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Teaching Transdisciplinarity in a Discipline-Centred World

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Health care researchers and practitioners are increasingly asked to work across disciplines (or, in keeping with the conference theme, "Between the Tides") to deal with complex health issues. But working with individuals from different fields is more challenging than it sounds. Working across disciplines can result in tension and miscommunications. Furthermore, to explore interactions among disciplines requires breaking down disciplinary boundaries and creating a common framework and language to define, analyze, and develop new approaches.

This paper explores the benefits and challenges of teaching transdisciplinarity in a discipline-centred world, including a description of the journey of one post-graduate research training program as it strives to help student researchers break down disciplinary borders and develop a common framework to approach a particular health issue – in this case, the problem of substance misuse and addictions.

Introduction

With the recognition that health issues are complex and are affected by social, cultural, political, physical, psychological, and economic factors (Rosenfield, 1992) comes the realization that single disciplines cannot adequately describe a given health problem, nor devise its solution.

Thus, in order to fully understand any health problem, research from varied disciplines, including basic biomedical research, clinical research, epidemiology, sociology, psychology, and others, is needed. Moreover, the knowledge from each of these disciplines must be synthesized and integrated, as the manifestation of what each of these disciplines studies in people's actual lives does not occur in isolation. For example, social problems occur alongside, and interact with, physical and health problems in the individual's life, so keeping sociology separate from the biomedical sciences misses the bigger picture. This speaks to the need for collaboration among researchers from different disciplines. Yet universities are typically structured in discipline-separate "silos" which "foster competitiveness and individualism…more than cooperation and consensus-building" (Poole, Egan, & Iqbal, 2009, p. 148-9). As Austin, Park, and Goble (2008) noted: "In contemporary academia, there is a tension between disciplinary specialization and the need to acknowledge the complex reality of the 21st century" (p. 557). Fortunately, there is increasing interest in the value of cross-disciplinary collaborative research in the health sciences (Fuqua, Stokols, Gress, Phillips, & Harvey, 2004; Kessel & Rosenfield, 2008; Scott & Hofmeyer, 2007). But collaborative research is complicated (Younglove-Webb, Gray, Abdulla, & Thurow, 1999), requiring skills beyond those typically gained in disciplinary training. This paper discusses how one postgraduate research training program worked "between the tides" in its journey towards transdisciplinarity.

What is Transdisciplinarity?

While there is some disagreement in the literature on the language used for the different types of collaborative research, many scholars refer to Rosenfield's (1992) definitions, which describe taxonomy of cross-disciplinary research as:

- **multidisciplinary research**: researchers address a common problem independently, either concurrently or sequentially, in their own disciplines, in isolation from other disciplines; results are brought together only at the end.
- **interdisciplinary research**: researchers work together to address a common problem, but each researcher works from their own discipline's base, using their own discipline's techniques.
- **transdisciplinary research**: researchers work together to consciously transcend their discipline's conceptual, theoretical and methodological orientation to develop a "shared approach" to research and build a common framework that is used to define, analyze and develop new approaches to the problem (Kessel & Rosenfield, 2008).

Transdisciplinarity involves "blurring boundaries" between disciplines and the synthesis of a new epistemology – new conceptual and theoretical frameworks, and new methodological approaches that ultimately yield a deeper understanding of the problem being studied "as a complex dynamic system" (Kessel & Rosenfield, 2008, p. S228). Mitrany and Stokols (2005) identify characteristics of transdisciplinary researchers, including inclusive thinking, broad-gauged, contextually oriented in their theorizing, methodologically eclectic, open-minded, respectful of divergent viewpoints, and adept at promoting good will and cross-disciplinary tolerance.

The "products" of transdisciplinary research extend beyond the products of traditional disciplinary research (e.g., academic publications and presentations in discipline-specific journals and at discipline-specific conferences) and include new, innovative hypotheses; integrative theoretical frameworks for analyzing problems; novel methodological approaches to analyzing those problems; and, ultimately, evidence-based recommendations for policy and practice (Stokols et al., 2003). This is not to say that unidisciplinary research cannot generate such things as new hypotheses or evidence-based recommendations, but rather that transdisciplinary research yields hypotheses, frameworks, method-

ological approaches, and evidence-based recommendations that are beyond those which can have been achieved by unidisciplinarity, or even multi or interdisciplinarity.

