policy to support high stakes decisions about the achievement of competence for entry to practice; evidence to support high-stakes decisions about progress and promotion; documentation of honest feedback on practicum assessments; and mechanisms to support teacher candidates’ insight regarding their level of developing competence throughout the program. Participants were in agreement that “somebody who meets all the expectations may not necessarily be a competent teacher” (P6). They explained that while checklists of performance indicators are important for flagging problematic performance and gathering evidence needed for potential litigation, they are problematic in that they “pull apart what is natural.” While most instructors can holistically “spot teacher candidates in difficulty, we still need a ‘fitness to teach’ policy document to show how some people are not fit to teach” (P6).

All participants expressed their concern with how difficult it is win an academic appeal at the university senate, despite “the amount of time and effort we put into collecting data to support student removal from the program” (P6). This same participant went on to explain how “our biggest challenge is collecting that evidence, the counterevidence that they’re not meeting the standard” (P6). The other participants offered two reasons for this. First, associate teachers are “reluctant to assess a candidate honestly and accurately” because “they want to be nice” (P4B) and they don’t want to prevent a candidate from “getting a job” (P6). Second, some teacher candidates who are struggling don’t have the insight to know they are in difficulty, and “half our battle is to try and convince them that they’re not meeting expectations” (P6) so that they can be effectively counselled out of the program. When documenting assessment evidence
and making these high-stakes decisions, each participant suggested reframing the judgment as a question of trust: “Would I want this person to be teaching my children?” (P6, P4A, P4B)

**Urban and Regional Planning (MPL)**

Despite multiple participants being asked from this university program to participate in the study only one person agreed and felt able to speak to the professional entry-to-practice competencies and how they are developed and assessed at the program level. All quotes within this case description can be attributed to the same participant (P16).

Competence in planning was equated to the student-level outcomes of winning peer-reviewed awards for their work and being hired after graduation: “I guess the greatest definition of competence is where the students are hired by professional planning organizations within six months of graduation. […] We would also note things like winning provincial and national awards as well” […] So there’s some evidence that they’ve turned out fairly well, at least according to people externally.” After graduation, students need “between two and three years of practice [and to pass an ethics exam] before they can become licensed”.

It was thought that because the Canadian Institute of Planners’ competencies (CIP, 2010) are “content based”, competence is developed through successful completion of a “core curriculum” of graduate courses. According to the participant, “It’s assumed that if we’re saying that we’re teaching, and that they’re included in our core curriculum, you’ve successfully completed the curriculum, and that you have demonstrated mastery of the material”.

Documentation for accreditation was described as being a time-onerous task that “takes months and months to put together.” It was thought that students are not aware of the CIP’s competencies because it is something that the program takes care of behind the scenes: “We show it to them at the beginning and we just tell them ‘You’re going to have it all by the time
you graduate’. All of these competencies are met adequately [in the core curriculum], according to the people reviewing our documentation for accreditation”. Despite having academic freedom, faculty in this program are often reminded that their course content must align with specific competencies for accreditation:

Normally we would say ‘you have academic freedom,’ but these courses belong to the program and to the profession. You’re delivering it’. […] You of course have freedom to work on the pedagogy. We have the set of competencies that we are trying to cover in a spreadsheet. Your course is [mapped to these competencies].

Make sure you’ve got it covered.

Within courses, students are thought to develop specific competencies through group discussions, exploration of case studies during labs, and course-based projects with industry partners to address local or international planning needs. These learning opportunities are thought to be authentic and work-integrated:

We get a real client, a real project, a real budget and you go and do a planning study in a group of six to 10 students with one faculty member and an adjunct faculty member who’s a senior professional planner. […] We give them information on how to manage a taskforce and lead meetings and things like that. They go off and they do it. […] They have to learn to run their own work.

According to the participant, “it’s actually pretty rare to have a class that is lecturing, write a paper or things like that.” Given that “all of the faculty have practice and most have practiced extensively” and have the capacity to support students in working with industry partners to develop plans that could potentially be used, course learning opportunities were described as being very authentic.
In addition to the core curriculum courses, the participant explained that students also have the option to complete a not-for credit internship organized through a faculty-member and their alumni connections. According to the participant, “We’re not looking for specific competencies developed in the professional internship itself. We are mainly looking for whether they had a good professional experience.”

Group projects, in which students are required to “draft drawings, write a report, and deliver a presentation,” are thought to be assessed through a combination of self-, peer-, and faculty assessments. At mid-term and the end of the semester, the participant explained that “we have a peer evaluation to make sure that people don’t check out. It’s only worth about 10% of the grade […]. And we use an instrument designed for us for peer review by university’s teaching and learning centre.” Adjunct faculty from industry and core faculty from the program use a rubric to evaluate the group presentations. However, as the participant explained, “we don’t have a rubric for reports [which are worth 50% of their mark]”. Therefore, setting performance standards for the different project reports can be challenging:

I tell the faculty A+ means you’ve submitted it for publication. An A means good enough to be submitted for acceptance by council. An A-minus means excellent work for grad school but not quite good enough to be adopted professionally. And a B+ is good work for grad school but not good enough for practice. And a B-minus is you just scrape through. And we never hand out anything other that’s lower than a B+. The students just go crazy doing real work. And these things won provincial and national awards as well.
According to the participant, the program’s main challenge with assessment is developing “formal evaluation measures” and “validated instruments” for evaluating student’s achievement on work-integrated projects:

So it’s harder to get formal evaluation measures into these when we’re still scoping what the nature of the work is. So we can evaluate process, ‘how good is your presentation’, but formal evaluation metrics for product, substantive content, is a lot harder to develop on the fly. Projects change every year, every term.

That’s a pedagogic challenge.

It was thought that the gold standard was to use “evaluation rubrics that are based on the same published research that’s used to evaluate professional plans.” So far, their approach has been to say to students, “Based on this book chapter is a rubric for evaluating a plan […] You will get a lecture on how you evaluate a plan, and readings on it. […] We’ll reach agreement on which elements we’re going to use for their plans, and then we use it for evaluating the final report.” It was thought that oftentimes the same case studies are used “because we are unable to come up with rubrics”. The participant explained that informally, faculty assess reports based on how well students meet one criteria: their ability to answer the “so what?” question and articulate “the relevance of their plan for the city”.

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Chapter 7

Study 3 – An Embedded Case Study Exploring How Professional Education Programs Are Approaching the Development and Assessment of Competence at a Mid-Sized Canadian University

Abstract

In recent years, professional education programs have been tasked with operationalizing entry-to-practice competence frameworks in order to meet professional accreditation standards. Time-honoured university policies present challenges for implementing elements of competency-based education, including (1) competencies embedded in the curriculum, (2) robust formative and summative assessment, (3) recognition of prior learning, (4) variable timelines to achieve fixed outcomes, and (5) a credential signifying achievement of a minimum standard of competence. Driven by the lack of empirical evidence informing approaches to these challenges across professional disciplines, the purpose of this study was to explore program leadership teams’ thinking about their approaches to operationalization. This study used a single embedded case study to explore how professional programs from one mid-sized Canadian university are approaching and perhaps problematizing the development and assessment of competence. Data collection involved semi-structured interviews with educational leaders (faculty and staff, n=21) from a sample of nine programs. Following a grounded theory approach to inductive thematic analysis, the constant comparative method was used to discern similarities and differences across programs and to begin building theory about the approaches to operationalization. While limited in scope given the use of a single university, the findings highlight: (1) diversity in the approaches to implementation being used across programs; (2) common attributes which can be used to classify the manner in which these programs operationalize competence; and (3)
challenges with supporting faculty, who have academic freedom, to buy in to competency-informed pedagogy and assessment. Given these findings, it is recommended that professional accrediting bodies and education programs spend time to consider the role professional programs play in determining competence for entry-to-practice along their pathway to licensure, as well their intents for implementing a competence framework, in order to ensure sufficiency in the approaches being used.

**Key words:** professional education programs; competence; entry-to-practice; assessment
Introduction

Nationally, professional accrediting and regulating bodies are shifting away from describing principles of practice to guide members of a profession and moving towards more explicit delineation of the knowledge and skills needed for entry-to-practice (e.g., CPA, 2015; Engineers Canada, 2016; RCPSC, 2015). This shift is a direct response to calls for enhanced public and professional protection, professional mobility, and educational accountability (e.g., Humphreys, Crino & Wilson, 2018; Taber et al., 2010). For licensing of domestically and foreign-trained professional graduates, regulating bodies need some way of knowing whether or not individuals have met the minimum professional standards required to practice safely and effectively within their defined scope of practice.

While some professions require candidates to pass external licensing exams after successful completion of their professional program (e.g., Medicine, Law, Nursing), this is not true across professional programs in Canada. There are also professions that rely on post-graduation processes (e.g., college regulation and hiring practices) to ‘weed out’ those who are not meeting competence standards (e.g., Teacher Education). Increasingly, competency-based education (CBE) is becoming a requirement for professional program accreditation (e.g., Frank, Snell, & Sherbino, 2015; Hatcher et al., 2013), meaning that professional education programs will have responsibility for monitoring students development of competence and making high-stakes decisions about their achievement of competence standards for entry-to-practice.

In its purest form, CBE differs from traditional higher education models with respect to structure, pedagogy, assessment, faculty role, student interaction, and credential (Carraccio, Wolfsthal, Englander, Ferentz & Martin, 2002; Pichette & Watkins, 2018). ‘True CBE programs’ are thought to include all of the following elements: (1) competencies embedded in
the curriculum, (2) robust formative and summative assessment, (3) recognition of prior learning, (4) variable timelines to achieve fixed outcomes, and (5) a credential signifying achievement of a minimum standard of competence (Pichette & Watkins, 2018). University policies, especially those predicated on the credit hour system (e.g., scheduling and timing of classes, time to degree completion, etc.), present a challenge for implementing the defining component of CBE, which is variable timelines allowing students to learn and progress at their own pace to achieve fixed outcomes (C-BEN, 2017; Pichette & Watkins, 2018). Most published literature describing how professional education programs are navigating this tension comes from the medical profession. According to the Higher Education Quality Council of Ontario’s (2018) report on CBE, “Some of the best and potentially most comprehensive examples of CBE-style programs to emerge in Canada are in our post-MD residency programs” (p. 13).

In 2017, the Royal College of Physicians and Surgeons of Canada, the accrediting body for specialist medicine in Canada, launched Competence By Design (CBD)—an initiative to implement Competency-Based Medical Education (CBME) in residency training and specialty practice across Canada. According to the RCPSC, CBD is “A move away from credentialing physicians solely on the basis of time spent on rotations and activities in favour of ensuring achievement on the basis of attained milestones of competence” (Frank, Snell & Sherbino, 2015, p.12). Despite having to comply with time-based requirement (e.g., time/service on rations), postgraduate medical education programs are enabling learners to demonstrate achievement of competence standards at their own pace. Even though residents cannot graduate in less time, they can be given more complex cases or more time to demonstrate competence if needed. Accordingly, CBD has been described as being a ‘hybrid’ in that it uses a competency-based approach, but in the context of the existing time-based service/rotation system (RCPSC, 2016).
While postgraduate medical education programs can serve as an illustrative example of competency-based learning and assessment, caution should be exercised in considering how CBME approaches might work in other professional disciplines. Even though postgraduate medical education is considered entry-to-practice (Frank, Snell & Sherbino, 2015), these programs are unique in that they are almost entirely workplace-based. Most professional programs are a combination of work-integrated learning opportunities (e.g., field placements, practicums, etc.) and time spent on campus in required courses. Given these differences, there is a need to also understand how entry-to-practice competence frameworks are being operationalized in professional programs across disciplines. How a professional program operationalizes competency-based learning and assessment will likely depend on myriad factors, including but not limited to: (1) the profession’s pathway to licensure, (2) program requirements set by the professional accrediting body, (3) how competence is conceptualized within the profession, (4) the vision of program leadership who make implementation decisions, (4) university regulations and policies, and (5) the financial and human resources available to the program (Pérez, van der Stuyft, del Carmen Zabala, Castro, & Lefèvre, 2016).

The Research Problem

The published literature describing how professional programs are implementing entry-to-practice competence frameworks within time-based, higher-education systems is siloed within professional disciplines and their respective educational journals and limited to mostly conceptual commentaries (e.g., Falender & Shafranske, 2012; Pijl-Zieber, Barton, Konklin, Awosoga, & Craine, 2014; Uhlenbeck, Verloop, & Beijaard, 2002). There is a desperate need for published empirical research exploring how professional education programs across academic disciplines are navigating this tension—especially in the Canadian context (Pichette & Watkins,
In reviewing the literature, we found only two relevant studies investing competency-based teaching and assessment methods across different disciplines (Conway, Chen & Jefferies, 2000; Koenen, Dochy, & Berghmans, 2015). Taken together, their findings suggest that: (1) professional programs struggle with implementing assessments to monitor students’ learning progress over time and to make valid and reliable high-stakes decisions about students’ achievement of competence standards; and (2) there is a need for illustrative examples demonstrating how university-based professional programs are developing and assessing competence in practice.

**The Research Purpose**

Driven by the practical need for university-based professional programs to implement competency-based learning and assessment for accreditation, and the lack of empirical research investigating what this looks like across professional disciplines, the purpose of this research was to explore the following questions:

1. How are professional programs across professional disciplines operationally approaching the development and assessment of competence?

2. How are professional program problematizing the assessment of competence? What considerations and/or challenges are currently influencing their thinking about how to approach the assessment of competence in practice?

**Methods**

**Research Design**

The research was conducted using a single embedded case study design. Case study research is a form of applied empirical inquiry for investigating a contemporary problem within
a real-life context (Yazan, 2015). The practical need to understand implementation and the conceptual need to build theory on how professional programs are approaching competency-based learning and assessment, lend themselves to using Merriam’s (2009) method of conducting case study research. According to Yazan (2015), Merriam’s approach is described as constructivist in that qualitative data collection emphasizes the important role the researcher plays as an instrument in data collection processes. Through “effective interviewing”, “careful observation”, and the “mining of documents”, the researcher is positioned to “make sense/meaning out of the data” (Merriam, 1998, p.178).

According to Merriam (2009), the intent of the case study influences its form as being descriptive, interpretive, or evaluative. Whereas descriptive case studies focus solely on providing thick, rich description of a phenomenon without guidance from theory, interpretive case studies use relevant theory to analyze and build theory about a phenomenon. Evaluative case studies go one step further than analysis to form judgments about the case. This research adopted an interpretive approach so as to not only describe similarities and differences in competency-based learning and assessment across different professional contexts, but also to expose important theoretical considerations. Evaluative judgments about the merit, worth, or significance of individual professional programs was avoided.

