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How are Professional Programs from Diverse Disciplines Approaching the Development and Assessment of Competence at a Mid-Sized Canadian University?

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How are Professional Programs from Diverse Disciplines Approaching the Development and Assessment of Competence at a Mid-Sized Canadian University?

Abstract
Time-honoured university policies, such as the credit-hour and academic freedom, present challenges for professional education programs tasked with operationalizing entry-to-practice competence frameworks for professional accreditation. A single embedded case study was used to explore how professional programs from one mid-sized Canadian university are approaching and perhaps problematizing the development and assessment of competence. Semi-structured interviews were conducted with educational leaders (faculty and staff, *n*=21) from a sample of nine programs. Following a grounded theory approach to qualitative analysis, the constant comparative method was used to inductively discern similarities and differences across programs, and to begin building theory about approaches to operationalization. While limited in scope given the use of a single university, our findings highlight: (a) diversity in approaches to operationalization across programs, (b) common attributes which can be used to classify the manner in which these programs operationalize competence, and (c) challenges with supporting faculty 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 university-based programs play in determining competence for entry-to-practice, as well their intents for implementing a competence framework, to ensure sufficiency in the approaches being used.

Les politiques universitaires qui ont fait leurs preuves, telles que les crédits-heures et la liberté académique, présentent des défis dans le cas des programmes d'enseignement professionnel dont la tâche est de rendre opérationnels les cadres de compétence de l'entrée à la pratique pour l'obtention d'une accréditation professionnelle. Une étude de cas intégrée unique a été utilisée pour explorer comment les programmes professionnels d'une université canadienne de taille moyenne répondent et peut-être rendent problématique le développement et l'évaluation des compétences. Des entrevues semi-structurées ont été menées avec des leaders en éducation (enseignants et personnel, *n*=21) d'un échantillon de neuf programmes. En suivant une approche théorique fondée à l'analyse qualitative, la méthode comparative constante a été utilisée pour discerner inductivement les similarités et les différences entre les programmes, et pour commencer à échafauder une théorie sur les approches à l'opérationalisation. Nos résultats, bien que limités dans leur portée du fait que nous n'avons fait cette recherche que dans une seule université, illustrent ce qui suit : (a) la diversité dans les approches à l'opérationalisation dans divers programmes, (b) les attributs communs qui peuvent être utilisés pour classifier la manière dont ces programmes opérationalisent la compétence, et (c) les défis pour encourager les enseignants à accepter une pédagogie fondée sur les compétences et l'évaluation. Vus ces résultats, il est recommandé que les organismes d'accréditation et les programmes d'enseignement prennent le temps de considérer le rôle que les programmes universitaires jouent pour déterminer la compétence de l'entrée à la pratique, ainsi que leur intention de mettre en pratique un cadre de compétence, afin d'assurer la suffisance dans les approches utilisées.

Keywords
professional education programs, competence, entry-to-practice, assessment, qualitative; programmes d'enseignement professionnel, compétence, de l'entrée à la pratique, évaluation, qualitatif

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Professional accrediting and regulating bodies are shifting away from describing principles of practice guiding members of a profession and moving towards explicit delineation of the knowledge and skills needed for entry-to-practice (e.g., CPA, 2015; Engineers Canada, 2017; Frank et al., 2015). This shift is in response to calls for enhanced public and professional protection, professional mobility, and educational accountability (e.g., Humphreys et al., 2018; Taber et al., 2010). For licensing of domestically- and foreign-trained graduates, regulating bodies need to know whether or not individuals have met the minimum professional standards required to practice safely and effectively within their defined scope of practice.