History and Evolution of Our Program

There is increasing recognition that fully understanding and addressing complex health problems requires collaboration across disciplines. In response, in 2002 the Canadian Institutes of Health Research (CIHR) launched a Strategic Training Initiative in Health Research (STIHR) to create training programs that equip students to develop both specific content knowledge and transferable skills in working across disciplines to define, analyze, and develop new approaches for solving complex health problems. The Intersections of Mental Health Perspectives in Addictions Research Training[1] (IMPART) program was funded as one of 84 such programs across Canada. IMPART focuses on the issues of gender and addictions and received a renewal of funding from STIHR in April 2009 with an expanded mandate to explore the intersections of violence, trauma, and mental health with addictions and gender. IMPART is made up of:

- **mentors**: faculty members from the Universities of British Columbia (UBC), Victoria, and Toronto, representing a diverse array of disciplines (e.g., nursing, sociology, epidemiology, neuroscience, counselling psychology);
- **trainees**: graduate students, postdoctoral fellows, or clinician- or community-based researchers conducting research on gender and addictions; they can come from any disciplinary background; and a
- **program coordinator**: an individual responsible for program development and who works to facilitate the transdisciplinary projects of trainees and mentors

The goal of IMPART is to enhance the capacity of researchers in applying a sexed and gendered approach to the study of addictions and its intersections with mental health, trauma, and violence. IMPART works to produce addictions researchers conversant with transdisciplinarity and having the necessary skills to work with colleagues from a variety of disciplines.

Over the six years of its existence, IMPART has created a curriculum that is trainee-centred and fosters a supportive, transdisciplinary research community. An evolution of IMPART has been informed by the literature on transdisciplinary research and training as well as feedback from trainees and mentors. Initially, seminars consisted of mentors lecturing on addictions and gender. Trainee feedback indicated that more active and interactive learning was desired and required to allow for true transdisciplinarity. Seminars are now led by trainees, although mentors do co-present with trainees on occasion. Time devoted to formal presentations decreased, allowing time for discussions to interrogate one's own and each others' understandings, assumptions, and approaches – a necessary process for transdisciplinarity.

Access to IMPART has increased through the use of online forums and videoconferencing, resulting in the program's geographical expansion. Originally, all trainees and mentors attended seminars in Vancouver. Through the use of videoconferencing, trainees have now attended seminars from Victoria, BC; Kelowna, BC; Toronto, ON; Hawaii, USA; and London, UK. Currently, IMPART consists of:

- individualized **learning plans** directly linking each trainee's needs to IMPART objectives;
- a **research project** in the area of gender, addictions, mental health, violence, and trauma;
- an **online course** covering the core concepts in gender and addictions, and their intersections with mental health, violence, and trauma from a variety of disciplines, allowing trainees to learn about the knowledge, perspectives, methodological approaches, and values of other disciplines;

[1] Formerly the Integrated Mentor Program in Addictions Research Training program.

- **monthly seminars** which expand beyond the online course and provide opportunities to build community and share knowledge and ideas;
- **professional development workshops** (e.g., presentation skills, media training);
- annual **Research Day** with trainees, mentors, and community stakeholders sharing ideas and knowledge and building community; and
- **trainee-driven, transdisciplinary collaborative projects** (e.g., grant proposals, manuscript preparation, knowledge translation).

Transdisciplinary Features of Our Program

IMPART provides trainees and mentors with the tools to transcend their own discipline and work toward the development of transdisciplinary frameworks for addressing their research. Recognizing that each discipline brings its own philosophical worldview, language, traditions, and research approaches, the IMPART online course was developed to provide background on the issues of addictions from a variety of disciplinary perspectives, setting the stage for transdisciplinary work. The course consists of a series of work-at-your-own pace modules, allowing trainees to focus on the areas with which they are least familiar in order to "fill in the gaps" in their own background knowledge. This exposure to the perspectives and knowledge of their fellow trainees provides a more level playing field on which to start their conversations and collaborations. Additionally, reviewing the modules on one's own discipline provides trainees with an opportunity to reflect on assumptions and perspectives which their own field brings to the table, a process that often does not occur during unidisciplinary training.