This case study used an embedded design because it involved the exploration of multiple units of analysis (Scholz & Tietje, 2002). Within the ‘main unit’ of a university, there are several professional programs (i.e., sub-units). In order to compare and contrast the approaches programs (sub-units) are using for implementation, it was useful to identify key components that could serve as embedded units (i.e., more detailed units) for analysis. Within and across the
embedded units of a sub-unit, the triangulation of data across sources allowed the authors to richly describe and compare the approaches being used across programs (Denzin, 1978).

**Conceptual Framework**

Competency-based education stems from an amalgamation of conceptual frameworks from the fields of social cognition, assessment and evaluation. These frameworks include; but are not limited to, outcomes-based learning (Spady, 1994), backwards design (Wiggins & McTighe, 2005), the novice to expert continuum (Benner, 1982), self-regulated learning (Zimmerman, 2000), the Zone of Proximal Development (Vygotsky, 1978), learning for mastery (Bloom, 1968), and formative and summative assessment (Wiliam & Black, 1996). Within the field of professional education, there is no comprehensive learning theory that accounts for multiple key components of competency-based learning. Nevertheless, given that social interactions are at the heart of professional learning (Eraut, 1994, 1998; Knowles, 1973; Schön, 1987), learning theories from the field of social cognition are likely most relevant as a conceptual framework.

Sameroff’s (2010) Unified Theory of Development, which integrates a systems perspective on the interrelationships between models of social contexts, co-regulated learning, and development, was used as a conceptual framework for this study— even though it was not developed with professional education in mind. As a macro model of learning and development, demonstrating the reciprocal regulation of learning between students and more competent professionals (i.e., faculty), Sameroff’s (2010) theory demonstrates how social contexts may be influencing the approaches professional programs are using to develop and assess competence. In particular, the model of co-regulated learning highlights the important role of faculty in scaffolding students’ learning processes and their development of competence. Faculty take on the role of ‘a more capable other’ (Vygotsky, 1978) and work with learners to accomplish tasks
that are within the learner’s range of competence (Stalmeijer, Dolmans, Wolfhagen & Scherpber, 2008). ‘More capable others’ can be defined as professionals who have been entrusted to supervise and scaffold learning opportunities and feedback for professional candidates.

The Case

A medium-sized (less than 30,000 students), Canadian public university was purposefully selected as the case (i.e., main unit) in which to conduct this research. It was thought that this university was representative of medium-sized universities in Canada, based on the number and diversity of professional education programs (i.e., sub-units) granting degrees at the undergraduate, graduate, and postgraduate levels. Prior to conducting the research, ethics approval was obtained from the university’s General Research Ethics Board. In order to protect the confidentiality of professional program participants, it was agreed that the institution would not be named and that it would be referred to as a medium-sized Canadian university.

Data Collection

Within the university, only those programs accredited by a professional accrediting body were included in this study. Across these professional programs, recruitment was targeted to faculty and staff members who are educational leaders in formal (i.e., titles/positions) or informal (i.e., thought leader) capacities, who have an informed voice in program-level decision-making about the design and operationalization of assessment and evaluation. Confirmation of participation in professional accreditation and potential participants’ email addresses were obtained from each professional program’s websites housed within the central university’s domain. Through an email invitation, potential participants were informed that participation was voluntary, research findings would not be used to make evaluative judgments of their
professional program, and that participant confidentiality would be protected by refraining from naming the institution or using any potentially identifying demographic information or quotes. In addition to criterion sampling, some snowball sampling was also used to recruit thought-leaders within professional programs (Patton, 2002).

**Semi-Structured Interviews**

Semi-structured interviews were used “to enter into the other person’s perspective” (Patton, 2002, p. 341) to learn about situations that preclude the presence of an observer. An interview protocol, containing a pre-determined set of questions with flexibility to prompt and explore responses in detail, was used (see Table 7.1). All interviews were conducted by the principal investigator (JR). During and immediately following interviews, memos were written about recurring ideas and/or questions that emerged (Merriam, 2009). This allowed for continual refinement and adjustment of interview questions, as well as concurrent sense-making of emerging themes and understandings. Recruitment for interviews continued until saturation was reached (meaning that new insights were no longer emerging within or across professional programs) and we had exhausted recruitment of potential participants. With the consent of participants, each interview took about 45–60 minutes to complete, was audio-recorded and subsequently transcribed verbatim by a professional external transcriptionist (who was required to sign a confidentiality agreement). Prior to starting data analysis, each transcript was checked for accuracy of transcription by the principal investigator (JR). Each participant was also emailed a copy of their entire transcript and invited to member-check for accuracy of transcription and content and to make any revisions or omissions as they saw fit.
Table 7.1. *Questions from the Interview Protocol*

<table>
<thead>
<tr>
<th>Interview Question</th>
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</thead>
<tbody>
<tr>
<td><strong>Participant information:</strong></td>
</tr>
<tr>
<td>1. Approximately how long have you been in your current role?</td>
</tr>
<tr>
<td>2. How are you currently involved in program development and decision-making?</td>
</tr>
<tr>
<td><strong>Conceptualize competence:</strong></td>
</tr>
<tr>
<td>3. What does your profession say competence is?</td>
</tr>
<tr>
<td>4. Currently, how does your program conceptualize competence?</td>
</tr>
<tr>
<td><strong>Operationalize the development of competence:</strong></td>
</tr>
<tr>
<td>5. How does your program help learners to develop competence?</td>
</tr>
<tr>
<td>a. Curriculum?</td>
</tr>
<tr>
<td>b. Learning opportunities?</td>
</tr>
<tr>
<td>c. Assessment and evaluation?</td>
</tr>
<tr>
<td>6. How do instructors help learners to develop competence?</td>
</tr>
<tr>
<td>7. How do students help themselves to develop competence?</td>
</tr>
<tr>
<td><strong>Operationalize the assessment of competence</strong></td>
</tr>
<tr>
<td>8. How do you monitor the development of candidates' competence?</td>
</tr>
<tr>
<td>9. How do you make high-stakes decisions about promotion (i.e., graduation) and/or remediation?</td>
</tr>
<tr>
<td>10. What challenges, if any, does your program currently experience in assessing candidates' competence/readiness for practice?</td>
</tr>
</tbody>
</table>

**Data Analysis**

**Step 1: Writing narrative case descriptions.**

The first step of data analysis involved writing narrative case descriptions for each of the participating professional programs. Within each case, a template approach (Crabtree & Miller, 1999) was used to look for patterns emerging across participants’ interviews with regards to how they: (1) conceptualized competence, (2) described the development of competence, (3) described the assessment of competence, and (4) problematized the assessment of competence. This template of categories served to organize the data within a case for subsequent inductive analysis.
Following a close-reading of all interview transcripts within a case (i.e., program), a focused coding approach (Glaser, 1978) was used to assign meaning (a label) to segments of data (i.e., more than one word or line of text). In comparing and contrasting the focused codes emerging within a category (i.e., 1-4 above), themes (i.e., shared ideas) were identified in the data. These central ideas have been described within the case category descriptions. When writing the narratives, the goal was to keep the central ideas “close to the data” (Charmaz, 2006, p. 59) by using direct quotes from participants (i.e., using the language of participants). This is important given that the case descriptions served as the data for subsequent analysis.

**Step 2: Extracting key information to compare cases.**

The second step of data analysis involved generating a table that could be used to compare and contrast similarities and differences in the approaches being used to develop and assess competence across the professional programs. Relevant information about program context (i.e., requirements for professional certification, professional accrediting body, name of entry-to-practice competence framework), program structure (i.e., program tuition fees [domestic], expected time to completion, course requirements, work-integrated learning component), and approach to implementation (i.e., conceptualization of competence, student awareness of competence framework, approaches used to develop competence, purpose of assessing competence, approaches used to assess competence, and challenges with assessing competence) were extracted from the case descriptions and recorded in the integration table (Table 7.2). Sameroff’s (2010) micro models (social contexts, co-regulated learning, and development) informed the extraction and organization of the data according to program context, program structure, and approach to implementation.
**Step 3: Inductive thematic analysis.**

The third step of data analysis involved using the Constant Comparative Method (Glaser, 1992; Glaser & Strauss, 1967; Strauss, 1987) to discern conceptual similarities and differences and to discover patterns of meaning (themes) in the extracted data. The integration table served as a matrix to compare similarities and differences both within and across cases (i.e., within a column and across columns). Research questions and Sameroff’s Unified Theory of Development (2010) informed the sense-making process within cases. Asking the following two questions guided comparison of approaches across cases: (1) How is this similar to or different from what is described in X program? and (2) What ideas are mentioned consistently across several programs? (Bowen, 2009). Once themes were identified, the case descriptions were read closely once again to check the interpretations of the data and to select illustrative quotes.
Table 7.2. Integration table for comparing and contrasting similarities and differences in program contexts, program structures, and approaches to implementation

<table>
<thead>
<tr>
<th>Requirements for professional certification (post program completion)</th>
<th>Business</th>
<th>Clinical Psychology</th>
<th>Engineering</th>
<th>Law</th>
<th>Nursing</th>
<th>Occupational Therapy</th>
<th>Postgraduate Medical Education (Specialty)</th>
<th>Teacher Education</th>
<th>Urban and Regional Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (no regulating body)</td>
<td>Period of supervised practice; written Knowledge and jurisprudence/ethics exams; oral exam</td>
<td>Work experience requirement (articling period); written Bar Exam (Barristers’ and Solicitors’)</td>
<td>Written exam of knowledge, skills, and judgment (NCLEX-RN)</td>
<td>Written exam of academic knowledge and professional behaviour (NOTCE)</td>
<td>Written exam of knowledge and application of knowledge; Objective Structured Clinical Exam (OSCE)</td>
<td>None</td>
<td>Work experience requirement (record of mentorship and record of practical experience); ethics and professionalism course and test; professional examination</td>
<td>Mandated by the Professional Standards Board for the Canadian Institute of Planners (CIP)</td>
<td></td>
</tr>
<tr>
<td>Optional (e.g., by AACSB International) for quality assurance ‘seal of approval’</td>
<td>Mandated by Canadian Psychological Association (CPA)</td>
<td>Mandated by the Canadian Engineering Accreditation Board (CEAB), Engineers Canada</td>
<td>Mandated by the Federation of Law Societies of Canada</td>
<td>Mandated by the College of Nurses of Ontario (CNO)</td>
<td>Mandated by the Canadian Association of Occupational Therapists (CAOT)</td>
<td>Mandated by the Royal College of Physicians and Surgeons of Canada (RCPSC)</td>
<td>Mandated by the Ontario College of Teachers (OCT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCom: &lt; $20,000 MBA: &lt; $100,000 Master of:</td>
<td>&lt; $10,000</td>
<td>&lt; $15,000</td>
<td>&lt; $20,000</td>
<td>&lt; $10,000</td>
<td>&lt; $15,000</td>
<td>N/A; residents paid salary for service</td>
<td>&lt; $10,000</td>
<td>&lt; $15,000</td>
<td></td>
</tr>
</tbody>
</table>

Program tuition fees (domestic)

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<table>
<thead>
<tr>
<th>Business</th>
<th>Clinical Psychology</th>
<th>Engineering</th>
<th>Law</th>
<th>Nursing</th>
<th>Occupational Therapy</th>
<th>Postgraduate Medical Education (Specialty)</th>
<th>Teacher Education</th>
<th>Urban and Regional Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor: 4 years; Master: 12 months</td>
<td>Master: 2 years; Doctoral: 4 years</td>
<td>Bachelor: 4 years</td>
<td>3 years</td>
<td>4 years</td>
<td>2 years</td>
<td>3 – 7 years</td>
<td>16 months</td>
<td>2 years</td>
</tr>
<tr>
<td>Yes; course topics driven by market demands</td>
<td>Yes; theoretical and applied courses</td>
<td>Yes; courses in areas of legal practice</td>
<td>Yes: theory, lab and clinical courses</td>
<td>Yes: theory, lab, and clinical courses</td>
<td>No; required to attend academic half days</td>
<td>Yes: courses in required topic areas and electives</td>
<td>Yes: theory, lab, and methods courses</td>
<td></td>
</tr>
<tr>
<td>Expected time to completion</td>
<td>Course requirements</td>
<td>Work-integrated learning requirement</td>
<td>Conceptualization of competence</td>
<td>Student awareness of entry-to-practice competence framework</td>
<td>Approaches used to develop competence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>No: optional placements and one 12-month internship</td>
<td>Component knowledge and skills</td>
<td>Unaware of competencies</td>
<td>Boot camp; Lectures; Team-based projects; Team-based coaches; Personal tutors</td>
<td>Lectures; Observation and dialogic-case review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No: optional internships</td>
<td>No: optional externships</td>
<td>Integration of knowledge and skills in research and clinical practice</td>
<td>Moderately aware of competencies through practicum assessment</td>
<td>Lectures; Observation and dialogic-case review</td>
<td>Lectures; labs; team-based design projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No: optional placements</td>
<td>Yes: clinical placements (years 2-4)</td>
<td>Component knowledge and skills</td>
<td>Mostly unaware of competencies</td>
<td>Lectures; labs; team-based design projects</td>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes; theoretical and applied courses</td>
<td>Yes: field work placements (30 weeks)</td>
<td>Integration of knowledge and skills</td>
<td>Unaware of competencies</td>
<td>Lectures; discussion of cases; direct observation and feedback</td>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes; courses in areas of legal practice</td>
<td>Yes: practicum placements (80 days)</td>
<td>Integration of knowledge and skills</td>
<td>Unaware of competencies</td>
<td>Mostly direct observation and feedback; some didactic sessions</td>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes: theory, lab and clinical courses</td>
<td>Entirely workplace-based apprenticeship</td>
<td>Integration of knowledge and skills</td>
<td>Unaware of competencies</td>
<td>Lectures; discussion of cases; professional learning plans; direct observation and feedback</td>
<td>Lectures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No: required to attend academic half days</td>
<td>Yes: courses in required topic areas and electives</td>
<td>Integration of knowledge and skills</td>
<td>Unaware of competencies</td>
<td>Lectures; discussion of cases; labs; team projects</td>
<td>Lectures; discussion of cases; labs; team projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purpose of assessing competence</td>
<td>Business</td>
<td>Clinical Psychology</td>
<td>Engineering</td>
<td>Law</td>
<td>Nursing</td>
<td>Occupational Therapy</td>
<td>Postgraduate Medical Education (Specialty)</td>
<td>Teacher Education</td>
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<tr>
<td>Summative decisions: admissions; successful course and program completion</td>
<td>Academic cut scores and PSEs on intake; written reports; oral pres.; written exams</td>
<td>Written and oral comprehens. exams; research theses; direct observation of performance on practicum</td>
<td>Written report; oral pres.; written exams</td>
<td>Written legal analysis; written exams</td>
<td>Written assignments; oral pres.; portfolios and reflection; written and OSCE exams; direct observation of performance on clinical placements</td>
<td>Written assignments; oral pres.; portfolios and reflection; written and OSCE exams; direct observation of performance on clinical placements</td>
<td>Written assignments; oral pres.; portfolios and reflection; direct observation of teaching on practicum</td>
<td>Written reports; oral pres.; written exams; optional research thesis</td>
</tr>
<tr>
<td>Challenges with assessing competence</td>
<td>Academic freedom and buy in to develop rubrics to assess professional skills through authentic performance tasks (e.g., team-based case studies)</td>
<td>Assessing integration of clinical practice and research competencies; hesitation to document honest, constructive feedback on practicum (esp. for professional skills); making high-</td>
<td>Academic freedom and buy in to develop authentic assessment activities and tools to assess students’ ability to integrate graduate attributes to solve ill-defined,</td>
<td>Academic freedom and buy in to engage in faculty development (e.g., developing multiple choice items, developing formative assessment opportunities, etc.)</td>
<td>Assessing students’ ability to transfer across clinical settings; assessing professional skills; providing honest, constructive feedback; collecting sufficient evidence to</td>
<td>Resources to conduct multiple assessments through entrustment decisions; hesitation to document honest, constructive feedback; collecting sufficient evidence to win an academic appeal or counsel students out</td>
<td>Academic freedom and faculty development/ resources to develop rubrics to assess achievement on authentic performance tasks (e.g., work-integrated team-based projects)</td>
<td>Academic freedom and faculty development/ resources to develop rubrics to assess achievement on authentic performance tasks (e.g., work-integrated team-based projects)</td>
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<tr>
<td>stakes progress, promotion, and remediation decisions</td>
<td>complex problems</td>
<td>win an academic appeal or counsel students out of the program</td>
<td>evidence to make progress and remediation decisions and to win an academic appeal of the program</td>
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<td>about progress and remediation for students whose behaviour has been flagged; collecting sufficient evidence to win an academic appeal</td>
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</tbody>
</table>
Findings

