REFLECTIONS

Leveraging knowledge translation and implementation science in the pursuit of evidence informed health professions education

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Abstract

Evidence informed approaches to health professions education can ensure accountability to learners and society in providing meaningful and effective education and helping resource strained systems via streamlined and cost-efficient practices. Knowledge translation and implementation science are two areas of study originally developed in clinical medicine in response to concerns that health care practices were incongruent with the scientific evidence. Two decades of research have led to important advances in our understanding of the nature and magnitude of research-practice gaps, the factors that support or impede adoption of evidence in clinical decision-making, and in the design and evaluation of theory driven interventions to reduce gaps. This paper borrows concepts from knowledge translation and implementation science to further our thinking about how health professions education can 'truly' be evidence informed. The article is organised in four sections: a discussion of the impetus for the evidence informed health professions education movement; a description of the origins of knowledge translation and implementation science; a discussion on how knowledge translation and implementation science can be leveraged to advance the evidence informed health professions education agenda; and suggestions for future discussion and research. An example is used to illustrate the application of the underpinning principles of knowledge translation and implementation science. The authors suggest a theory driven, staged and systematic approach that integrates knowledge translation principles and processes and involves key stakeholders interested in promoting the application of educational research of evidence.

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Introduction

While the idea of using research to inform practice and policy is not new (Caplan 1975), the last 15 years have been marked by renewed calls for education to be based on the findings from educational research. Educators and administrators are urged to adopt evidence-based practices to ensure accountability to learners and society in providing meaningful and effective education, and helping a resource strained system via streamlined and cost-efficient pedagogies (Broekkamp and Van Hout-Wolters 2007). However, the unsystematic use, or non-use of evidence continues to deter the progress and success of educational ventures (Broekkamp and Van Hout-Wolters 2007; Lysenko et al. 2014). Poor uptake of evidence in many areas of education is fuelling scholars' concerns that we are experiencing a phenomenon of inert knowledge (Greenhalgh and Russell 2006). Reasons for the apparent disconnect between educational research and practice include: (a) educators' inclination for practical wisdom over scientific literature (Lortie 1975); (b) educators' challenges in accessing and consolidating non-synthesized evidence (OECD 2012); (c) shortage of evidence that answers real-life educational problems (Hayward and Phillips 2009); (d) a belief amongst educators that educational problems are far too complex and unsolvable through research; (e) perceptions that professional judgement and tacit knowledge do not have a rightful place in "actionable knowledge", which reduces the educator's role to that of a consumer of knowledge (Hammersley 2004); and (f) the perennial debates on the value and usefulness of qualitative v.s. quantitative research.

These reasons mirror those of the evidence-based medicine (EBM) movement. For example, there appears to be a divide between the formal views of evidence advocated by EBM, and the sources of knowledge and evidence used for decision-making in educational practice environments (Levin 2013).

Health professions education (HPE) is experiencing a similar phenomenon. With an unprecedented growth in the quantity and quality of evidence (Reed et al. 2009) it is no surprise that the HPE scientific community and many of its stakeholders (e.g. teachers, program directors, accrediting bodies) are in dialogue on the exchange and uptake of this evidence to inform education practices and policies (Van der Vleuten et al. 2000; Yardley et al. 2010). For the purposes of this paper, we define evidence-informed health professions education (EIHPE) as the process by which individuals involved in HPE (e.g. teaching, assessment, curriculum design and development, administration, research) use research findings to inform their educational practices (Thomas et al. 2019).

This paper aims to borrow concepts from knowledge translation (KT) and implementation science (IS), two areas in rapid expansion in the clinical sciences, to further our thinking on how HPE can 'truly' be EIHPE. We are working with the thesis that, like most fields, HPE is generating new knowledge at a very rapid pace. This unprecedented growth compels us to ask, if, and how this knowledge is being used to inform and improve educational practices and policies. We argue that a theory driven, staged and systematic approach that integrates KT theories, principles and processes, and involves key stakeholders with a vested interest in EIHPE can support the utilization of educational research. The article is organised in four sections: First, we discuss the impetus for the EIHPE movement to situate current conversations in the historical discourse on the use of scientific evidence in HPE. We then briefly describe the origins of KT and IS, and differentiate the goals of each one. In the third section, we propose ways in which KT and IS can advance the EIHPE agenda. We conclude with suggestions on future

areas of research. We use an example from one HPE practice, weaved through the paper, to illustrate the application of KT and IS.