Within Canada, many professions require candidates to pass external licensing exams after successful completion of their postsecondary program (e.g., Medicine, Law, Nursing). However, some professions rely on post-graduation processes (e.g., college regulation and hiring practices) to "weed out" those who are not meeting the standard of competence (e.g., Teaching). Increasingly, competency-based education (CBE) is becoming a requirement for professional program accreditation (e.g., Frank et al., 2015; Hatcher et al., 2013); meaning, postsecondary 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 concerning structure, pedagogy, assessment, faculty role, student interaction, and credentials (Carraccio et al., 2002; Pichette & Watkins, 2018). "True CBE programs" are thought to include all of the following elements: (a) competencies embedded in the curriculum, (b) robust formative and summative assessment, (c) recognition of prior learning, (d) variable timelines to achieve fixed outcomes, and (e) 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), present a challenge for implementing the defining component of CBE: variable timelines allowing students to learn and progress at their own pace to achieve fixed outcomes (Bushway et al., 2017; Pichette & Watkins, 2018). In Canada, most published literature describing how professional programs are navigating this tension comes from Medicine. 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 (RCPSC), 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 et al., 2015, p. 12). Despite having to comply with time-based requirements, 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. Accordingly, CBD has been described as a "hybrid," using a competency-based approach, but in the context of the existing time-based service/rotation system (RCPSC, 2016).

While postgraduate medical education programs serve as illustrative examples of competency-based learning and assessment, caution should be exercised in considering how CBME approaches might work in other professions. Even though postgraduate medical education

is considered entry-to-practice (Frank et al., 2015), these programs are unique because they are almost entirely workplace-based. Most professional programs are a combination of work-integrated learning opportunities (e.g., field placements) 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 postsecondary programs across professions. How a program operationalizes competency-based learning and assessment will likely depend on several factors, including: (a) the profession's pathway to licensure, (b) program requirements set by the professional accrediting body, (c) how competence is conceptualized within the profession, (d) the vision of program leadership who make implementation decisions, (e) university regulations and policies, (f) the financial and human resources available to the program, and (g) faculty members' buy-in and know-how (Pérez et al., 2016; Rich, 2019).

Research Problem

The published literature, which describes how professional programs are implementing competency-requirements 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 et al., 2014; Uhlenbeck et al., 2002). There is a need for published research exploring how postsecondary programs are approaching operationalization across professions (Pichette & Watkins, 2018). In reviewing the literature, we found only two relevant studies investigating competency-based teaching and assessment methods across different disciplines (Conway et al., 2000; Koenen et al., 2015). Taken together, their findings suggest: (a) 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 (b) there is a need for illustrative examples demonstrating how university-based professional programs are developing and assessing competence in practice.

Research Purpose

Driven by professional program accreditation requirements for CBE and the lack of empirical research investigating operationalization across disciplines, the purpose of this research was to explore the following questions:

1. How are university-based programs across different professions operationally approaching the development and assessment of competence?
2. How are programs perhaps 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?

Method

Research Design

The research was conducted using a single embedded case study design. Case study research is a form of applied inquiry for investigating a contemporary problem within a real-life context (Yazan, 2015). The practical need to understand operationalization 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. Merriam's approach is described as constructivist (Yazan, 2015). The researcher acts as an instrument to make sense of the data through effective interviewing, careful observation, and mining of documents (Merriam, 2009).

According to Merriam (2009), the intent of the case study influences its form as being descriptive, interpretive, or evaluative. An interpretive approach was used 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 merit, worth, or significance of individual professional programs were avoided.

This case study used an embedded design because it involved 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). To compare and contrast the approaches programs (sub-units) are using for operationalization, 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 sub-units, triangulation of data across sources allowed authors to describe and compare approaches being used within and across programs.