Research participants included both faculty and staff (n=21) from nine diverse professional programs across the university. For each participating professional program, Table 7.3 describes the number of individuals interviewed, their assigned participant number (based on order of interviews), and their years of experience acting in a formal or informal educational leadership capacity. In an effort to de-identify participants’ gender, pseudonyms have not been used. Instead, participants are referred to by the order in which they were interviewed. For example, the third participant interviewed is cited as P3. Interview 4 was a group interview with two participants, A and B (P4A and P4B). In the following section we describe themes and illustrative quotes which serve to answer the research questions.

Table 7.3. The number of individuals interviewed from each participating professional program

<table>
<thead>
<tr>
<th>Professional Program (Degree or Certificate)</th>
<th>Number of Program Participants</th>
<th>Participant Number</th>
<th>Years of Educational Leadership Experience: Mean, (Standard Deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business (BCom, MBA)</td>
<td>n=3</td>
<td>P9, P14A, P14B</td>
<td>4.2 (2.6)</td>
</tr>
<tr>
<td>Clinical Psychology (MSc and PhD C. Psych)</td>
<td>n=2</td>
<td>P18, P19</td>
<td>3.5 (0.7)</td>
</tr>
<tr>
<td>Engineering (BASc)</td>
<td>n=3</td>
<td>P1, P3, P11</td>
<td>7.2 (3.0)</td>
</tr>
<tr>
<td>Law (JD)</td>
<td>n=2</td>
<td>P10, P17</td>
<td>6.5 (0.7)</td>
</tr>
<tr>
<td>Nursing (BScN)</td>
<td>n=2</td>
<td>P2, P7</td>
<td>7.5 (2.1)</td>
</tr>
<tr>
<td>Occupational Therapy (MSc OT)</td>
<td>n=2</td>
<td>P5, P12</td>
<td>6.0 (1.4)</td>
</tr>
<tr>
<td>Postgraduate Medical Education (Certificate of Completion)</td>
<td>n=3</td>
<td>P8, P13, P15</td>
<td>5.3 (3.2)</td>
</tr>
<tr>
<td>Teacher Education (BEd)</td>
<td>n=3</td>
<td>P4A, P4B, P6</td>
<td>23.3 (15.3)</td>
</tr>
<tr>
<td>Urban &amp; Regional Planning (MPL)</td>
<td>n=1</td>
<td>P16</td>
<td>10.0 (N/A)</td>
</tr>
</tbody>
</table>
How Are Professional Programs Across Professional Disciplines Operationally

Approaching the Development and Assessment of Competence?

Two diverse approaches were identified across the nine professional education programs within the university. Approaches A and B emerged from a comparison of the data in Table 7.2. Within a case (i.e., program), data describing program context and structure was used to interpret and compare the approaches used to develop and assess competence across cases.

**Approach A: Demonstrated by Business, Engineering, Law, and Planning.**

In professions where competence is represented by their accrediting body as lists of knowledge/understandings and skills, competence was conceptualized by program leadership as being equal to the sum of its component parts. All participants from these programs described competence as being a “combination” of technical/discipline-specific knowledge and professional skills that are needed to “do the work of an [X]”. For example, “legal analysis […]—distilling the principle from case law to figure out how it applied to a new set of facts in a different context” was described by the legal education participants as being an “essential skill” to “think like a lawyer” (P10, P17).

In these programs, individual competencies were thought to be carefully mapped to, and developed through, individual on-campus courses (lectures and labs [in some programs]). Lectures were didactic and thought to provide some opportunities for students to practice applying their knowledge through discussion of cases. Labs were thought to provide more focused opportunities for students to work individually and in groups to practice applying their knowledge and skills to approach authentic tasks. Work-integrated learning experiences were not a program requirement; however, internships and externships were perceived to be available to students upon their request. Therefore, it was assumed that students from these programs were
‘ready for practice’ by virtue of passing all of their required courses. Post program completion, the requirements for professional certification required graduates to complete a period of supervised work experience in the profession, as well as written ethics and jurisprudence exams.

For these programs, the main purpose of assessment was perceived to be summative decision-making about student achievement in individual courses. Students had to achieve a certain grade in all required courses in order to successfully complete the program. Each assessment tool and task was thought to be mapped to specific competencies. Common summative assessment tasks included written reports, oral presentations, and written exams. Perceived challenges with assessing competence included how to support faculty to develop rubrics (and other assessment tools) to evaluate multiple competencies through the demonstration of authentic performance tasks. With university policies surrounding academic freedom, it was perceived to be challenging for these programs to get faculty to buy in to competence-informed instruction, learning opportunities, and assessment in order to meet accreditation requirements.

The financial resources available to these programs from student tuitions were similar. Programs following this approach tended to have more expensive (domestic) tuition fees, ranging from less than $15,000 to $20,000 per year. A notable outlier was the 12 month MBA program, which had a tuition fee of less than $100,000.

**Approach B: Demonstrated by Clinical Psychology, Nursing, Occupational Therapy, Postgraduate Medical Education, and Teacher Education.**

In professions in which competence is represented by their accrediting body as an integrated system of knowledge and technical and professional skills, competence was conceptualized by program leadership as being equal to *more than* the sum of its component parts. In these programs, students were perceived to be aware of their entry-to-practice
competence framework. This is because the framework was thought to be used as a mechanism for co-regulating students’ development of competencies (including their capacity to independently self-regulate learning), thereby supporting assessment as and for student learning (i.e., formative assessment).

In these programs, individual competencies were thought to be mapped to and developed through work-integrated learning opportunities and, in most cases, on-campus courses (e.g., theoretical and applied courses). Work-integrated learning opportunities (e.g., practicums, clinical placements, field work placements) were extensive, ranging from 80 days (Teacher Education) to completely workplace-based service-learning (Postgraduate Medical Education). On- and off-campus, the main approach to developing competence was thought to be direct observation of authentic performance tasks and dialogic feedback with faculty.

For these programs, assessment was perceived to serve both formative and summative functions. Assessment was thought to inform students’ ongoing learning progress towards program completion, as well as high-stakes decisions about promotion or remediation from specific courses and/or program milestones. Students were expected to demonstrate ‘readiness for practice’ through multiple workplace-based assessments completed by supervisors in the field. Post program completion, graduates from most of these programs (with the exception of Teacher Education) must also demonstrate competence through written exams (testing applied knowledge and judgment), and in some cases, oral or performance based exams (e.g., Objective Structured Clinical Exams).

Multiple approaches were used to assess students within each of these programs, including: written assignments, oral presentations, electronic portfolios and direct observation of workplace-based performance. Perceived challenges focused on how to assess students’ abilities
to integrate competencies in and across authentic practice contexts, support faculty to document honest, constructive feedback on workplace-based performance, and gather timely evidence to inform high-stakes decisions about student remediation and removal from the program.

The financial resources available to these programs from student tuitions were also similar. Programs following this approach tended to have lower (domestic) tuition fees, ranging from less than $10,000 to less than $15,000 per year. A notable outlier was Postgraduate Medical Education, which does not require tuition (i.e., residents are paid for their service). This is despite having more extensive work-integrated learning requirements requiring direct supervision from active members of the profession.

What Considerations and/or Challenges are Currently Influencing Programs’ Approach to the Assessment of Competence in Practice?

Tensions with implementing externally developed competence frameworks within existing university structures.

Each program’s identified challenges directly related to how they are approaching the development and assessment of competence. For programs taking approach A, these challenges had to do with implementing competency-based approaches to instruction and assessment within well-established university structures. The most commonly referenced barriers to implementation included having the human and financial resources to persuade and support faculty, who have academic freedom, to buy in to competency-informed pedagogy and assessment. For programs taking approach B, these challenges had to do with faculty’s capacity to assess and evaluate competence at the student level.
**Academic freedom.**

Across business, engineering, law, and planning, several participants perceived a tension in satisfying the university requirements for academic freedom and their accreditation body’s standards for competency-informed instruction and assessment. These participants explained that while it is the responsibility of the program to ensure that individual courses intend to develop and assess specific competencies for accreditation, under the protection of academic freedom, faculty and instructors are granted the right to choose their course content, pedagogy, and approaches to assessment. However, differences existed across programs with how much participants thought they could influence faculty. For example, all three participants from business agreed that “with academic freedom, we cannot dictate how they assess students” (P9). Whereas in urban and regional planning, the participant explained that they needed to be much more authoritative with faculty in explaining how accreditation requirements trump academic freedom:

> Normally you have academic freedom, but these courses belong to the program and to the profession. You’re delivering it’. […] You of course have freedom to work on the pedagogy. We have the set of competencies that we are trying to cover in a spreadsheet. Your course is [mapped to these competencies]. Make sure you’ve got it covered (P16).

Participants from law and engineering explained that even when faculty are encouraged to implement competency-informed approaches to instruction and assessment (e.g., authentic performance tasks), they may not do so in practice because of a lack of buy-in or know-how. According to these participants, there is a tension in that faculty are hired and promoted primarily based on their research accomplishments. Faculty without professional work
experience in the field may not value work-integrated learning opportunities or struggle with developing simulated/authentic learning opportunities where students can practice and receive feedback on tasks they will be expected to do upon entry-to-practice. For example, participants from Law thought there is a perception amongst their faculty that “it’s dirty in a law school to talk about the practice of law” (P17). They thought that because a large percentage of their faculty have never practiced law and are “pure academics” (P17), their comfort level is “being legal scholars” and “teaching the way they were taught” (P10). Similarly, in engineering, participants explained that there is “variation in the degree to which instructors are conscious of and deliberately developing the [Graduate] Attributes” (P3). As one participant explained, “some faculty don’t see that as their role and consequently pay lip service to the idea of [developing] Graduate Attributes that are outside of the technical sphere” (P11). These ‘outside’ attributes include ‘professional skills’, such as communicating and collaborating with clients, peers, and those in allied professions, as examples. Consequently, these and other intrinsic competencies may not be a focus of their conversations or feedback to students.

*Capacity to assess and evaluate competence at the student-level.*

All participants across clinical psychology, nursing, occupational therapy, postgraduate medical education and teacher education agreed that competence is difficult to assess and evaluate at the student level. Evaluation decisions about the achievement of competence standards were perceived to be inferences based on documented evidence of performance collected from multiple assessments conducted over time, across tasks, assessors, and practice contexts. For example, participants from occupational therapy explained that because “every assessment method has its limitations” (P5) and student performance isn’t consistent across assessments, you need “paper and pencil tests” and “live assessments” where students have to
“think on their feet to come up with a solution” (P12). Similarly, participants from postgraduate medical education agreed that the more they saw evidence of a learner’s “ability to transfer” (P13) and “perform consistently across practice contexts” (P8), the more “confident they were in that individual’s competence” (P15). However, several participants also recognized the resources required to support faculty in conducting multiple assessments to assess students’ development and achievement of competence standards over time (P2, P6, P8, P12, P19). As one participant from occupational therapy explained, designing and conducting assessments that “get into people’s heads” to assess their ability to make professional judgments “takes a lot of work to set up and a lot of work to grade” (P12). With increasing class sizes and “not many more resources” (P12), there was a perceived risk of faculty burnout.

In addition to faculty burnout, participants from clinical psychology, nursing, occupational therapy, postgraduate medical education and teacher education also had concerns about getting core faculty and adjuncts from the field to: (1) document honest judgments of student performance; (2) share or ‘feed forward’ performance information to support students’ ongoing learning; and (3) make timely high-stakes decisions about students’ progression or remediation. Participants perceived faculty from their programs to be comfortable and willing to document feedback about students’ technical knowledge and skills, but quite hesitant to document feedback about their “professional skills” or “soft skills.” They perceived faculty to shy away from writing down anything about the more ‘personal’ aspects of performance because its uncomfortable to “give bad news” about someone’s character (e.g., integrity, work ethic, etc.) (P13, P18, P19), “they want to be nice” (P2, P4B), they don’t want to tarnish a students’ record (P6) and trainees might not be receptive to this type of feedback (P19).
Participants also perceived faculty from their programs to worry about documenting potentially ‘biased’ concerns that could have unintended negative consequences for students who are still learning (P6, P12, P13, P19). Despite having expertise in their profession, faculty were perceived to worry about the accuracy and reliability of their professional judgments about student performance, often wondering ‘if it’s just me’ who noticed concerns about a particular student in difficulty. These concerns, along with wanting to give students time/opportunity to learn and improve, were thought to prevent faculty and programs from making timely high-stakes decisions about students’ progression, remediation, or removal from the program (P6, P12, P13, P19). As one participant from clinical psychology explained, there’s a tendency on the part of faculty instructors/assessors to not want to “rock the boat”:

Recognizing that there’s individual differences in how long it takes people to learn things, or where their starting point is. I think people are generally uncomfortable with giving bad news. I think that’s a big part of it. I think if somebody progresses further, then it becomes even more uncomfortable, ‘well nobody else has raised any concerns—that I actually know of— so I shouldn’t rock the boat. I’ll just continue on’. I think people perceive documentation as taking a lot of time and potentially the person might argue with that documentation and that’s stressful, so it’s easier to not do anything. (P19)

Academic appeals were perceived to be ‘unwinnable’ without extensive documentation of students not meeting competence standards and evidence of multiple unsuccessful remediation efforts (P2, P6, P12, P13). Therefore, in an effort to balance students’ learning needs and public protection, participants explained that their program’s approach would be to try and “counsel
these students out of their program” by working to develop students’ insight as to why they have been unsuccessful in meeting performance standards (P2, P6, P19).