A call for evidence-informed health professions education

Though the origin of HPE as a field of study can be traced to the 1950s (Kuper et al. 2010), the EIHPE movement has garnered increasing attention over the last 20 years. This heightened call for the use of research has come from key associations and professional group such as the Institute of Medicine, the Association of Medical Education of Europe, and the American Association of Medical Colleges; initiatives such as the Best Evidence in Medical Education Collaboration and *ask* AMEE; as well as from key scholars in the field.

In their 2001 report, the Institute of Medicine argued that the education of health care professionals "*had not kept pace with or been responsive enough to shifting patient demographics and desires, changing health system expectations, evolving practice requirements and staffing arrangements, new information, a focus on improving quality, or new technologies*" (p.1, chap 2 (Institute of Medicine Committee on Quality of Health Care 2001)). In their 2003 follow up report, the Institute of Medicine (Committee on Health Professions Education 2003) suggested that HPE curricula must focus on core competencies such as patient-centered care, interdisciplinary teams, evidence-based practice, quality improvement and informatics.

The drive towards EIHPE is also reflected in the growth of initiatives such as: (1) the Best Evidence Medical Education (BEME) collaboration, an international group of individuals, universities and professional organizations committed to the development of evidence informed education in the health professions, that commissions and makes available syntheses of the latest findings from education research (Harden et al. 2000); and (2) *ask* AMEE, a recently developed resource that provides educators with a freely accessible source of information on a specific education topic.

In parallel, a number of influential scholars have written about the nature and purpose of HPE research. They have highlighted the need to generate data on issues that matter most to educators, to help them monitor and benchmark their programs (OECD 2012; Dauphinee and Wood-Dauphinee 2004), as well as build better bridges between theory and practice (Durning et al. 2012; Tractenberg and Gordon 2017). Importantly, the literature is replete with field-specific matters which may influence the EIHPE agenda, namely: (a) the context-specificity of findings from educational research, which can often restrict their application in different educational settings, and with different levels of learners (Onyura et al. 2015); (b) the quality and strength of available evidence (Cook and Beckman 2010; Norman 2007); (c) the relevance of educational research in the "real world" (Cook and Beckman 2010; Yardley 2014; Maggio et al. 2018) and by extension, its readiness for implementation in educational settings; and (d) the definition of the term "evidence" a subject of animated discussion in HPE (Thistlethwaite et al. 2012; Yardley et al. 2010).

Collectively, the growth in the quantity and quality of HPE research, the call for evidence-informed approaches to HPE, and the growing number of initiatives aimed at the synthesis and dissemination of HPE research, underscore the necessity of exploring the ways in which HPE can be more evidence-informed.

In this paper, we use the following case example as an illustration of how to operationalise the KT process. A small physiotherapy program (number of new admissions annually ~ n = 50) is considering modifying its admissions procedures. Since the start of the program, more than 20 years ago, they have used single non-blind interviews (i.e. admission file available to interviewers) conducted by a panel of three interviewers (2 faculty, 1 clinician). The program director and admissions chair are considering moving to multiple mini interviews (MMI) given the existing evidence on its psychometric properties. The admissions chair enlists members of the admissions committee to help with the implementation of the MMI for all new applicants.

Origins of knowledge translation and implementation science

Knowledge translation is a multi-phase process that aims to promote the uptake of research evidence to bridge existing research to practice gaps, improve practices and ultimately, patient care (Straus et al. 2011; Graham et al. 2006). Implementation science, is concerned with the theories, models and methods used in KT to inform and improve HPE (Bauer et al. 2015). We describe each in greater detail next.