Conceptual Framework

CBE draws upon conceptual frameworks from social cognition, assessment, and evaluation. These frameworks include outcomes-based learning (Spady, 1994), backward design (Wiggins & McTighe, 2005), novice-to-expert continuum (Benner, 1982), self-regulated learning (Zimmerman, 2000), Zone of Proximal Development (Vygotsky, 1978), learning for mastery (Bloom, 1968), and formative and summative assessment (Wiliam & Black, 1996). Within the professional education field, there is no comprehensive learning theory that accounts for multiple key components of competency-based learning. Since social interactions are at the heart of professional learning (Eraut, 1998; Schön, 1987), theories from 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 development, demonstrating reciprocal regulation of learning between students and more competent professionals, Sameroff's (2010) theory demonstrates how social contexts may be influencing the approaches professional programs are using to develop and assess competence. In particular, this model of co-regulated learning highlights the important role faculty play in scaffolding students' learning processes and their development of competence through direct supervision and ongoing feedback (Rich, 2017). Faculty take on the role of "a more capable other" (Vygotsky, 1978) and work with learners to accomplish tasks within the learner's range of competence.

The Case

A medium-sized (< 30,000 students), Canadian public university was purposefully selected as the case in which to conduct this research. This university is thought to be representative of medium-sized universities in Canada, based on the number and diversity of professional programs granting degrees at undergraduate, graduate, and postgraduate levels. Before conducting the

research, ethics approval was obtained from the university's General Research Ethics Board (no. 6022767).

Data Collection

Only programs accredited by a professional body were included in this study. Across these programs, recruitment was targeted to faculty and staff 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 program's website housed within the central university's domain. Through an email invitation, individuals were informed participation was voluntary, research findings would not be used to make evaluative judgments of their program, and 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 participants within 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 precluding 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 1). All interviews were conducted by the principal investigator. During and following interviews, memos were written about recurring ideas and emerging questions (Merriam, 2009). This allowed for continual refinement of interview questions, as well as concurrent sense-making of emerging themes and understandings. Recruitment for interviews continued until saturation was reached and recruitment of potential participants had been exhausted. With consent from participants, each interview took 45 to 60 minutes, was audio-recorded and subsequently transcribed verbatim by a professional transcriptionist. Before starting data analysis, each transcript was checked for accuracy by the principal investigator. Each participant was also emailed a copy of their transcript and invited to member-check accuracy of transcription and content and to make any necessary revisions or omissions.

Table 1
Questions from Interview Protocol

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

Data Analysis

Step 1: Writing Narrative Case Descriptions

The first step of data analysis involved writing narrative case descriptions for each participating program. Within each case, a template approach (Crabtree & Miller, 1999) was used to look for patterns emerging across participants' interviews with regards to how they: (a) conceptualized competence, (b) described the development of competence, (c) described the assessment of competence, and (d) problematized the assessment of competence. This template of categories served to organize data within a case for subsequent inductive analysis.

Following a close reading of all interview transcripts within a program, a focused coding approach (Glaser, 1992) was used to assign meaning (a label) to segments of data. In comparing and contrasting focused codes emerging within a category (i.e., a-d above), authors were able to identify themes in the data. These central ideas have been described within case category descriptions. When writing narratives, the goal was to keep central ideas close to the data by using direct quotes from participants. This was important given case descriptions served as data for subsequent analysis.

Step 2: Extracting Key Information to Compare Cases

The second step of data analysis involved generating an integration table to compare and contrast similarities and differences in approaches being used to develop and assess competence across professional programs. Sameroff's (2010) micro models (social contexts, co-regulated

learning, and development) informed data extraction from case descriptions and data organization according to program context, program structure, and approach to implementation (Table 2).

Step 3: Inductive Thematic Analysis

The third step of data analysis involved using the Constant Comparative Method (Glaser, 1992; Glaser & Strauss, 1967) to discern conceptual similarities and differences and discover patterns of meaning (themes) in the extracted data. The integration table served as a matrix to compare similarities and differences within and across cases (i.e., within a column and across columns). 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). Sameroff's (2010) Unified Theory of Development informed sense-making with regards to the potential roles professional context and faculty play in developing (e.g., co-regulating) and assessing learners' competence. Once themes were identified, case descriptions were re-read closely to check interpretations of the data and to select illustrative quotes.