Summary

The delineations between the two approaches and their associated challenges were clear and consistent. There appeared to be no overlap or gradation. A key difference between programs taking approach A (business, engineering, law, and planning) and programs taking approach B (clinical psychology, nursing, occupational therapy, postgraduate medical education, and teacher education) was the absence/presence extensive work-integrated learning requirements (i.e., practicums, field/clinical placement, service requirements). This difference likely contributes to the clear dichotomy. Faculty from programs taking approach A cannot directly observe students’ developing or demonstrating the achievement of competence standards in the workplace.

Discussion

The findings of this study offer important and novel insights into the approaches professional education programs are using to operationalize entry-to-practice competence frameworks across professional disciplines. Research investigating perceived tensions with implementing externally derived competence-frameworks within existing university-based structures will contribute important understandings to the competency-based education movement within professional and higher education (Pichette & Watkins, 2018). Specifically, the findings support faculty, program leadership and policy makers to understand what it takes to implement competency-based teaching/learning and assessment at the professional program level.
The findings suggest that professional programs are taking one of two approaches to operationalizing their competence framework. Within this mid-sized Canadian university, business, engineering, law, and planning programs appear to have taken what can be interpreted as being a competency-informed approach (i.e., approach A), demonstrating how their program aligns with their competence framework. Student performance data on individual component competencies was collected to support decisions about quality assurance and ongoing program improvement. This information was used to support programs in identifying gaps in the curriculum (i.e., what the program is intending to cover), gaps in course instruction (i.e., what instructors are intending to teach in their courses), and gaps in their assessments (i.e., what instructors are intending to assess, using specific methods and tools). In contrast, clinical psychology, medicine, nursing, occupational therapy and teacher education programs appear to have taken an approach (i.e., approach B) that is more consistent with a competency-based approach; demonstrating how students are developing and achieving entry-to-practice competence standards through a combination of classroom and work-integrated learning opportunities. Student performance data was collected to inform formative decisions about students’ learning and ongoing development of competence and summative high-stakes evaluation decisions about the achievement of competence standards, in addition to program improvement efforts. This difference suggests that programs taking a competency-informed approach tend to be more concerned about the instrumental use of assessment data for maximizing the value of program inputs (Lim, 1999) potentially because they have no opportunity to directly observe students’ demonstrating competencies in the workplace. In contrast, programs taking a more competency-based approach appear to be more concerned with the developmental use of assessment data to inform decisions about learning processes and
products (i.e., outcomes) (AERA, APA, NCME, 2014). This may be because of their extensive work-integrated learning requirements.

Another possible explanation for why a program may choose to take one approach over the other is their pathway to licensure. For those programs taking a competency-informed approach, there may be less explicit pressure placed on the program to offer work-integrated learning opportunities or to accurately and reliably develop and assess competence at the student-level because of their requirements for professional certification post program completion. Graduates of these programs are often required to complete a period of supervised work experience and to write a professional ethics or jurisprudence exam. These post-graduation processes (e.g., college regulation and hiring practices) may serve as gatekeeping mechanisms to weed out graduates who are not meeting competence standards. In comparison, professions adopting more of a competency-based approach may not require a period of supervised practice post-graduation because they have workplace integrated learning requirements for professional program completion. For these programs, successful program completion signifies achievement of a minimum standards of competence (Pichette & Watkins, 2018).

While competency-based approaches claim to “enable more consistent graduate outcomes” (e.g., C-BEN, 2017; Pichette & Watkins, 2018), the findings of this study suggest that this may be difficult for programs to achieve. Participants from programs taking approach B (which is more consistent with a competency-based approach) perceived competence to be difficult to assess, and for faculty to need resources, incentives, and educational support to develop their capacity to use multiple authentic performance-based assessments to scaffold students’ development of competence and to inform high-stakes decisions about their progress and progression. These findings are consistent with the challenges identified in collecting assessment
data and making assessment decisions within Competency-Based Medical Education (CBME) (e.g., Gruppen et al., 2018; Holmboe et al., 2011; Mejicano & Bumsted, 2018). According to Gruppen et al. (2018) competency-based approaches “place particular demands on assessment quality, frequency, purpose, and management that exceeds the traditional requirements” (p. S20). To this point, the medical education community has experienced challenges with managing, visualizing, and communicating assessment data, defining and making valid and reliable assessment decisions, and “modeling the considerable complexity of assessment in real-world settings and richly interconnected social systems” (Gruppen et al., 2018, p. S17).

**Implications for Practice, Policy and Research**

In light of the findings from this study, it is important for those leading professional accrediting bodies and professional education programs to spend time to consider the role professional programs play in determining competence for entry-to-practice along their pathway to licensure, along with their intents for implementing a competence framework. The following questions may help those tasked with program design, delivery, and monitoring to decide whether they should be taking a competency-informed or competency-based approach to implementation. To what extent:

- are there university policies limiting the potential for students to develop competence through authentic work-integrated learning opportunities (e.g., credit hour requirements)?
- do faculty hiring and promotions structures value and reward professional practice and educational development experiences that enable faculty to develop authentic learning and assessment opportunities?
• are policies surrounding grading and reporting, the sharing of student performance information, faculty teaching evaluations, or academic appeals limiting the documentation and mobilization of evidence needed to support low- and high-stakes decisions about students’ development and achievement of competence?
• is there investment in educational resources to support faculty who are tasked with a developmental approach to operationalization at the program level?

The intent of this work was to begin to identify key foundations with respect to the development and assessment of student competence across professional disciplines. While limited in scope, given the use of a single university, the findings highlight diversity in the approaches to implementation being used across programs, while also illustrating common attributes that can be used to classify the manner in which these programs operationalize competence. Focusing this research on the perspectives of program leaders enabled the examination program intentions and challenges, but prevented the triangulation of participants’ perspectives with evidence from direct observation or confidential program accreditation documents. Rather, the focus was to explore the intentions behind, perceived approaches to, and challenges with, operationalization. Efforts were made to increase the credibility of the data and trustworthiness of findings, including writing memos throughout data collection, providing participants with opportunities to member check the accuracy of their data, triangulation of ideas across program participants, and collaborative interpretation of findings through discussions amongst members of the research team. In future research, it will be important to determine the extent to which professional certification requirements influence programs’ conceptions of, and approaches to, competency-based teaching, learning, and assessment across disciplines and institutions. It will also be important to explore the perceived challenges with implementation.
from the perspectives of students and faculty instructors/advisors/assessors, who are directly involved in developing and assessing competence in academic and work-integrated environments.
Chapter 8

Discussion

Chapter Overview

I begin this final chapter with a summary of the research questions and key findings; highlighting important themes that have emerged across Studies 1, 2 and 3, and how they relate to ongoing discussions about competency-based approaches to professional education. Next, I recap how this program of research (i.e., Studies 1, 2, and 3) was intentionally designed to explore potential alignment between how competence is conceptualized, represented and operationalized in practice. I then provide and discuss a key quote to illustrate this relationship. Subsequently I explain the limitations of this research as it has been conducted, and the implications for further research. Finally, before bringing the chapter to a close with concluding remarks, I discuss the implications of this research as a whole, explaining how the findings have potential to inform practice, policy, and future scholarship.

Research Question 1: What similarities and/or differences exist in the ways in which professional accrediting bodies conceptualize, describe and represent competence?

Professions describe similar competencies which can be thematically grouped into the same competence domains. However, the language used to describe the standard of competence across professional entry-to-practice frameworks is inconsistent. Whereas some professions represent competence as a collective list of component parts, others represent competence as an integrated system of competencies. The conceptual tension between ‘component’ and ‘integrated’ conceptions of competence within professional literature (Eraut, 1994, 1998; Gonczi, 1994; Short, 1984) manifests as architectural differences amongst the entry-to-practice competence frameworks. Hager and Gonczi (1996) suggested that how competence is...
conceptualized has implications for how competence standards are used and assessed in practice. My work advances this earlier work, demonstrating that the manner in which competence is described and architecturally represented within entry-to-practice competence profiles has implications for the ways that competence is thought about, developed and assessed at the program level. This assertion was subsequently investigated in Study 3.

The organization of knowledge into structured patterns (i.e., mental models) enables multiple people, who have different experiences or perspectives, to engage in group decision-making about theoretical concepts, like competence (Cannon-Bowers, Salas, & Converse, 1993). The language and architecture used to represent competence are important for creating a shared mental model of performance standards at particular milestones along the professional pathway to licensure (e.g., at entry-to-practice). Having shared ideas about outcomes allows the multiple stakeholders involved in professional education to communicate and coordinate their efforts more effectively (Kellermans, Floyd, Pearson, & Spencer, 2008; Wu, Martin, & Ni, 2017).

Research Question 2: How is a highly resourced, highly workplace-based professional education program currently operationalizing the assessment of competence within their own professional context, using their own entry-to-practice competence framework?

This emergency medicine postgraduate medical education program is using a programmatic approach to address three intended purposes for assessment: formative use to guide low-stakes decisions about residents’ learning, summative use to inform high-stakes decisions about residents’ progress, promotion and remediation, and developmental use to inform decisions about ongoing program improvement). For a visual representation of the model of programmatic assessment, refer to Figure 5.1 in Study 2. Within this model, the same faculty members hold multiple roles. For example, a faculty member can assess resident performance in
the workplace, work to support residents’ learning as their Academic Advisor, and inform high-stakes decisions about residents’ achievement and progression as a member of the Competence Committee. While there is a perceived tension in the role of Academic Advisor as a learning mentor and evaluator of achievement, Academic Advisors are uniquely positioned as brokers of residents’ performance information between cycles of knowledge production and use. Specifically, Academic Advisors can see how the same performance information can be generated and used for both formative assessment, summative assessment and program improvement.

Within this model of programmatic assessment, the competence framework, learning management system (including an electronic portfolio), faculty, Academic Advisors, and Competence Committee members are critical components and supports for co-regulating candidates’ learning and development of competence (Rich, 2017). However, their ability to co-regulate learning is limited by the trustworthiness of, and their access to, documented performance information. In this system, educational decisions are only as good as the performance information (knowledge) upon which they are made. Academic Advisors, by nature of their position as knowledge brokers, are well-positioned to see how individual components/supports work together to enable the system of assessment to function. Thus they may be an important resource for leading faculty and resident development efforts to improve the program of assessment. For example, Academic Advisors may be able to provide specific guidance to faculty and residents who may not realize the unintended consequences of failing to document critical information about resident performance. Similar to the findings of Curry and Docherty (2017), this study would suggest that considerable financial and human resources are needed to support all assessment stakeholders (i.e., learners, assessors, Academic Advisors,
Competence Committee members, program leadership) in understanding how their combined efforts contribute to the functioning of a system of assessment, which aims to serve multiple purposes (i.e., formative, summative, and program development).

**Research Question 3:** (a) How are professional education programs, with potentially fewer resources and lesser emphasis on workplace-based training, conceptualizing professional competence and approaching the assessment of competence being put into practice?

Two diverse conceptions of competence and approaches to the assessment of competence were identified in the sample of nine professional education programs from one medium-sized Canadian university. In professions that represent competence as lists of component knowledge and skills, program leadership conceptualized competence as being equal to the sum of its component parts. These programs were perceived to adopt an instrumental approach to operationalization, focusing on the measurement of learning outcomes for summative assessment and quality improvement related to program-level change (e.g., identifying potential gaps in curriculum and instruction, and improving the reliability and validity of individual assessment tools and activities). In contrast, in professions that represent competence as an integrated system of competencies from different meta-competency domains, program leadership conceptualized competence as being equal to more than the sum of its component parts. These programs were perceived to adopt a developmental approach to operationalization, using their competence framework as a mechanism to support students’ abilities to self-regulate learning, and faculty members’ abilities to co-regulate learning through formative and summative assessment opportunities over time.
Research Question 3: (b) What considerations and/or challenges are currently influencing their thinking about the assessment of competence?

Each program’s perceived assessment challenges directly related to their current approach to implementation. Participants from programs currently taking an instrumental approach to operationalizing their entry-to-practice competence framework (engineering, law, business, and planning) recognized the limitations of ‘measurement’ analytics for reporting on and supporting program-level change, and the benefits of a more developmental approach for students and their learning. These programs often referred to the challenges associated with developing authentic, work-integrated learning opportunities and assessments that require students to practice integrating multiple competencies as they would in field or practice settings in order to accomplish real-life professional tasks. As noted by others (e.g., Guskey, 2003; Wiggins, 1998), developing authentic performance tasks is especially challenging for educators who typically have little to no training in assessment development, very little time, and concerns about losing objectivity in grading.

In contrast, programs currently using a more developmental approach to operationalizing their entry-to-practice competence framework recognized the challenges that come with assessing the integration of meta-competencies and students’ abilities to perform consistently across multiple authentic practice contexts (e.g., in different settings, with different clients, etc.). These challenges are consistently reported by those implementing competency-based education and assessment in the professions (e.g., Gonczi, 1994; Hawkins et al., 2015; Pijl-Zieber et al., 2014). When discussing challenges with assessing performance, participants from these programs described a ‘failure to fail’ phenomenon, referring to difficulties with getting core program faculty and adjuncts from the field to: (1) document honest judgments of student
performance; (2) share or ‘feed forward’ performance information to support these students’ ongoing learning; and (3) make timely high-stakes decisions about the students’ progression or remediation. This is consistent with prior research, which has found that faculty are reluctant to fail students because of a lack of documentation, lack of knowledge about what to document, anticipation of an appeal, and lack of remediation options (Dudek, Marks & Regehr, 2005). Others have similarly suggested that clear documentation and communication of student underperformance, while time-consuming and potentially demoralizing for faculty, are essential for managing students who are not meeting performance standards (e.g., Duffy, 2013).