Knowledge translation and its corresponding phases

Despite the widespread use of diverse terms to refer to KT (e.g. diffusion, research utilization, knowledge exchange) (Thomas and Bussieres 2016a,b), there is broad consensus that KT aims to optimise the adoption, appropriate adaptation, delivery, and sustainability of effective practices and policies within defined contexts (Brown et al. 2017). KT originated from the biomedical and clinical sciences in response to a growing recognition that diagnostic tools and treatments were often either overused, underused or misused in many areas of health care (Schuster et al. 1998; McGlynn et al. 2003), that together, resulted in suboptimal care and poor health outcomes. Over two decades of research on the root causes of this under- over- and/or misutilization of scientific evidence in clinical practice have converged on a number of individual and organizational factors that alone, or in combination, influence clinician behaviour. Examples of individual factors include limited knowledge of the evidence, poor confidence in one's ability to adopt new practices, resistance to change, and tensions between the nature of the evidence and its use in practice (Gupta et al. 2017; Lizarondo et al. 2011; Duncombe 2018). Aspects related to the work context include restricted access to up-to-date user-friendly technology, competing demands on clinicians' time, leadership values, as well as organizational climate, and unfavourable and/or conflicting attitudes toward evidence based practices (Gale 2009; Bonham et al. 2014). Importantly, the sheer volume of new knowledge, and the pace at which it is generated and disseminated, further compounds the uptake challenge, making it virtually impossible for clinicians to remain up to date (Corish 2018).

KT is used to address these various root causes, and typically consists of three distinct phases (described in detail in Sect. "How knowledge translation and implementation science can support evidence informed health professions education"): (a) documenting the nature and the magnitude of research-practice gaps; (b) identifying and explaining the individual, organizational and system level factors (i.e. determinants) that support or inhibit the use of research findings to inform practice; and (c) designing and evaluating the impact

of theory-driven and tailored strategies to increase the use of research findings (Graham 2012). Importantly, for the KT process to be successful in bridging research-practice gaps, key stakeholders (e.g. teachers, program directors) from various contexts and settings need to be involved (Bowen and Graham 2013). KT processes however, tend to be fraught with complexity as they must take into account the nature, strength and relevance of the evidence intended to be moved into practice, the caracteristics of the innovation or new practice, the end users' readiness for practice change, and last but not least, organizational reinforcement and support for such practice changes, which often compete with strong committments towards efficiency and cost effectiveness.

Implementation science

KT practitioners and researchers have been called to draw from different disciplines (e.g. sociology, psychology), theories (e.g. learning, behaviour change, organizational) and frameworks (e.g. KT process models, determinant frameworks) to explain and predict health care professionals' behavior or adherence to a new practice, and implementation outcomes (Brehaut and Eva 2012; Colquhoun et al. 2010). This is particularly helpful given the numerous challenges associated with KT processes; indeed, human behaviour is complex and health care professionals function within complex and evolving contexts.

In keeping with IS's main objective, interventions used to promote the uptake of scientific knowledge in educational practices must be grounded in theoretical frameworks, they must be developed using robust methods and should consider the different stakeholders who can endorse EIHPE within a specific context (Lapaige 2010). When used appropriately, different theories (Nielsen et al. 2015a) can enhance conceptual clarity, specify hypothesized relationships between constructs, identify determinants of change/research use, inform data collection and data analysis, specify implementation processes and/or outcomes and guide implementation planning (Birken et al. 2017; Hull et al. 2019).

There are many models and frameworks available to guide KT. A detailed description of these is beyond the scope of this paper as others have previously reported on these (Nilsen and Bernhardsson 2019; Weiner et al. 2017; Birken et al. 2017, 2018). Briefly, as an example, Nielsen et al. (2015a, b) proposed five categories of theoretical approaches to achieve three overarching aims: first, to describe or guide the processes used to translate research findings into practice (using process models such as the Knowledge to Action framework (Graham et al. 2006) and the Stetler model (Stetler 2010); second, to help elucidate what factors influence implementation outcomes, using determinant frameworks such as the Theoretical Domains Framework (TDF) (Michie 2014), classical theories such as Social Cognitive Theory (Godin et al. 2008) and the Theory of Reasoned Action (Ajzen and Fishbein 2000), and implementation theories such as Implementation Climate (Jacobs et al. 2014) and Organizational Readiness (Weiner 2009); third, to evaluate implementation outcomes with models such as the PRECEDE-PROCEDE model (Green and Kreuter 2005) and the framework by Proctor et al. (2011).