Table 2

Integration Table Comparing and Contrasting Similarities and Differences in Program Contexts, Program Structures, and Approaches to Operationalization

	Business	Clinical Psychology	Engineering	Law	Nursing	Occupational Therapy	Postgraduate Medical Education (Specialty)	Teacher Education	Urban and Regional Planning
Requirements for professional certification (post-program completion)	None (no regulating body)	Period of supervised practice; written knowledge and jurisprudence/ ethics exams; oral exam	Work experience requirements; written jurisprudence/ ethics exams	Work experience requirement (articling period); written Bar Exam (Barristers' and Solicitors')	Written exam of knowledge, skills, and judgment (NCLEX-RN)	Written exam of academic knowledge and professional behaviour (NOTCE)	Written exam of knowledge and application of knowledge; Objective Structured Clinical Exam (OSCE)	None	Work experience requirement (record of mentorship and record of practical experience); ethics and professionalism course and test; professional examination
Professional program accreditation body	Optional (e.g., by AACSB International) for quality assurance "seal of approval"	Mandated by: Canadian Psychological Association (CPA)	Mandated by: Canadian Engineering Accreditation Board (CEAB), Engineers Canada	Mandated by: Federation of Law Societies of Canada	Mandated by: College of Nurses of Ontario (CNO)	Mandated by: Canadian Association of Occupational Therapists (CAOT)	Mandated by: Royal College of Physicians and Surgeons of Canada (RCPSC)	Mandated by: Ontario College of Teachers (OCT)	Mandated by: Professional Standards Board for the Canadian Institute of Planners (CIP)
Entry-to-practice competence framework	Programs specify intellectual and behavioural competencies as learning goals	Core Competencies Required for the Professional Practice of Psychology (2015)	Graduate Attributes (2016)	National Entry to Practice Competency (2012)	Entry to Practice Competencies (2014)	Profile of Practice of Occupational Therapists in Canada (2012)	CanMEDS Competency Framework (2015)	Standards of Practice and Ethical Standards (2006)	Competency Standards for the Planning Profession in Canada (2010)
Program tuition fees (domestic)	BCom: < $20,000 MBA: < $100,000 Master of: < $50,000	< $10,000	< $15,000	< $20,000	< $10,000	< $15,000	N/A; residents paid salary for service	< $10,000	< $15,000

	Business	Clinical Psychology	Engineering	Law	Nursing	Occupational Therapy	Postgraduate Medical Education (Specialty)	Teacher Education	Urban and Regional Planning
Expected time to completion	Bachelor: 4 years; Master: 12 months	Master: 2 years; Doctoral: 4 years	Bachelor: 4 years	3 years	4 years	2 years	3–7 years	16 months	2 years
Course requirements	Yes: course topics driven by market demands	Yes: theoretical and applied courses	Yes: theoretical and applied courses	Yes: courses in areas of legal practice	Yes: theory, lab, and clinical courses	Yes: theory, lab, and clinical courses	No: required to attend academic half days	Yes: courses in required topic areas and electives	Yes: theory, lab, and methods courses
Work-integrated learning requirement	No	Yes: six 4-month practicum placements and one 12-month internship	No: optional internships	No: optional externships	Yes: clinical placements (years 2-4)	Yes: fieldwork placements (30 weeks)	Entirely workplace-based apprenticeship	Yes: Practicum placements (80 days)	No: optional not-for-credit internship
Conceptualization of competence	Component knowledge and skills	Integration of knowledge and skills in research and clinical practice	Component knowledge and skills	Component knowledge and skills	Integration of knowledge and skills	Integration of knowledge and skills	Integration of knowledge and skills	Integration of knowledge and skills	Component knowledge and skills
Student awareness of entry-to-practice competence framework	Unaware of competencies	Moderately aware of competencies through practicum assessment	Mostly unaware of competencies	Unaware of competencies	Moderately aware of competencies through practicum assessment	Moderately aware of competencies through practicum assessment	Very aware of competencies through ongoing, low-stakes assessment	Moderately aware of competencies through practicum assessment	Unaware of competencies
Approaches used to develop competence	Boot camps; lectures; team-based projects; team-based coaches; personal tutors	Lectures; observation and dialogic-case review	Lectures; labs; team-based design projects	Lectures	Lectures; labs; direct observation and feedback	Lectures; discussion of cases; direct observation and feedback	Mostly direct observation and feedback; some didactic sessions	Lectures; discussion of cases; professional learning plans; direct observation and feedback	Lectures; discussion of cases; labs; team projects