Faculty reluctance to flag students who are not meeting competence standards is a longstanding concern in professional education (e.g., Dudek, Marks & Regehr, 2005; Ilott & Murphy, 1997). In order to address issues with subjectivity and the quality of information obtained from individual performance assessments, many have suggested the need for ‘programs’ or ‘systems’ of assessment in order to look for patterns in performance over time and contexts (e.g., Bok et al., 2013; Ginsburg et al., 2010; Gonczi, 1994; van der Vleuten et al., 2012). Within systems of assessment, high-stakes decisions about the achievement of competence standards are made when sufficient information is gathered across individual assessments (van der Vleuten et al., 2015). This approach to assessment is consistent with the model of programmatic assessment examined in Study 2. The findings of Study 2 suggest that even within a program of assessment, the formative and summative assessment decisions are only as trustworthy as the performance information that is collected and entered into the system.

**Connecting Research Questions 3(a) and (b)**

The apparent dichotomy in approaches and challenges to assessing competence is consistent with the ‘two assessment models’ described by Hager and Butler (1996). According to
Hager and Butler (1996, p. 376) there are “two distinctive models” available for educational assessment; a scientific measurement model, and a legal judgment model, each following a different set of assumptions, principles and practices. Figure 8.1 summarizes key differences in the assessment practices.

As can be seen in Figure 8.1, the measurement model focuses on using valid and reliable instruments to generate numerical scores that constitute evidence about a student’s achievement of knowledge and skills. In contrast, the judgment model centers on triangulating a collection of evidence gathered from demonstrations of performance in simulated or real-life contexts to make inferences about the achievement of competence standards. In comparing the measurement model to the judgment model, Hager and Butler (1996, p. 369) make distinctions on the following dimensions: “(1) component parts to the whole, (2) analysis to synthesis, (3) aspects remote from practice to actual practice, (4) external rules governing behaviour to personal, experiential integration of practice, and (5) achievement early in the curriculum to exit achievements.” These distinctions mirror the tensions found in my research between component parts or integrated conceptions and representations of competence (Study 1), and programs measuring the attainment of individual competencies at the end of term using summative assessments (i.e., exams, written reports) or inferring competence from multiple performance assessments observed over time (Studies 2 and 3).
Table 8.1. *Practices differentiating the scientific measurement and judgment models of assessment*

<table>
<thead>
<tr>
<th>Measurement model</th>
<th>Judgment model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination focus</td>
<td>A variety of diverse assessment events as the focus</td>
</tr>
<tr>
<td>Measurement of attainments</td>
<td>Inference of competence</td>
</tr>
<tr>
<td>Single scores and measures</td>
<td>Multiple sources of evidence</td>
</tr>
<tr>
<td>Controlled test conditions</td>
<td>Simulation of life situations</td>
</tr>
<tr>
<td>Emphasis on objectivity</td>
<td>Emphasis on avoidance of bias</td>
</tr>
<tr>
<td>Focus on test instruments, validity and reliability</td>
<td>Emphasis on triangulation, direct evidence, informed judgement</td>
</tr>
</tbody>
</table>


**Additional Threads Emerging Across Studies 1, 2, and 3**

In its purest form, competency-based approaches to education differ from traditional higher education program models with respect to structure, pedagogy, assessment, faculty role, student interaction, and credential (Carraccio, Wolfsthal, Englander, Ferentz & Martin, 2002; Pichette & Watkins, 2018). Figure 8.2 provides a comparison of the elements of traditional programs, which are focused on structure and process, and competency-based programs, which are focused on the development and achievement of outcomes. As can be seen in Figure 8.2, faculty have an important role to play in operationalizing elements of a competency-based program.
Table 8.2. *A comparison of the elements of traditional and competency-based educational programs*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Structure- and process-based</th>
<th>Competency-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving force for curriculum</td>
<td>Content – knowledge acquisition</td>
<td>Outcome – knowledge application</td>
</tr>
<tr>
<td>Driving force for process</td>
<td>Teacher</td>
<td>Learner</td>
</tr>
<tr>
<td>Path of learning</td>
<td>Hierarchical (teacher ➔ student)</td>
<td>Non-hierarchical (teacher ↔ student)</td>
</tr>
<tr>
<td>Responsibility for content</td>
<td>Teacher</td>
<td>Student and teacher</td>
</tr>
<tr>
<td>Goal of educational encounter</td>
<td>Knowledge acquisition</td>
<td>Knowledge application</td>
</tr>
<tr>
<td>Typical assessment tool</td>
<td>Single subjective measure</td>
<td>Multiple objective measures (“evaluation portfolio”)</td>
</tr>
<tr>
<td>Assessment tool</td>
<td>Proxy</td>
<td>Authentic (mimics real tasks of profession)</td>
</tr>
<tr>
<td>Setting for evaluation</td>
<td>Removed (gestalt)</td>
<td>“In the trenches” (direct observation)</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Norm-referenced</td>
<td>Criterion-referenced</td>
</tr>
<tr>
<td>Timing of assessment</td>
<td>Emphasis on summative</td>
<td>Emphasis on formative</td>
</tr>
<tr>
<td>Program Completion</td>
<td>Fixed time</td>
<td>Variable time</td>
</tr>
</tbody>
</table>


The findings of Studies 2 and 3 suggest that more integrated conceptions and representations of competence are difficult for programs and their faculty to develop and assess across professional disciplines. Further, they suggest that university and program-level policies,
practices, and resources may serve to enable or constrain faculty buy-in, as well as their capacity to enact competency-based approaches to instruction and assessment.

The results from Study 2 suggest that even within a highly-resourced and work-integrated professional education program (such as the Emergency Medicine program studied), there are multiple challenges with operationalizing a programmatic approach to assessment. For other programs that are less-resourced and work-integrated, taking a competency-based approach to learning and assessment would likely require even more investment from faculty or perhaps a different operational model.

Under a Faculty Association’s Collective Agreement with their University, faculty instructors have the academic freedom to choose their course content, as well as how they teach and assess students’ learning—so long as they respect the course description, degree learning expectations, etc. Collective Agreements also specify conditions regarding teaching workload (based on the academic unit/credit hour structure) and criteria for renewal, tenure and promotion (e.g., evidence of being a ‘good teacher’ and ‘high quality scholarly or creative work’). Learning how to operationalize elements of competency-based education for professional accreditation, while still upholding their Collective Agreements, satisfying any program-level policies surrounding assessment and evaluation, and working within the constraints of available resources, are challenging tensions for faculty to navigate. As an example, in discussing the barriers of operationalizing competency-based education in the health professions, others have suggested that the structures and policies of the university and program, as well as the established practices and attitudes of the faculty can present major challenges to implementation (e.g., Grochowski, Halperin & Buckley, 2007; Hatcher et al., 2013)
Contribution of Studies 1, 2, and 3: Demonstrating the Relationship Between Conceptualization, Representation, and Operationalization

Taken altogether, the findings of this research suggest that how competence is conceptualized and represented by professional accrediting bodies matters and is related to how professional program leadership conceptualize and operationalize the development and assessment of competence at the program-level. This was an assertion made by Hager and Gonczi in 1996. Since then, there has been a gap in the empirical research investigating the relationship between conceptions, representations, and operationalization of competence across professional disciplines. This dissertation provides empirical evidence to address this gap.

Together, Studies 1, 2, and 3 explore the potential relationships amongst the conceptualization, representation, and operationalization of competence (Figure 8.1). In moving from the conceptual to the practical, there tends to be alignment in how competence is thought about as a concept, represented as a framework, and developed and assessed in practice. Figure 8.1 provides an overall picture of important considerations in moving entry-to-practice competence frameworks from theory to practice. It has potential value for organizing the ideas of policy-makers, practitioners, and researchers when making decisions about scope.

As illustrated in Figure 8.1, the focus of Study 1 was to compare and contrast representations of entry-to-practice competence frameworks through document analysis. The findings indicate there are architectural differences between competence frameworks and imply that professions think about competence in different ways. Professional competence frameworks are written and revised by members of the profession. Documents are social artifacts representing peoples’ thinking about concepts at a given point in time (Bowen, 2009). Given that
professionals are known to approach complex problems from different perspectives (Schön, 2017), it makes sense that these perspectives would also influence how they view competence as a construct and design teaching/learning and assessment opportunities accordingly. This presents a possible line of inquiry for future research as it was not within the scope of Study 1 to directly investigate the extent to which professional conceptions of competence influence the development of competence frameworks.

![Diagram of the relationship between conceptualizations, representations, and operationalizations of competence](image)

**Figure 8.1.** The relationship between conceptualizations, representations, and operationalizations of competence

*Note.* Figure 8.1 indicates the focus of my multiple manuscripts and highlights the important question of alignment in moving from theory to practice.

A hypothesis emerging from Study 1 was that there would be alignment between how competence is represented in a profession’s entry-to-practice frameworks and operationalized at the program level. I found evidence to support this hypothesis in Studies 2 and 3. Depending on whether competence was represented as lists of knowledge, skills, or abilities, or as systems of meta-competency domains, program leadership adopted different approaches to operationalizing
the development and assessment of competence and perceived different challenges with assessment.

In Study 3, there is also evidence that program leaderships’ perceived challenges with operationalizing the ‘measurement’ of individual competencies prompts them to re-conceptualize, -operationalize, and -represent competence as being more integrated and holistic. To illustrate this finding in a more concrete way, I have provided an illustrative quote from engineering. Within engineering, entry-to-practice competence is represented as a list of 12 Graduate Attributes ((1) A knowledge base for engineering; (2) Problem analysis; (3) Investigation; (4) Design; (5) Use of engineering tools; (6) Individual and team work; (7) Communication skills; (8) Professionalism; (9) Impact of engineering on society and the environment; (10) Ethics and equity; (11) Economics and project management; and (12) Life-long learning). Within this engineering program, individual Graduate Attributes were mapped to specific course outcomes, learning opportunities and assessments. Students were assumed to be competent by virtue of passing all of their required courses. This quote illustrates Participant 1’s thought process in moving from representation (framework) → operationalization → re-conceptualization → re-operationalization → re-representation → re-operationalization:

The first response of anybody going through this is ‘OMG how do we create a system that can measure all of these things? […] And that [sparks] questions surrounding the data and accuracy of what you are doing. And then [you ask] ‘is this really the best way that you can evaluate your students? […] ‘Does this really mean that they actually used all of those skills in the way that we want them to?’ And then that becomes, ‘well then, how do we actually do that?’ Now we’re talking about them demonstrating a competency. […] And that’s where it
becomes less about the individual Attributes and more about how well the student just performs as an engineer. And that becomes the question of, ‘do you need a more defined apprenticeship model?’ Because that’s what engineering was – an apprenticeship model. As soon as academics got involved and regulation got involved, it moved away from the apprenticeship model. […] Because you can say that you demonstrate the required outcomes in communication, and all of these things, but maybe you can’t put them together. If you can’t put them together, then you’re not going to be a competent engineer. You will be someone who’s right at the cusp. But you’re not making the connections, and you’re not utilizing your skills in concert. That’s what we want them to do. So it becomes breaking down the little siloed list to say, ‘these are the aspects of them, but we expect you to use them together’. And doing that is going to take a change in how we look at evaluating and developing our students.

This quote highlights how adoption of their professional competence framework (i.e., the 12 Graduate Attributes) sparked a need to operationalize the framework at the program level in order to meet accreditation requirements. Operationalization led to the realization of challenges associated with their approach to developing and assessing competence at the program level. This prompted them to reconsider what the engineering profession means by competence as a construct, and to consider alternative possibilities for operationalization, and to re-envision how competence should be represented as a framework.
**What is the utility of Sameroff’s Unified Theory of Development?**

Sameroff’s Unified Theory of Development (2010) was the overarching conceptual framework for Studies 1, 2, and 3. Sameroff’s macro model (Figure 7.2) provided a social-cognitive systems perspective on the relationships between overlapping social contexts (micro model 1), co-regulated learning (micro model 2), and development over time (micro model 3). Together, these three micro models provided useful representations for understanding how professional education programs in different disciplines are approaching the development and assessment of competence in practice. Specifically, the model of overlapping social contexts was useful for thinking about how students and faculty are nested within a professional program and a university and also influenced by professional accrediting and regulating bodies. The model of co-regulated learning was useful for thinking about the role of faculty instructors as co-regulators of learners’ development of competence and ability to independently self-regulate learning. Lastly, the model of development over time was useful for thinking about the opportunities available for students to receive formative feedback on their development of competence over time.

When considered in relation to each other, these micro models were particularly useful for distinguishing developmental use of assessment to inform decisions about learning processes and products (i.e., outcomes) (AERA, APA, NCME, 2014), from instrumental use of assessment to inform summative grades and decisions about program inputs (Lim, 1999); thereby helping to distinguish competency-based from competency-informed approaches to operationalization. This was explored in Study 3. Whereas a competency-informed approach to operationalization focuses on aligning curriculum, learning opportunities and assessments to a competency-framework, competency-based approaches focus on competency-focused instruction and
ongoing formative and summative assessment in authentic practice settings so as to allow students to develop and demonstrate their achievement of competence standards at their own pace (Pichette & Watkins, 2018; van der Vleuten & Schuwirth, 2012; Van Melle, 2019).

Therefore, Sameroff’s (2010) Unified Theory of Development (see Chapter 2, Figure 2.2, p. 33) can be best position within the operationalization circle of Figure 8.1.

**Limitations of Studies 1, 2, and 3**

Taken individually, each study had its own limitations associated with sampling and generalizability (as discussed in Manuscripts 1, 2, and 3). Studies 2 and 3 were conducted at a single site. However, together, Studies 2 and 3 accomplish both an in-depth investigation of operationalization within an information-rich program, and breadth of investigation comparing operationalization across nine professional disciplines—while keeping the university context constant. The findings of Studies 1, 2, and 3 complement one another in scope and focus (as represented in Figure 8.1) and convey a consistent message about why conceptions and representations of competence matter and can inform the development and assessment of competence by professional education programs.

**Strategies to enhance the generalizability of findings**

While generalizability is cautioned in applied qualitative research, it is an important pragmatic consideration for readers. In reading this dissertation, people may be curious about the transferability of findings beyond the limited cases studied and the extent to which the findings have relevance or utility for their own educational context(s). Through careful selection of information-rich samples and case studies that balance depth and breadth, as well as rich description of both context and program illustrations, I invite readers to extrapolate from my findings (Cronbach, 1980). I encourage readers to apply the awareness and understandings
gained from this research to extrapolate beyond the boundaries of the data and consider the applicability of the findings to other university-based professional education programs. In this way, my findings can be treated as working hypotheses to be investigated in other contexts (Cronbach, 1975; Guba, 1978).