Though there is no gold standard approach for selecting the right framework, some authors (Birken et al. 2018; Nilsen and Bernhardsson 2019; Weiner et al. 2017) have provided a list of frameworks with some guidance on how to select the appropriate one. The selection of the right model or framework should be guided by the proposed KT goal. For instance, if one is interested in understanding what may facilitate or hinder the integration of a new practice, then one of the determinant frameworks is the way to go. In our

Table 1 Example of the use of the AIMD framework for the 3-phase knowledge translation process

Phase	Goal	How KT method and frameworks	Outcome
Identifying the nature and magnitude of the research practice gap	Documenting current admissions processes in the physiotherapy program	Models/frameworks Process Models Stetler Model Knowledge to Action Framework Methods Review of accreditation report Review evidence on admissions Map practices to evidence Stakeholders Implementation committee Admissions committee Faculty members Program director/chair	Mapping of selection practices and procedures Summary of existing systematic reviews on selection and admissions into HPE programs List of best practices in creating, implementing and evaluating the impact of MMI with a focus on rehabilitation programs as available List of differences between panel interview and MMI processes documented in the literature; for example: Multiple short scenario-based interviews each one assessing one or more attributes, Interviewers representing various stakeholders (e.g. clinicians, members of the public)
Identifying and explaining the individual, organizational and system level factors that support or inhibit practitioners' use of research to inform practice	Exploring the perceived facilitators and barriers in implementing a new interview process from the perspectives of different stakeholders	Models/frameworks Theoretical Domains Framework Consolidated Framework for Implementation Research Promoting Action on Research Implementation in Health Services (PARIHS) Methods Interviews Focus groups Brief survey of faculty Stakeholders Faculty Current students Clinicians and preceptors Program director/chair	Facilitators Faculty motivation Release time to review the literature and create MMI stations Support from other HPE programs having implemented MMI Barriers Faculty and administrators' lack of knowledge on the value and/or evidence of this tool for admissions into HPE programs; Lack of resources to launch a full scale MMI in a small program; Faculty's lack of confidence in their ability to successfully integrate MMI into their work schedule

Table 1 (continued)

Phase	Goal	How KT method and frameworks	Outcome
Designing, implementing and evaluating the impact of KT interventions to reduce research–practice gaps	Designing interventions targeting identified barriers and leveraging existing facilitators	Models/framework AIMD framework: *Aims*: what do you want your intervention to achieve and for whom? *Ingredients*: what comprises the intervention? *Mechanisms*: how do you propose the intervention will work? *Delivery*: how will you deliver the intervention? Stakeholders Implementation committee Admissions committee Faculty members Program director/chair	Aims Increase knowledge Increase confidence of faculty Limited resources Ingredients Short presentation Question and answer Testimonials Video and webinar Mechanisms Considering local needs of this program Involved multiple stakeholders Buy in from Chair and Director Delivery Face to face With champion Online Tailored

experience, the choice of a model is guided by one's familiarity with the framework, its ease of use, and how well the framework addresses the KT goal.

Importantly, IS's scope is broader than that of traditional clinical research; rather than the focus being primarily at the patient (individual) level, it also considers the provider, organization, and policy levels of healthcare. Implementation research "requires transdisciplinary research teams that include members who are not routinely part of most clinical trials, such as health services researchers, economists, sociologists, anthropologists, organizational scientists and operational partners including administrators, front-line clinicians, and patients" (Bauer et al. 2015).