	Business	Clinical Psychology	Engineering	Law	Nursing	Occupational Therapy	Postgraduate Medical Education (Specialty)	Teacher Education	Urban and Regional Planning
Purpose of assessing competence	Summative decisions: admissions; successful course and program completion	Formative and summative decisions: guide ongoing learning; progress, promotion, and remediation decisions	Summative decisions: course and program completion	Summative decisions: course and program completion	Formative and summative: guide ongoing learning; course and program completion; remediation decisions	Formative and summative: guide ongoing learning; course and program completion	Formative and summative: guide ongoing learning; progress, promotion and remediation decisions	Formative and summative; guide ongoing learning; course and program completion; remediation decisions	Summative decisions: course and program completion
Approaches used to assess competence	Academic cut-scores and PSEs on intake; written reports; oral pres.; written exams	Written and oral comprehensive exams; research theses; direct observation of performance on practicum	Written report; oral pres.; written exams	Written legal analysis; written exams	Written assignments; oral pres.; written and OSCE exams; direct observation of performance on clinical placements	Written assignments; oral pres.; portfolios and reflection; written and OSCE exams; direct observation of performance on clinical placements	Direct-observation of performance by supervisors patients, allied health professionals; written exams; oral exams; OSCE exams	Written assignments; oral pres.; portfolios and reflection; direct observation of teaching on practicum	Written reports; oral pres.; written exams; optional research thesis

	Business	Clinical Psychology	Engineering	Law	Nursing	Occupational Therapy	Postgraduate Medical Education (Specialty)	Teacher Education	Urban and Regional Planning
Challenges with assessing competence	Academic freedom and buy in to develop rubrics to assess professional skills through authentic performance tasks (e.g., team-based case studies)	Assessing integration of clinical practice and research competencies; hesitation to document honest, constructive feedback on practicum (esp. for professional skills); making high-stakes progress, promotion, and remediation decisions	Academic freedom and buy in to develop authentic assessment activities and tools to assess students' ability to integrate graduate attributes to solve ill-defined, complex problems	Academic freedom and buy in to engage in faculty development (e.g., developing multiple-choice items, developing formative assessment opportunities, etc.)	Assessing students' ability to transfer across clinical settings; assessing professional skills; providing honest, constructive feedback; collecting sufficient evidence to win an academic appeal or counsel students out of the program	Resources to conduct multiple assessments to determine students' ability to transfer and perform consistently across contexts; knowing when to make high-stakes decisions about progress and remediation for students whose behaviour has been flagged; collecting sufficient evidence to win an appeal	Assessing integration of competencies through entrustment decisions; hesitation to document honest, constructive feedback (esp. for professional skills); collecting sufficient evidence to make progress, promotion or remediation decisions and to win an academic appeal	Assessing integration of competencies; hesitation to document honest, constructive feedback; collecting sufficient evidence to win an academic appeal or counsel students out of the program	Academic freedom and faculty development/ resources to develop rubrics to assess achievement on authentic performance tasks (e.g., work-integrated team-based projects)

Findings

Research participants included faculty and staff (*n*=21) from nine diverse professional programs across the university. For each program, Table 3 describes the number of individuals interviewed, their assigned participant number, and their years of experience acting in a formal or informal educational leadership capacity. 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, interview 4 was a group interview with two participants, A and B (P4A and P4B). In the following section, themes and illustrative quotes are used to support key findings and to answer the research questions.