In interpreting and extrapolating my findings to other contexts, readers can place trust in my efforts to enhance the quality and credibility of my research methods. First, as an important instrument in the research design, data collection, and analyses, I have tried to be intentionally reflexive and explicit in stating: (1) the experiences that affect my positionality as a researcher; (2) the systems lens that I bring to applied qualitative research; and (3) any potential conflicts of interest. Second, within each study, I have been intentionally descriptive in articulating my approach to systematically conducting the research. This allows readers to critically evaluate my findings in light of the limitations and strengths of my approach. Across all three studies, I was the only researcher who analyzed the data. However, when making sense of the data, I was careful to check my interpretations against my cited literature (i.e., prior research), conceptual framework, participants’ perspectives, and my committee members’ knowledge and experiences with supporting teaching/learning and assessment within and across professional education programs.

**Recommendations for Future Policy**

Two recommendations for policy emerged from the research findings. These recommendations are framed as suggestions for leadership of professional accrediting and regulating bodies, and professional education programs.

**Suggestions for leadership of professional accrediting and regulating bodies.** Entry-to-practice competence frameworks inform professional accreditation standards as well as the
development and assessment of competence at the professional program level. Given that there are tensions with competence as a concept (Eraut, 1994, 1998; Gonczi, 1994; Short, 1984), it is suggested that leadership of professional accrediting and regulating bodies review the language and architecture they are using to represent competence to ensure that they align with and accurately communicate their professional conception of entry-to-practice competence.

**Suggestions for leadership of professional education programs.** Professional program leadership need to take the time to closely examine existing university policies to determine which elements of competency-based education are feasible to implement. For example, it is critical to know to what extent the university/program can support:

- students to learn and progress at their own pace and demonstrate achievement of competence standards in authentic practice contexts (i.e., in simulated and workplace-based settings); and

- the revision of existing policies, or the development of new policies, to encourage and support faculty to develop their educational capacity to enact elements of CBE.

Once these factors are known, it is recommended that leadership from university-based professional programs and professional accrediting bodies spend time to negotiate the role that professional programs can feasibly play in determining individual student’s competence for entry-to-practice.

**Recommendations for Future Practice**

Two recommendations for practice emerged from the research findings. Once again, these recommendations are framed as suggestions for leadership of professional accrediting and regulating bodies, and professional education programs.
Suggestions for leadership of professional educations programs. Professional program leadership tasked with operationalizing entry-to-practice competence frameworks need to consider the following questions when making program-level decisions about the design of teaching/learning and assessment opportunities:

- How does our profession conceptualize and represent competence? As an integrated system? Component parts?
- In our professional pathway to licensure, what role does our program play in determining individual student’s competence for entry-to-practice? To what extent does the program need to serve as a professional gatekeeper preventing incompetent graduates from gaining entry-to-practice?
- What university structures enable and/or inhibit the program to take on this role?
- What resources must be made available to support faculty (and other teaching and learning stakeholders) in enacting elements of CBE?

Suggestions for faculty of professional educations programs. For faculty tasked with enacting elements of CBE within their professional education program (e.g., developing authentic performance assessment tools, conducting direct observation and documenting feedback on student performance, making high-stakes evaluation decisions about progress, promotion, or remediation, etc.), it is suggested they consider their own attitudes towards and capacity for engaging in new instructional pedagogy and approaches to assessment. Faculty may consider seeking out educational development opportunities to develop their abilities to:

- co-regulate learning;
- document honest, criterion-referenced judgements of student performance;
• share or ‘feed forward’ performance information to support students’ ongoing learning; and

• make timely high-stakes decisions about students’ progress, promotion, or remediation.

Recommendations for Future Research

Given that this research was exploratory and limited in scope, my recommendations for future research focus on opportunities to investigate the generalizability of my research findings. It is suggested that future research:

• Use Study 1 as a framework for similar research investigating the extent to which professions represent entry-to-practice competence in similar ways, but with a different sample of entry-to-practice competence frameworks (e.g., from different professional disciplines, from a different country, etc.)

• Use Study 2 as a framework for conducting further in-depth investigations of system of assessment, but within professional education programs/contexts that are not entirely workplace-based (e.g., clinical psychology, which integrates course-based learning and practicum placements)

• Use Study 3 as a framework for comparing and contrasting how professional education programs across a different sample of professional disciplines are operationalizing the development and assessment of competence, but in another university context (e.g., a large university)

• Compare and contrast the approaches being used to develop and assess competence within the same profession (e.g., engineering), but across small, medium, and large programs/universities (i.e., within different university structures that have different policies and resources)
• Investigate operationalization from multiple perspectives using a stratified purposeful sample of program leadership, faculty, and students. Where possible, triangulate participants’ perspectives with targeted direct observation of enactment and accreditation documents.

**Final Thoughts and Conclusions**

Taken altogether, the findings of Studies 1, 2, and 3 suggest that how competence is conceptualized and represented matters and has the potential to shape how competence is developed and assessed at the program level. Therefore, in this tension between component parts and integrated holistic conceptions, frameworks representing atomized lists or relational architectures, and programs taking instrumental or developmental approaches to operationalization, there appears to be divergent approaches in moving entry-to-practice competence from theory to practice.
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Appendix A: C-BEN’s (2017) Assessment Strategy

10 Standards for credential-level assessment strategy with robust implementation (C-BEN, 2017)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A A.</td>
<td>Authentic assessments are built within and aligned to an overarching assessment strategy for the competency being measured and the credential being earned. The assessment strategy clearly articulates how the set of assessments supports the learning journey for students, matches the cognitive level of the competencies being demonstrated and determines mastery at the appropriate academic level.</td>
</tr>
<tr>
<td>B.</td>
<td>The set of authentic assessments is designed to provide learners with multiple opportunities and ways to demonstrate competency, including measures for both learning and ability to apply (or transfer) that learning in novel settings and situations. The assessment strategy and each of the assessments and their corresponding rubrics equitably measure learning outcomes across diverse student groups, while guarding against bias in formative and summative assessment. Faculty understand the faculty role in the overarching assessment strategy for the credential and are trained in and can articulate the critical role played by each assessment in validating mastery of a competency.</td>
</tr>
<tr>
<td>C.</td>
<td>Each authentic assessment is transparently aligned to program competencies and its corresponding rubric, is rigorous, has clear and valid measures and is approved by faculty and assessment professionals. Formative assessments serve as a tool for learning providing feedback for reflection and refinement while also offering a feedback loop that is timely and appropriate to the competency and intent of the assessment. Summative assessments’ ability to measure application or the “can do” aspect of a competency is validated by a subject matter expert, ideally one external to the program design team. The assessment design accommodates personalization for learners by offering flexibility in when assessments will be administered, often supported by technology. The timeliness of feedback from assessments enables learners to proceed with the absolute minimum of delay. Technology is used wherever possible to facilitate and expedite the timeliness of feedback.</td>
</tr>
</tbody>
</table>
Appendix B: Study 1 – Supplementary Appendix Tables Illustrating Organization of Entry-to-Practice Competence Frameworks

Table S3.1

*Engineering Canada’s (2017) 12 Graduate Attributes organized according to knowledge/understanding and abilities*

<table>
<thead>
<tr>
<th>Type of Attribute</th>
<th>Description</th>
</tr>
</thead>
</table>
| Knowledge/understanding | • “A knowledge base for engineering,” including “mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program” (#1);  
                           • “An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and public interest” (i.e., “professionalism”) (#8); |
| Abilities               | • “An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems…” (#2);  
                           • “An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information…” (#3);  
                           • “An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs…” (#4);  
                           • “An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities…” (#5);  
                           • “An ability to work effectively as a member and leader in terms, preferable in a multi-disciplinary setting.” (#6);  
                           • “An ability to communicate complex engineering concepts within the profession and with society at large…” (#7);  
                           • “An ability to analyze societal and environmental aspects of engineering activities…” (#9);  
                           • “An ability to apply professional ethics, accountability, and equity.” (#10);  
                           • “An ability to appropriately incorporate economics and business practices…” (#11); and  
                           • “An ability to identify and to address their own educational needs in a changing world….“ (#12) |
Table S3.2

*The Federation of Law Societies of Canada’s (2018) Competency Requirements, organized by knowledge/understanding and skills/abilities*

<table>
<thead>
<tr>
<th>Competency Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge/understanding</strong></td>
<td>“Knowledge of the relevant legislation, regulation, rules of professional conduct and common or case law and general principles of ethics and professionalism applying to the practice of law in Canada” (2.1.a);</td>
</tr>
<tr>
<td></td>
<td>“Knowledge of the nature and scope of a lawyer’s duties including to clients, the courts, other legal professionals, law societies, and the public” (2.1.b);</td>
</tr>
<tr>
<td></td>
<td>“Knowledge of the range of legal responses to unethical conduct and professional incompetence” (2.1.c); and</td>
</tr>
<tr>
<td></td>
<td>“Knowledge of the different models concerning the roles of lawyers, the legal profession, and the legal system, including their role in the securing access to justice” (2.1.d);</td>
</tr>
<tr>
<td></td>
<td>“Understanding of the foundations of law, including: principles of common law and equity, the process of statutory construction and analysis, and the administration of law in Canada” (3.1)</td>
</tr>
<tr>
<td></td>
<td>“Understanding of the principles of public law in Canada, including: the constitutional law of Canada, including federalism and the distribution of legislative powers, the Charter of Rights and Freedoms, human rights principles and the rights of Aboriginal peoples of Canada; Canadian criminal law; and the principles of Canadian administrative law” (3.2)</td>
</tr>
<tr>
<td></td>
<td>“Understanding of the principles that apply to private relationships, including: contracts; torts; and property law” (3.3)</td>
</tr>
<tr>
<td><strong>Skills/abilities</strong></td>
<td>“Problem-Solving Skills,” including the “ability to identify relevant facts; identify legal, practical, and policy issues, and conduct the necessary research arising from those issues; analyze the results of research; apply the law to the facts; and identify and evaluate the appropriateness of alternatives for resolution of the issue or dispute” (1.1)</td>
</tr>
<tr>
<td></td>
<td>“Legal Research Skills,” including the “ability to identify legal issues; select sources and methods and conduct legal research relevant to Canadian law; use techniques of legal reasoning and argument […] to analyze legal issues; identify interpret, and apply the results of research; and effectively communicate the results of research” (1.2)</td>
</tr>
<tr>
<td></td>
<td>“Oral and Written Communication Skills,” including the “ability to communicate clearly in the English or French Language; identify the purpose of the proposed communication; use correct grammar, spelling, and language suitable to the purpose of the communication”</td>
</tr>
</tbody>
</table>
and for its intended audience; and effectively formulate and present well-reasoned and accurate legal argument, analysis, advice or submissions” (1.3)

- “Skills to identify and make informed and reasoned decisions about ethical problems in practice” (2.2.a); and
- “Skills to identify and engage in critical thinking about ethical issues in legal practice” (2.2.b)

Table S3.3

For each CanMEDS 2015 Role, the number of key and enabling competencies

<table>
<thead>
<tr>
<th>Role</th>
<th># of Key Competencies</th>
<th># of Enabling Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Expert</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Communicator</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Collaborator</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Leader</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Health Advocate</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Scholar</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Professional</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>7</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>

Table S3.4

For the role of Medical Expert, a sample key competency and set of enabling competencies

<table>
<thead>
<tr>
<th>Role</th>
<th>Key Competency</th>
<th>Enabling Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Expert</td>
<td>1. Practice medicine within their defined scope of practice and expertise</td>
<td>1.1 Demonstrate a commitment to high quality care of their patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2 Integrate the CanMEDS Intrinsic Roles into their practice of Medicine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.3 Apply discipline knowledge of the clinical and biomedical sciences relevant to their discipline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.4 Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5 Carry out professional duties in the face of multiple, competing demands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.6 Recognize and respond to complexity, uncertainty, and ambiguity inherent in medical practice</td>
</tr>
</tbody>
</table>
Table S3.5

For Entry-Level Registered Nurse Practice (CNO, 2014), the number of broad competency categories, number of competencies, and examples of each

<table>
<thead>
<tr>
<th>Broad Competency Category</th>
<th># of Competencies</th>
<th>Examples of competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Responsibility and Accountability</td>
<td>23</td>
<td>1. Demonstrates accountability and acceptance of responsibility for one’s own actions and decisions.</td>
</tr>
<tr>
<td>Knowledge-Based Practice</td>
<td>51</td>
<td>33. Proactively seeks new information, knowledge, and best practices for use in the provision of nursing care.</td>
</tr>
<tr>
<td>Ethical Practice</td>
<td>12</td>
<td>78. Promotes a safe environment for clients, self, health care providers and the public that addresses the unique needs of clients within the context of care.</td>
</tr>
<tr>
<td>Service to the Public</td>
<td>8</td>
<td>92. Manages resources in an environmentally and fiscally responsible manner to provide effective and efficient client care.</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>6</td>
<td>96. Practices within the scope of registered nursing practice as defined by the Nursing Act, 1991.</td>
</tr>
</tbody>
</table>

**Totals: 5**

Table S3.6

For the Canadian Association of Occupational Therapists’ (2012) roles, the number of key and enabling competencies for “competent” practice

<table>
<thead>
<tr>
<th>Role</th>
<th># of Key Competencies</th>
<th># of Enabling Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert in Enabling Occupation</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>Communicator</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Collaborator</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Practice Manager</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Change Agent</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Scholarly Practitioner</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Professional</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

**Totals: 7**

237
Table S3.7

For the role of Expert in Enabling Occupation, a sample key competency and set of enabling competencies

<table>
<thead>
<tr>
<th>Role</th>
<th>Key Competency</th>
<th>Enabling Competencies</th>
</tr>
</thead>
</table>
| Expert in Enabling Occupation | 1.1 Function effectivley as a client-centred expert in occupation, occupational performance, and occupational engagement. | 1.1.1 Demonstrate expertise in occupations, occupational engagement, and occupational engagement in practice with clients.  
1.1.2 Advocate for the client and occupational therapy to create positive first point of contact with client based on a referral, contact request, or the occupational therapist’s recognition of the real or potential occupational challenges.  
1.1.3 Incorporate the client’s perspective on meaning and relevance of needs and plans.  
1.1.4 Establish positive therapeutic relationships with clients that are characterized by understanding, trust, respect, honesty, and empathy  
1.1.5 Demonstrate skills in client-centred practice including mediation, negotiation, awareness, and respect for client. |