How knowledge translation and implementation science can support evidence informed health professions education

In this section, we discuss a three-phase KT process for moving evidence into practice: (a) identifying the nature and magnitude of a research-practice gap; (b) identifying and explaining the individual, organizational and system level factors that support or inhibit the use of research findings to inform practice; and (c) designing, implementing and evaluating the impact of KT interventions to reduce research-practice gaps. For each phase, we highlight how IS (i.e. use of robust methods and frameworks) can support the KT process. We use the case scenario presented earlier as an example (see Table 1).

Identifying the nature and magnitude of the research practice gap

By 'nature', we mean a description of how the current educational and /or policy practices (e.g. the teaching approach used, the frequency of exposure to an educational intervention, the type of assessment) are congruent (or not) with a best practice as documented in the empirical literature (original research), in evidence syntheses (e.g. BEME reviews) and/or in guidelines which contain ready to use knowledge (e.g. twelve tips, ask AMEE, AMEE guides). Magnitude refers to the extent to which the current practice varies from the best available evidence, that is, how big or widespread is the problem or research-practice gap. Methods such as surveys, interviews, observations, chart audits and checklists used in clinical studies in rehabilitation (Anaby 2017), medicine (Bryant et al. 2014) and nursing (Squires et al. 2011) are examples of how these methods have been used to document and measure such gaps.

In our admissions example, this step consists of documenting current admissions processes in the physiotherapy program. First, the admissions committee would consult program and/or accreditation documents to extract information on selection practices and procedures. Second, they would consult existing and/or recent systematic reviews on selection and admissions into HPE programs (e.g. Patterson et al. 2017, 2016). Third, they would list the best pratices in creating, implementing and evaluating the impact of MMI with a focus on rehabilitation programs if available. Lastly, they would determine how the current admissions practices (e.g. one panel interview) differ from those recommended in the literature (e.g. multiple short scenario-based interviews, each one assessing one or more attributes, interviewers representing various stakeholders (e.g. clinicians, members of the public)). Although documenting research-practice gaps is a necessary first step in KT, to our knowledge, there is currently little evidence of this in the HPE literature.

Identifying and explaining the individual, organizational and system level factors that support or inhibit practitioners' use of research to inform practice

Once a research-practice gap is identified, its causes (or determinants) must be ascertained. Determinants are defined as factors that increase (i.e. facilitate) or decrease (i.e. act as a barrier) the likelihood that research evidence will be used to inform educational decision-making, or that a new practice will be successfully implemented. Determinants are typically organised into three levels: individual (e.g. knowledge, attitudes, skills), organizational (e.g. availability of resources, culture, readiness to change) and system (e.g. educational and health care reforms, accreditation standards) (Thomas and Bussieres 2016a, b).

Though this second step is also vital in any implementation effort, very few studies have explored factors that influence the use of evidence in the context of HPE. Onyura and colleagues (Onyura et al. 2015) examined features of medical educators' environments perceived to either enable (e.g. faculty development, involvement in knowledge creation) or impede (e.g. poor quality of available evidence, time constraints, faculty resistance to change) their use of research findings. In a larger scale study of almost 400 AMEE members, Thomas et al. (2019), identified several facilitators of EIHPE including: favorable attitudes towards the notion of evidence; being confident in one's ability to be an evidence-informed educator, to appraise the HPE scientific literature; and the belief that colleagues are supportive of evidence use. In contrast, barriers to EIHPE included competing professional priorities; the volume of HPE literature; and lack of access to research at the work place. Interestingly, both the facilitators and barriers to EIHPE varied across various stakeholder groups based on work role and professional qualifications. As Thomas et al. suggest "in clinical research, KT investigators study the facilitators and barriers to a specific evidence-informed practice (e.g. the use of a specific assessment or treatment intervention, for a patient group with a specific condition, within a particular setting). Respondents can, therefore, anchor their answers to that particular practice" (Thomas et al. 2019). The HPE context should follow a similar process whereby a research-practice gap is identified for a specific group of practitioners, in a specific context and for a defined teaching or assessment practice.