Table 3
Number of Individuals Interviewed from Each Participating Professional Program

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

How Are Professional Programs Across Professional Disciplines Operationally Approaching the Development and Assessment of Competence?

Two diverse approaches were identified across nine professional programs within the university. Approaches A and B emerged from a comparison of data in Table 2. Within a case (i.e., program), data describing program context and structure was used to interpret and compare 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 components. All participants from these programs described competence as being a "combination" of technical/discipline-specific knowledge and professional skills 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 legal education participants as being an "essential skill" to "think like a lawyer" (p. 10, p. 17).

In these programs, individual competencies were thought to be carefully mapped to, and developed through, individual on-campus courses. 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 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/externships were perceived to be available options. Therefore, it was assumed students from these programs were "ready for practice" by passing all of their required courses. Following program completion, requirements for licensure 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 to successfully complete the program. Assessment tasks and tools were 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 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 competency-informed instruction, learning opportunities, and assessment to meet accreditation requirements.

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 $15,000CAD to $20,000CAD per year. A notable outlier was the 12-month MBA program, which had a tuition fee of less than $100,000CAD.

Approach B: Demonstrated by Clinical Psychology, Registered 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. Work-integrated learning opportunities (e.g., practicums) 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 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 field supervisors. Post program completion, graduates from most of these programs (except for Teacher Education) are required to demonstrate competence through written exams (testing applied knowledge and judgment), and in some cases, oral or performance-based 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.

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 $10,000CAD to less than $15,000CAD 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, challenges had to do with operationalizing competency-based approaches to instruction and assessment within well-established university structures. Commonly referenced barriers to operationalization included having human and financial resources to persuade and support faculty, who have academic freedom, to buy into competency-informed pedagogy and assessment. For programs taking approach B, challenges related to faculty members' capacities to assess and evaluate competence at the student level.

Academic Freedom. Across Business, Engineering, Law, and Planning, several participants perceived a tension in satisfying 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 program's responsibility to ensure 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 the profession. You're delivering it'. […] You, of course, have the freedom to work on pedagogy. We have the set of competencies 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 may not value work-integrated learning opportunities or struggle with developing simulated/authentic experiences 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 faculty that "it's dirty in a law school to talk about the practice of law" (P17). Participants 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 how there is "variation in the degree to which instructors are conscious of and deliberately developing [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 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 instruction 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 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 is not 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 assessment burnout, participants from Clinical Psychology, Nursing, Occupational Therapy, Postgraduate Medical Education, and Teacher Education also had concerns about getting faculty and field adjuncts to (a) document honest judgments of student performance, (b) share or feed-forward performance information to

support students' ongoing learning, and (c) 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 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 their faculty 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). 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, to balance students' learning needs and public protection, participants explained how 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

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. This difference likely contributes to the clear dichotomy. Faculty from programs taking approach A do not directly observe students' developing or demonstrating achievement of competence standards in the workplace.

Discussion

The findings of this study offer important and novel insights into the approaches university-based programs are using to operationalize entry-to-practice competence frameworks across professions. Research investigating perceived tensions with implementing externally derived competence frameworks within existing university-based structures will contribute important understandings to the CBE movement within professional/higher education (Pichette & Watkins, 2018). Specifically, the findings support faculty, program leadership and policymakers to understand what it takes to operationalize competency-based teaching/learning and assessment at the postsecondary program level. Operationalizing CBE is a systemic teaching and learning initiative, requiring shared mental models, investment, and decision-making at every level; from higher-education policy and administration to frontline faculty development (e.g., how to

design authentic teaching and learning experiences and assessments to co-regulate students' development of competence).