Table S3.8

For the Association of Faculties of Pharmacy of Canada’s (AFPC, 2017) Educational Outcomes, the number of roles and key and enabling competencies

<table>
<thead>
<tr>
<th>Role</th>
<th># of Key Competencies</th>
<th># of Enabling Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Provider</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Communicator</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Collaborator</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Leader-Manager</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Health Advocate</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Scholar</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Professional</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td><strong>Totals: 7</strong></td>
<td><strong>20</strong></td>
<td><strong>71</strong></td>
</tr>
</tbody>
</table>
Table S3.9

For the role of Care Provider, a sample key competency and set of enabling competencies

<table>
<thead>
<tr>
<th>Role</th>
<th>Key Competency</th>
<th>Enabling Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care</td>
<td>CP1. Practice within the pharmacist</td>
<td>CP1.1 Apply knowledge from the foundational sciences to make decisions relevant to the</td>
</tr>
<tr>
<td>Provider</td>
<td>scope of practice and expertise.</td>
<td>contemporary and evolving scope of pharmacist practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP1.2 Integrate AFPC Communicator, Collaborator, Leader-Manager, Health Advocate,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scholar, and Professional roles in the practice of pharmacy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP1.3 Recognize and respond to the complexity, uncertainty, and ambiguity inherent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in pharmacy practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP1.4 Explain the benefits, risks and rationale associated with pharmacist provided</td>
</tr>
<tr>
<td></td>
<td></td>
<td>care as an important step in obtaining and documenting consent to pharmacist care.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP1.5 Recognize and take appropriate action when signs, symptoms, and risk factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>that relate to medical or health programs that fall into the scope of practice of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>other health care professionals are encountered.</td>
</tr>
</tbody>
</table>

Table S3.10

For each realm of competence in the planning profession, the number of constituent sub-domains and examples of each (CIP, 2010)

<table>
<thead>
<tr>
<th>Realm of Competence</th>
<th># of Sub-Domains</th>
<th># of Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Competencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Settlement</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>History and Principles of Community Planning</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Government, Law, and Policy</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Plan and Policy Considerations</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Plan and Policy Making</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Plan and Policy Implementation</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Development in Planning and Policy</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>20</strong></td>
<td><strong>71</strong></td>
</tr>
<tr>
<td>Enabling Competencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Communication</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Leadership</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Professionalism and Ethical Behaviour</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>25</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>
Table S3.11

For the functional competency Human Settlement, a sample sub-domain and detailed description

<table>
<thead>
<tr>
<th>Functional Competency</th>
<th>Sub-Domain</th>
<th>Detailed description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Settlement</td>
<td>Human Settlement and Community, Regional, and Provincial Settings</td>
<td>• Understand knowledge of human settlement, its evolution and history, influence of natural setting and site context, geography, economy, environment and sustainability issues, changing forms and political and social structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Able to identify lessons learned from past experiences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Able to link lessons learned in human settlement to current and future planning challenges and opportunities</td>
</tr>
</tbody>
</table>

Table S3.12

For Psychology’s Core Competency Interpersonal Relationships, a summary of the knowledge and skills (MRA, 2004)

<table>
<thead>
<tr>
<th>Core Competency</th>
<th>Knowledge</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal</td>
<td>Knowledge of theories and empirical data on the professional relationship, such as:</td>
<td>• Effective Communication</td>
</tr>
<tr>
<td>Relationships</td>
<td>• Interpersonal relationships</td>
<td>• Establishment and maintenance of rapport</td>
</tr>
<tr>
<td></td>
<td>• Power relationships</td>
<td>• Establishment and maintenance of trust and respect in the professional relationship</td>
</tr>
<tr>
<td></td>
<td>• Therapeutic alliances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interface with social psychology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• More specific knowledge of the fluctuations of the therapeutic/professional relationship as a function of intervention setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowledge of self, such as:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Motivation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Values</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Personal biases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Factors that may influence the professional relationship (e.g., boundary issues)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowledge of others, such as:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Macro-environment in which the person functions (work, national norms, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Micro-environment (personal differences, family, gender differences, etc.)</td>
<td></td>
</tr>
</tbody>
</table>
Table S3.13

*For each Social Work Competency Block, the number of Global Competencies and Sub-Competencies (CCSWR, 2012)*

<table>
<thead>
<tr>
<th>Competency Blocks</th>
<th># of Global Competencies</th>
<th># of Sub-Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applying Ethical Standards</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Conducting Assessments</td>
<td>3</td>
<td>44</td>
</tr>
<tr>
<td>Planning Interventions</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Delivering Services</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td>Improving Policies and Practices</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Engaging in Reflective Practice and Professional Development</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td><strong>Totals:</strong> 6</td>
<td><strong>21</strong></td>
<td><strong>152</strong></td>
</tr>
</tbody>
</table>

Table S3.14

*For the Applying Ethical Standards Competency Block, a sample Global Competency and set of Sub-Competencies*

<table>
<thead>
<tr>
<th>Competency Block</th>
<th>Global Competencies</th>
<th>Sub-Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applying Ethical Standards</td>
<td>Identify ethical considerations related to the problem or needs being addressed.</td>
<td>1. Identify ethical considerations related to the problem or needs being addressed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Determine when a planned course of action is consistent with professional ethics.</td>
</tr>
</tbody>
</table>
### Table S3.15

*For Social Work's Core Learning Objective, the number bullets describing values, knowledge, and skills (CASWE, 2014)*

<table>
<thead>
<tr>
<th>Core Learning Objective</th>
<th># of listed Values, Knowledge, and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify as a professional social worker and adopt a value perspective of the social work profession.</td>
<td>2</td>
</tr>
<tr>
<td>2. Adhere to social work values and ethics in professional practice</td>
<td>2</td>
</tr>
<tr>
<td>3. Promote human rights and social justice</td>
<td>2</td>
</tr>
<tr>
<td>4. Support and enhance diversity by addressing structural sources of inequity</td>
<td>2</td>
</tr>
<tr>
<td>5. Employ critical thinking in professional practice</td>
<td>3</td>
</tr>
<tr>
<td>6. Engage in research</td>
<td>3</td>
</tr>
<tr>
<td>7. Participate in policy analysis and development</td>
<td>3</td>
</tr>
<tr>
<td>8. Engage in organizational and societal systems’ change through professional practice</td>
<td>3</td>
</tr>
<tr>
<td>9. Engage with individuals, families, groups, and communities through professional practice</td>
<td>5</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>25</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Table S3.16

*For Core Learning Objective 1, the bullets describing the required values, knowledge and skills*

<table>
<thead>
<tr>
<th>Core Learning Objective</th>
<th>Component values, knowledge, and skills</th>
</tr>
</thead>
</table>
| 1. Identify as a professional social worker and adopt a value perspective of the social work profession. | i. Social work students develop professional identities as practitioners whose professional goal is to facilitate the collective welfare and wellbeing of all people to the maximum extent possible.  
ii. Social work students acquire the ability for self-reflection as it relates to engaging in professional practice through a comprehensive understanding of the consciousness of the complex nature of their own social location and identities. Students develop an awareness of personal biases an preferences to advance social justice and the social wellbeing of social work service users. |
Table S3.17

For Teacher Education’s Core Competency statement, the number of Features and Mastery Criteria (MEQ, 2001)

<table>
<thead>
<tr>
<th>Category and Core Competency Statements</th>
<th># of Features</th>
<th># of Mastery Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. To act as a professional inheritor, critic and interpreter of knowledge or culture when teaching students</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. To communicate clearly in the language of instruction, both orally and in writing, using correct grammar, in various contexts related to teaching.</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td><strong>Teaching Act</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To develop teaching/learning situations that are appropriate to the students concerned and the subject content with a view to developing the competencies targeted in the programs of study.</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>4. To pilot teaching/learning situations that are appropriate to the students concerned and to the subject content with a view to developing the competencies targeted in the programs of study.</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5. To evaluate student progress in learning the subject content and mastering the related competencies.</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6. To plan, organize and supervise a class in such a way as to promote students' learning and social development.</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Social and Educational Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. To adapt his or her teaching to the needs and characteristics of students with learning disabilities, social maladjustments or handicaps.</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>8. To integrate information and communications technologies (ICT) in the preparation and delivery of teaching/learning activities and for instructional management and professional development purposes.</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>9. To cooperate with school staff, parents, partners in the community and students in pursuing the educational objectives of the school.</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>10. To cooperate with members of the teaching team in carrying out tasks involving the development and evaluation of the competencies targeted in the</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
programs of study, taking into account the students concerned.

Professional Identity

11. To engage in professional development individually and with others.
   5
12. To demonstrate ethical and responsible professional behaviour in the performance of his or her duties.
   7

Totals: 12

63

35

Table S3.18

For Core Competency 1, the Features and Level of Mastery

<table>
<thead>
<tr>
<th>Core Competency</th>
<th>Features</th>
<th>Level of Mastery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To act as a professional inheritor, critic and interpreter of knowledge or</td>
<td>• Situates the discipline's basic benchmarks and points of understanding (concepts, postulates and methods) in order to facilitate significant, in-depth learning by students.</td>
<td></td>
</tr>
<tr>
<td>culture when teaching students</td>
<td>• Adopts a critical approach to the subject matter. 4 Establishes links between the secondary culture set out in the program and the secondary culture of the students.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Transforms the classroom into a cultural base open to a range of different viewpoints within a common space.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Casts a critical look at his or her own origins, cultural practices and social role.</td>
<td>By the end of his or her initial training, the student teacher should be able to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• understand the subject-specific and program-specific knowledge to be taught, so as to be able to promote the creation of meaningful links by the students;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• exhibit a critical understanding of his or her cultural development and be aware of its potential and limitations;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• exhibit a critical understanding of the knowledge to be taught, so as to promote the creation of meaningful links by the students;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establish links with the students' culture in the proposed learning activities.</td>
</tr>
</tbody>
</table>
Appendix C: Study 2 – Health Sciences Research Ethics Board Approval

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS
RESEARCH ETHICS BOARD (HSREB)

HSREB Initial Ethics Clearance

February 21, 2018

Miss Jessica Rich
Faculty of Education
Graduate Studies Office
511 Union St.
Kingston, ON K7M 5R7

ROMEO/TRAQ: #6022942
Department Code: EDUC-015.18
Study Title: A case study of assessment roles, structures, and processes in a Competency-Based Emergency Medicine postgraduate training program
Co-Investigators: Dr. D. Klinger, Dr. A. Hall
Review Type: Delegated
Date Ethics Clearance Issued: February 21, 2018
Ethics Clearance Expiry Date: February 21, 2019

Dear Miss Rich,

The Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board (HSREB) has reviewed the application and granted ethics clearance for the documents listed below. Ethics clearance is granted until the expiration date noted above.

- Interview/Focus Group Questions
- Recruitment Email
- Letter of Information/Consent Form

Documents Acknowledged:

- CORE Certificate – J. Rich
- Letter of Approval/Support – Supervisor
- Confidentiality Agreement

Amendments: No deviations from, or changes to the protocol should be initiated without prior written clearance of an appropriate amendment from the HSREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

Renewals: Prior to the expiration of your ethics clearance you will be reminded to submit your renewal report through ROMEO. Any lapses in ethical clearance will be documented on the renewal form.

Completion/Termination: The HSREB must be notified of the completion or termination of this study through the completion of a renewal report in ROMEO.
Reporting of Serious Adverse Events: Any unexpected serious adverse event occurring locally must be reported within 2 working days or earlier if required by the study sponsor. All other serious adverse events must be reported within 15 days after becoming aware of the information.

Reporting of Complaints: Any complaints made by participants or persons acting on behalf of participants must be reported to the Research Ethics Board within 7 days of becoming aware of the complaint.

Note: All documents supplied to participants must have the contact information for the Research Ethics Board.

Investigators please note that if your trial is registered by the sponsor, you must take responsibility to ensure that the registration information is accurate and complete.

Yours sincerely,

[Signature]

Chair, Health Sciences Research Ethics Board

The HSREB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations, Canadian General Standards Board, and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP). Federalwide Assurance Number: FWA#:00004184, IRB#:00001173

HSREB members involved in the research project do not participate in the review, discussion or decision.
Appendix D: Study 2 – Combined Letter of Information/Consent Form

Combined Letter of Information and Consent Form

Study Title: A case study of assessment roles, structures, and processes in a Competency-Based Emergency Medicine postgraduate training program

Name of Primary Investigator and Supervisor: Jessica Rich, Ph.D. Candidate, and Dr. Don Klinger, Faculty of Education, Queen’s University

Name of Co-Investigator: Dr. Andrew Hall, Assistant Professor and CBME Lead, Department of Emergency Medicine, Queen's University

Background: My name is Jessica Rich, and I am a Ph.D. Candidate in the Faculty of Education, working under the supervision of Dr. Don Klinger and in collaboration with Dr. Andrew Hall. We are asking central PGME leadership in Assessment and Evaluation, Emergency Medicine program leadership, faculty and residents to take part in a research study. This research investigates the extent to which conceptions of competence drive program decision-making about how to assess developing competence. Specifically, we will be looking at the assessment role, structures and processes being used for formative development and summative assessment of competence. The focus of our research is not to make evaluations of individual residents or faculty. Rather, our aim is to better understand the roles, structures and processes of the assessment system and perceptions of how they work to develop residents’ competence.

Participation: You are invited to participate in an individual or group interview. The interview will last up to 1-hour and will be audio-recorded and later transcribed. During the interview, I will ask you to talk about assessment roles, structures, and processes that are designed to support residents' ongoing learning and development of competence.

There is no obligation for you to say yes to take part in this study. It is important for postgraduate trainees to know that deciding not to participate or withdrawing participation will not affect your academic standing. During the interview, you can choose not to answer a question or to stop answering questions at any point in time. Should you choose to withdraw during or following your interview, you may request removal of all or part of the data by verbally asking me (Jessica Rich) or emailing me at jessica.rich@queensu.ca. Removal of data will include deletion of responses from transcripts. Once data have been included in my dissertation or a manuscript and submitted for publication, data cannot be removed.

There are no known risks for taking part in this study. While there are no direct benefits to you as a participant, study results will help inform how your program and subsequent professional education programs make decisions about future approaches to assessing competence.