In our admissions example, the admisisons committee could use interviews, focus groups or a brief survey (i.e. methods), with faculty, current students enrolled in the physiotherapy program as well as with clinicians and preceptors, to explore the perceived challenges in implementing this new interview process. It is also key to inquire about factors that may be leveraged (e.g. faculty motivation, supportive colleagues, release time to review the literature and/or to work on creating interview stations, support from other HPE programs having implemented MMI) to facilitate the implementation of MMI in this program. Potential barriers to implementation may include faculty and administrators' lack of knowledge on the value and/or evidence of this admissions process in HPE programs, lack of resources to launch a full scale MMI in a small program, and faculty's lack of confidence in their ability to integrate MMI into their work schedule.

As per the principles of IS, it is key that the methods used to identify facilitators and barriers are sufficiently robust to allow the admissions committee to obtain the information they need and when possible, that a determinant framework such as the TDF (Cane et al. 2012) or the Consolidated Framework for Implementation Research (Damschroder et al. 2009) be used to guide this step of the implementation process.

Designing, implementing and evaluating KT interventions

Once the target audiences and the aim of the KT intervention are specified, and the barriers to change are identified, active elements of the intervention need to be considered. This requires careful selection of the theories that will help explain how the intervention might work and guide the design of the intervention (e.g., changing beliefs about current practices and subsequent consequences, changing perceived social norms, setting goals) (Brehaut et al. 2016). Often done by consensus, one needs to link a specific KT intervention to a previously identified barrier (i.e., a determinant) (Atkins et al. 2017). A KT intervention consists of multiple components or parts, that interact with one another in complex ways, often in a non-linear fashion. The mode of delivery of the KT intervention encompasses logistical and practical information including mode (e.g. video, AMEE guides); level (e.g. students, interprofessional team, program); intensity and frequency; who's delivering; and size of the target group (Bragge et al. 2017). Recognizing that for most HPE educators, the issue has progressed from that of 'Does this intervention work?' to 'When and for whom should we offer this intervention, and how might we maximize its benefits?' (Wong et al. 2012), robust evaluation of KT intervention is of paramount importance (Davies et al. 2010; Moore et al. 2015).

The large volume of literature developed over the past 20 years on the design of theory-based and tailored KT interventions in healthcare can serve to inform the integration of evidence into educational practices, systems and policies. The simplified AIMD framework (Bragge et al. 2017) is an implementation framework developed through a series of validation exercises; it is one of several frameworks that can be used when designing KT interventions. The AIMD includes four components: (a) *Aims:* what do you want your intervention to achieve and for whom?; (b) *Ingredients*: what comprises the intervention?; (c) *Mechanisms*: how do you propose the intervention will work?; and (d) *Delivery*: how will you deliver the intervention?

For our admissions example and using the AIMD framework, a KT intervention would: (1) aim to address the knowledge barrier, ease concerns (and increase confidence) about time requirements given faculty schedules, and explore ways in which the MMI can be implemented in a resource-constrained context. The intervention could comprise several components targeting the three previously identified barriers: (a) faculty may be given a short presentation on the evidence on MMI and an opportunity to discuss their role in creating interview scenarios; (b) testimonials from colleagues (i.e. champions) from other programs can also be used as exemplars of successfull implementation; (c) a video or webinar of MMI can be shown with questions and answers; and/or (d) a simulated MMI where evaluators can practice scoring stations, and deliberate on both the logistical aspects and the scoring process. Limited resources is not a trivial barrier. Though there is no silver bullet for this, the implementation team may consider creating MMI with fewer stations the first year, until the process becomes more fluid. An evaluation of the processs and outcomes of the KT process may result in an increase in the number and type of MMI stations. Adaptation of the evidence (i.e. best practice) is necessary when a new practice cannot be implemented as reported in the literature.