The findings suggest programs are taking one of two approaches to operationalize 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 were collected to support decisions about quality assurance and ongoing program improvement. This information was used to support programs in identifying gaps in 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 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 a different approach (i.e., approach B), which 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 decisions about students' learning and ongoing development of competence and high-stakes evaluation decisions about achievement of competence standards, in addition to program improvement efforts.

This difference suggests programs taking a competency-informed approach tend to be more concerned about instrumental use of assessment data for maximizing 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 developmental use of assessment data to inform decisions about students' learning processes and products (i.e., outcomes). This may be because of their extensive work-integrated learning requirements (Rich, 2019).

Another possible explanation for why a program may choose to take one approach over the other is their profession's pathway to licensure. For programs taking a competency-informed approach, there may be less 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 licensure post program completion. Graduates of these programs are often required to complete a period of supervised work experience and to write a professional ethics and jurisprudence exam. These post-graduation processes 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 and assessment requirements for professional program completion. For these programs, successful program completion signifies achievement of a minimum standard of competence (Pichette & Watkins, 2018).

While competency-based approaches claim to enable more consistent graduate outcomes (e.g., Competency-Based Education Network, 2017; Pichette & Watkins, 2018), the findings of this study suggest this may be difficult for programs to achieve. Participants from programs taking 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

challenges identified within 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). So far, 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 Students

When interpreting potential implications of these two approaches on students' learning, it is reasonable to infer that those experiencing competency-based teaching/learning and assessment may benefit from having a more explicit awareness of their ongoing development and achievement of competencies required for entry-to-practice. Work-integrated learning and assessment opportunities are the gold standard for providing students and program faculty with information about individual students' developing capacity to work safely and effectively in a given profession—so long as there are structures in place to support workplace supervisors with completing accurate and reliable competency-focused assessments of students' performance over time (Gruppen et al., 2018; Venville et al., 2018). An ongoing awareness of achievement in relation to entry-to-practice standards is important because it supports students in making evidence-informed decisions about readiness for practice, self-regulated learning goals, and career planning.

Implications for Practice, Policy, and Research

In light of the findings from this study, it is recommended that leaders of professional accrediting bodies and education programs consider the role postsecondary programs play in determining competence for entry-to-practice along their pathway to licensure, along with their intents for implementing a competency-framework. The following questions may help those tasked with program design, delivery, and monitoring to decide whether they should be taking a competency-based approach to operationalization: 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 enabling faculty to develop authentic learning and assessment opportunities? Are policies surrounding grading and reporting, 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 CBE at the program level?

Limitations

This work intended to identify key foundations concerning the development and assessment of student competence across professions. While limited in scope given the use of a single university, our findings highlight diversity in the approaches to implementation being used across programs, while also illustrating common attributes

that can be used to classify how these programs operationalize competence. Focusing this research on the perspectives of program leaders enabled us to examine program intentions and challenges, but prevented us from triangulating participants' perspectives with evidence from direct observation or confidential program accreditation documents. Rather, the focus was to explore intentions behind, perceived approaches to, and challenges with, operationalization. Efforts were made to increase credibility of the data and trustworthiness of our findings, including writing memos throughout data collection, providing participants with opportunities to member check for accuracy of their data, triangulation of ideas across program participants, and collaborative interpretation of findings through discussions amongst the research team. In future research, it will be important to determine the extent to which professional licensure 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 perceived challenges with operationalization from the perspectives of students and faculty instructors/advisors/assessors, who are directly immersed in developing and assessing competence on the ground.

Conclusions

In summary, the findings of this research showed: (a) diversity in the approaches to operationalization of entry-to-practice frameworks being used across programs, (b) common attributes which can be used to classify the manner in which these programs operationalize competence, and (c) challenges with supporting faculty, who have academic freedom, to buy into competency-informed pedagogy and assessment. These findings can be used to inform policy and practice decisions about (a) the role professional programs play in using assessment to determine competence for entry-to-practice along professional pathways to licensure, and (b) programs' intents for, and approaches to, operationalizing entry-to-practice competence frameworks in practice.

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