Confidentiality: Only the investigators directly involved in this study (i.e., myself, my supervisor, the co-investigator and my two doctoral committee members) will know the identity of the participating institution, program name, and individuals who volunteer to participate. In addition to the investigators, only a hired transcriber will have access to audio-files. The transcriber will be required to sign and return a confidentiality agreement. Each participant will be assigned a pseudonym. A file linking individuals’ names, titles, and programs to pseudonyms will be stored on my password protected Student One Drive.
account. Even though I will take purposeful steps to maintain confidentiality, it is possible that publication of the research could reveal participant identity. I will keep your data securely for five years. After five years, I will either destroy the data, or work with Queen’s University Open Scholarship Services to de-identify and preserve the data.

**Future Publication:** I hope to publish the results of this study in my doctoral dissertation and academic journals and present them at conferences. I will include quotes from some of the interviews when presenting findings. However, I will never include any real names with quotes, and I will do my best to make sure quotes do not include information that could indirectly identify participants. During the interview, please let me know if you say anything you do not want me to quote.

**Questions or Concerns:** If you have any questions about the research, please contact me, Jessica Rich, at jessica.rich@queensu.ca, my supervisor, Dr. Don Klinger, at klingerd@queensu.ca, or Dr. Andrew Hall, at andrew.hall@queensu.ca.

If you have any ethics concerns, please contact the Queen’s University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (HSREB) at 1-844-535-2988 (Toll free in North America) or the HSREB Chair at clarkaf@queensu.ca.

**Informed Consent:** This Letter of Information/Consent Form provides you with the details to help you make an informed choice. All your questions should be answered to your satisfaction before you decide whether or not to participate in this research study.

Keep one copy of the Letter of Information for your records and return one copy to the Primary Investigator, Jessica Rich.

By signing below, I am verifying that I have read the Letter of Information and all of my questions have been answered.

By signing below, I consent to participating in an audio-recorded focus group or interview:

Name of Participant: ________________________________

Signature: _______________________________________

Date: ___________________________________________
Appendix E: Study 2 – Interview Protocol

Individual and Group Interview Questions
(for residents and faculty)

The interview will have two parts. The first set of questions will focus on exploring concepts related to competence. In the second set of questions, we will dive into processes and roles within your system of assessment.

Part 1: Exploring key concepts
1. In the context of Emergency Medicine training, how do you conceptualize competence?

2. To what extent do the stages of training support or constrain [your/residents’] development of competence?
   i. Can you provide an example/instance in which the stages supported [your/a resident’s] development of competence?
   ii. Can you provide an example/instance in which the stages did not support (or perhaps even hindered) [your/a resident’s] development of competence?

3. In the context of Emergency Medicine training, how do you conceptualize self-regulated learning?

4. What is the relationship between self-regulated learning and the development of competence?

Part 2: Exploring processes and roles within the system of assessment
5. I know that faculty have different roles within your system of assessment (e.g., as a faculty supervisor, as an academic advisor, as a competence committee member, as a front-line faculty supervisor).
   i. When faculty are in different roles, how does this influence the nature of the learning interaction between a resident and faculty?
   ii. How do different roles influence how residents and faculty learn together?
   iii. In the different roles, do faculty scaffold/support the learning differently?

6. In the different roles, how much responsibility do faculty have for regulating residents’ learning?

7. In which roles do faculty most immediately and directly impact the development of residents’ self-regulated learning competence?

8. In the different roles, how do faculty help residents to practice self-regulated learning?

9. When interacting with a resident, in what ways are you learning from each other? If at all? (resident from faculty and faculty from resident)
   i. What do you do to influence the learning by the other person?
10. Do you use the same strategies with all residents?
   i. Do certain individuals bring specific self-regulatory challenges?
   ii. Across the stages of training, do you use different strategies?
   iii. Do you use the same strategies in all contexts?

11. How do these strategies help you and the resident to develop competence?

12. How do you take what you learned through these interactions with residents and apply the learning(s) to new contexts?

13. I am interested in the concept of co-regulation. It’s the idea that when working together, residents and more experienced physicians influence one another’s learning, and therefore, each individual’s ability to independently engage in self-regulated learning.
   i. Can you give an example of an instance where you and a resident were co-regulating each other’s learning and it was going really well?
      a. What are you and the resident doing to engage in co-regulation?
      b. What are they saying? What are they doing?
      c. To what extent is the learning reciprocal?
   ii. Is co-regulation easier in some contexts than others? (e.g., workplace, Academic Advisor meetings, etc.)

**Understanding your system of assessment:**
14. Can you describe for me the role of Academic Advisors within your system of assessment?
   i. To what extent do they play a role in mediating the production and use of assessment information?

**Transition statement:** For me to best understand your system of assessment, I need to understand the nature of the interactions (key role, structures, and processes)

**Sharing a model/visual representation:** (draw on whiteboard)
15. This is a visual model of key roles and processes in your system of assessment. Can you talk to me about its ability to reflect your current system? Does this resonate with you?
   i. Are there any roles, structures, or processes missing in the model?
   ii. How might this be revised to more accurately reflect your system of assessment?

**Do you have any final thoughts, comments or questions for me?**
Appendix F: Study 3 – General Research Ethics Board Approval

February 09, 2018

Ms. Jessica Rich  
Ph.D. Candidate  
Faculty of Education  
Duncan McArthur Hall  
Graduate Studies Office  
511 Union St West  
Kingston, ON, K7M 5R7

GREB Ref #: GEDUC-884-18; TRAQ # 6022767  
Title: "GEDUC-884-18 Do conceptions of competence drive professional education program's decisionmaking about how to assess future professionals' developing competence?"

Dear Ms. Rich:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GEDUC-884-18 Do conceptions of competence drive professional education program's decisionmaking about how to assess future professionals' developing competence?" for ethical compliance with the Tri-Council Guidelines (TCPS 2 (2014)) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (Article 6.14) and Standard Operating Procedures (405.001), your project has been cleared for one year. You are reminded of your obligation to submit an annual renewal form prior to the annual renewal due date (access this form at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Closure Form in Romeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one year period (access this form at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Adverse Event Form")). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To submit an amendment form, access the application by at http://www.queensu.ca/traq/signon.html; click on "Events"; under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies". Once submitted, these changes will automatically be sent to the Ethics Coordinator, Ms. Gail Irving, at the Office of Research Services for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Sincerely,

Joan Stevenson, Ph.D.  
Interim Chair  
General Research Ethics Board
Appendix G: Study 3 – Combined Letter of Information/Consent Form

Combined Letter of Information and Consent Form

Study Title: Do conceptions of competence drive professional education program's decision-making about how to assess future professionals' developing competence?

Name of Researcher: Jessica Rich, Ph.D. Candidate, Faculty of Education, Queen’s University

Name of Supervisor: Dr. Don Klinger, Faculty of Education, Queen’s University

Introduction: My name is Jessica Rich, and I am a Ph.D. Candidate in the Faculty of Education, working under the supervision of Dr. Don Klinger. I am asking professional program leadership and educational leaders (faculty and/or staff) to take part in a research study investigating how professional education programs conceptualize professional competence and assess readiness for practice. If you agree to take part, I will interview you for up to one hour at a location of your choice. The interview will be audio-recorded and later transcribed. During interviews, I may also ask you to share sample program documents illustrating how your program approaches the assessment of future professionals' competence. Following interviews, I will send you an interview summary and ask that you check for accuracy of my interpretations. In total, the study will take up to 90 minutes of your time. There are no known risks for taking part in this study. While there are no direct benefits to you as a participant, study results will help inform how subsequent professional education programs make decisions about future approaches to assessing competence.

Participation: There is no obligation for you to say yes to take part in this study. Participation is voluntary. Please note that because I am interviewing senior professional program leadership as well as those in supporting roles, there is the possibility that program leadership who choose to participate in this study will be able to identify subordinates and their comments. During your interview, you are not obliged to answer any question with which there is discomfort. You can choose not to answer a question or to stop answering questions at any point in time. Further, if you are in a supporting educational role, you do not have to provide program materials if you are concerned that you would be handing over confidential information. Should you choose to withdraw during or following your interview, you may request removal of all or part of the data by verbally asking me (Jessica Rich) or emailing me at jessica.rich@queensu.ca by August 17, 2018. Removal of data will include deletion of responses from transcripts or entire deletion of transcripts and associated audio-recordings. You will be emailed a transcript and a summary of interpretations made from your interview. You will be given 2-weeks to review and suggest revisions to these documents. Following the 2-week period, if I do not hear back from you, I will assume that you do not have any suggestions for revisions. Once data have been included in my dissertation or a manuscript and submitted for publication, data cannot be removed. The last possible date for you to request to withdraw your data will be Friday August 17, 2018.

Confidentiality: Only the investigators directly involved in this study (i.e., myself, my supervisor, and my two doctoral committee members) will know the identity of the participating institution, program names, and individuals who volunteer to participate. In addition to the investigators, only a hired transcriber will have access to audio-files. The transcriber will be required to sign and return a confidentiality agreement. Direct quotes from interviews or shared materials that could potentially reveal the individual or institution will not be used in manuscripts. The institution will not be named (i.e., it will be referred to as a mid-sized Canadian university) and each participant will be assigned a pseudonym. A file linking individuals' names, titles, and programs to pseudonyms will be stored on my password
protected Student One Drive account. All hard copy data will be stored in a locked file cabinet. Even though I will take purposeful steps to maintain confidentiality, it is possible that publication of the research could reveal participant identity. I will keep your data securely for five years. After five years, I will either destroy the data, or work with Queen’s University Open Scholarship Services to de-identify and preserve the data.

I hope to publish the findings (i.e., themes, sample quotes, and conceptual models) from this research in my doctoral dissertation and academic journals and present them at conferences. I will include quotes from some of the interviews and documents when presenting my findings. However, I will never include any real names with quotes, and I will do my best to make sure quotes do not include information that could indirectly identify participants. During the interview, please let me know if you say anything you do not want me to quote.

If you have any ethics concerns please contact the General Research Ethics Board (GREB) at 1-844-535-2988 (Toll free in North America) or chair.GREB@queensu.ca.

If you have any questions about the research, please contact me, Jessica Rich, at jessica.rich@queensu.ca or my supervisor, Dr. Don Klinger, at klingerdl@queensu.ca.

This Letter of Information provides you with the details to help you make an informed choice. All your questions should be answered to your satisfaction before you decide whether or not to participate in this research study.

Keep one copy of the Letter of Information for your records and return one copy to the researcher, Jessica Rich.

By signing below, I am verifying that: I have read the Letter of Information and all of my questions have been answered.

Name of Participant: ________________________________

Signature: ________________________________

Date: ________________________________
Appendix H: Study 3 – Interview Protocol

Study Title: Do conceptions of competence drive professional education program's decision-making about how to assess future professionals' developing competence?

Name of Researcher: Jessica Rich, Ph.D. Candidate, Faculty of Education, Queen’s University

Name of Supervisor: Dr. Don Klinger, Faculty of Education, Queen’s University

Welcome
- Thank you for your interest in participating in this study
- If you haven't had a chance to do so already, please take a few moments to review the combined Letter of Information and Consent Form
- If you have any questions or concerns while reading, please do not hesitate to ask me for clarification
- As a reminder, the purpose of this research is to better understand how professional education programs conceptualize professional competence and assess readiness for practice

Introductions
- My name is Jessica Rich – I am a PhD Candidate in the Faculty of Education at Queen's University
- I am conducting this study as part of my PhD Dissertation. My supervisor is Dr. Don Klinger

Confidentiality
- As an educational leader in your professional program, I am interested in hearing your thoughts on how your program conceptualizes competence and approaches the assessment of future professionals' competence
- Everything that you say during the focus group will be considered confidential
- You do not have to answer any questions you don't want to
- You can stop answering questions at any point
- With your permission, the interview will be audio-recorded (point out audio recorder placed on the table)
- I want to make sure that I accurately capture everything you have to say and not miss anything with delays in notetaking)
- Do I have your permission to audio-record?
- As a reminder, I will never include any real names with quotes, and I will do my best to make sure quotes do not include information that could directly identify you as a participant
- During the interview, please let me know if you say anything you do not want me to quote
- Do you have any questions so far?
Collection signed consent form (each participant keeps a copy for their records)
If the individual would not like to participate at this time:
• Thank you for your time and consideration
• Should you change your mind and wish to participate in the future, you may do so by contacting me via email (jessica.rich@queensu.ca)
• If you think that there is someone else in your program that I should be speaking to, please recommend that they get in touch with me via email (jessica.rich@queensu.ca)

Questions
• I have a series of questions for you (X in total) – listed on the handout provided
• The interview may take up to one hour. Should you have to leave part way through, just let me know.
• At the end of my list of questions, there will be an opportunity for you to share some open-ended comments and questions.

Do you have any questions before we begin?

Warm-up
1. Approximately how long have you been in your current role as [insert position title here]
2. Before your current role, approximately how long have you been working with the [insert] program?
   i. And in what capacity?
3. How are you currently involved in program development and decision-making?

Conceptions of Competence
4. What does your profession say competence is?
   i. From an accreditation perspective?
5. Within your profession, to what extent is there a pressure for [insert] programs to become more competency-based?
   i. What does this mean for your program, on the ground, moving forward?
6. Currently, how does your [insert] program conceptualize competence?

Operationalization: developing competence
7. From the role of program design/architecture: how do you help learners to develop competence?
   i. How has your curriculum been purposefully structured?
   ii. Learning opportunities?
   iii. Assessment and evaluation?
8. From the role of instructors/supervisors: how do instructors help learners to develop competence?
9. From the role of students: how do students help themselves to develop competence?

Operationalization: Assessment and evaluation
10. How do you monitor the development of candidates' competence/ readiness for practice?
11. How do you make high-stakes decisions about promotion (i.e., graduation) and/or remediation?
i. What evidence informs these decisions?
12. What informs your program’s approach to assessment and evaluation?
   i. Any contextual factors?
   ii. Accrediting body?
   iii. Resources?
13. What challenges, if any, does your program currently experience in assessing candidates' competence/ readiness for practice?

Questions about entry-to-practice profile
14. I’ve noticed [insert] about the architecture of your profession’s competency profile… do you have any insight as to why they have conceptualized competence in this way?
15. I’ve noticed that your profession defines the standard of competence in this way. Do you have any insight as to what informs this standard?
   i. Why have they described the standard in this way?

Wrap up
16. Do you have any final thoughts, comments or questions?

Conclusion/ wrap-up
• Thank you very much for your time and for helping me to better understand how your program approaches the assessment of competence
• If you have any thoughts or follow-up questions, please feel free to reach out to me. My email is on your copy of the Letter of Information/Consent Form
• In the next few days, I will be sending you an interview summary. I will ask that you check the summary for accuracy of my interpretations and provide any revisions.
• Again, thank you so much. I will be in touch [I will see myself out].