Taking into account local needs of the program, the proposed *mechanism* could be "based on either theory or empirical evidence" (Bragge et al. 2017) such that the presentation and webinar would be designed to address the knowledge and confidence gaps; new knowledge can influence confidence, which in turn can lead to a practice change. As Bragge et al. (2017) argue "the term could refer to 'how it is known to work' (empirically

established) or 'how it is thought to work' (theoretical rationale)" (p.7). The use of a champion, opinion leader or expert could result in influencing faculty beliefs about their ability to integrate this admission procedure into their schedules. Finally, modes for delivering these interventions should be feasible, acceptable and guided by the local context. They could include face to face meetings, online fora, and consultations with MMI experts from other programs or other universities.

Areas for future consideration and research

We conclude with suggestions that we hope will serve as food for thought on how KT and IS can be leveraged to advance EIHPE. First, we draw on the espoused principle of accountability for the education of future health care professionals and urge us, as a HPE community, to embrace this as a driving force in the development, implementation and assessment of the impact of our educational practices. With this in mind, we encourage our colleagues, when appropriate, to ensure that new knowledge is used in a timely manner to inform and improve HPE.

As Albert et al. (2007) described, HPE research endeavours are situated between the two poles of knowledge production and knowledge use. The questions we ask as researchers and the methods we employ to address these nothwithstanding, we ought to locate our HPE scholarship activites on this continuum. Regardless of which pole we are closest to, or whether we vascillate over time, our position on this continuum may have major implications for the EIHPE agenda, in particular, who is generating knowledge, for whom and to what end.

As a HPE community, we need to be mindful of evolving research agendas in high stakes areas such as Competency-Based Medical Education, assessment, selection and admissions, inteprofessional education, flipped classroom, and the rising attention to diversity and issues of social accountability in HPE. There will likely be continued and resounding calls for evidence to support the decisions we make and the "trends" we endorse.

To successfully move towards EIHPE, different stakeholders likely need to be at the 'table'. This may represent a departure from the ways in which educational practices and policies have been designed and implemented in the past; however, in an era of accountability and evolving academic missions, silos and ivory towers are no longer acceptable. In pursuit of a responsible and efficient multi-stakeholder approach to educational decision-making, we must ask who needs to be involved, when and why.

Faculty development has been described as a KT intervention (Thomas and Steinert 2014). Though there is limited research examining the role of faculty development as a form of KT intervention, we propose that this is an avenue worthy of empirical examination. There are likely several similarities and areas of overlap between what has traditionally been defined as KT interventions in the clinical realm and faculty development activites in HPE. Because of its focus on supporting the development of faculty members in their multiple roles and in helping to promote changes in knowledge, skills and attitudes in teaching, research and leadership practices (McLean et al. 2008; Steinert 2000, 2011; Steinert et al. 2006, 2012) faculty development may play an important role in promoting EIHPE.

Not unlike other scientific fields, advancing the agenda of EIHPE necessitates vigorous scholarship. There is a need for robust methodologies for developing, adopting and

adapting best practices and much of the work from KT in the clinical sciences can help inform methods in EIHPE.

Finally, though beyond the scope of this paper, we invite discussion and debate on two issues which we believe will inevitably have a critical impact on the EIHPE agenda: (a) how educational and practice contexts are subject to policies and procedures that are grounded in, and influenced by missions, resources and outcomes; and (b) the extent to which the evidence can, and will be a driver in educational decision-making in light of organizational missions and available resources.

Conclusions

In this article, we have argued that in pursuit of EIHPE, our community must engage in a deliberate, thoughtful and systematic process. Throughout the paper, we maintained that the practice of KT and its scientific study (IS), can help move us closer towards achieving an evidence informed approach to HPE and proposed that stakeholders work collaboratively to achieve this goal. Acknowledging that learning and professional development take place in complex HPE environments, we recommend that KT efforts take into account heterogenous groups of learners and educators, that are part of rapidly shifting practices within complex learning contexts. We have not attempted to be prescriptive, nor have we argued for a one-size-fits-all KT approach. Rather, our hope is that this article has provided the reader with food for thought, and that it will stimulate further discussion as our HPE community is increasingly called upon to demonstrate that educational practices and policies are aligned with the best available evidence and that they are responsive to societal needs.

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