Seminars, co-led by multidisciplinary teams of trainees and mentors, with topics being determined by the group at the start of each year, allow trainees and mentors to compare, contrast and synthesize knowledge, understanding and assumptions of each discipline. "Transdisciplinary moments," explicitly noted during seminars, serve to draw attention to the process and content of transdisciplinary thinking. Similarly, Research Day involves group discussions and participation from community stakeholders, which facilitates community-building and development of common frameworks and understanding.

Collaborative projects provide trainees the opportunity to work with colleagues from other disciplines to build transdisciplinary understanding. Examples of transdisciplinary projects undertaken by trainees include running a CIHR-funded Café Scientific event engaging members of the general public in discussions on the issues of addictions, and conducting a transdisciplinary literature review on the intersections of violence, trauma, and mental health with addictions and gender from each of the four pillars of health research (biomedical, clinical, population health, and health services). The latter formed the basis of the literature review for the grant application that secured continued funding for IMPART.

Challenges

IMPART has experienced some of the challenges facing those who seek to undertake transdisciplinary research (e.g., Choi & Pak, 2007; Heitkemper et al., 2008; Kessel & Rosenfield, 2008; Scott & Hofmeyer, 2007; Younglove-Webb et al., 1999).

Different worldviews and values, methodological approaches, and even language (including discipline-specific jargon) can complicate communications and understanding in transdisciplinary teams. While working on a transdisciplinary literature review on the intersections of violence, trauma, and mental health with addictions and gender, even something as seemingly simple as finding appropriate keywords for searching the literature was hampered by language differences among the different fields. For example, the word "trauma" when used by the sociologists yielded publications about the concept of interest (e.g., experiences causing severe mental and/or physical pain, such as childhood physical and sexual abuses, war, post-traumatic stress disorder), but using trauma in the biomedical literature yielded papers related to blunt force

injury. This was a clear transdisciplinary moment for the group, requiring us to stop and reflect on process and language. While highly useful, occurrences such as these do make transdisciplinary work more time-consuming, something often identified as a challenge of collaborative research.

Institutional policies can also pose a challenge; for example, the sharing of research credit, which accompanies collaborative research, is not a universal academic practice. The time-consuming nature of collaborative work can affect publication, promotion, tenure, and grant funding. Determining the order of authorship can be problematic and different disciplines place different value on multi-authored papers (as opposed to single-author papers).

Due to the relative newness of transdisciplinarity, there is, as yet, no agreement on the best way to assess the success of a transdisciplinary research agenda or training program (Stokols et al., 2003). Fortunately, the increasing interest in transdisciplinarity in health research has led to an emergent literature exploring possible ways of assessing the transdisciplinarity, including assessing the transdisciplinarity of a research product (Mitrany & Stokols, 2005), research agendas (Fuqua et al., 2004) and researcher competencies (Gebbie et al., 2008).

Some short-term assessments used by IMPART to monitor program success include: (a) tracking trainee conference presentations and publications, focusing on those co-authored by IMPART trainees and mentors; and (b) obtaining trainee reflections on the value of transdisciplinarity to their thinking and research. Plans to evaluate medium- and long-term outcomes (e.g., the development of a transdisciplinary research agenda or academic appointment of a program graduate to a multidisciplinary research centre) include assessment of the transdisciplinarity of products (e.g., articles, theses/dissertations), and the use of surveys and case studies of program graduates in the years following completion of IMPART.

Factors that Facilitate Successful Transdisciplinary Research

Securing funding through the CIHR STIHR has allowed IMPART to provide training that creates an environment conducive to successful transdisciplinarity (Choi & Pak, 2007; Heitkemper et al., 2008; Kessel & Rosenfield, 2008; Spruijt-Metz & Chou, 2004; Younglove-Webb et al., 1999). This includes the development of a mutually respectful community of learners from a variety of disciplines, with trainees and mentors continually exposed to other disciplines and their research approaches, agendas, methods, and values. Also, trainees and mentors are focused on a common problem – that of addictions – and work to develop a shared understanding of the problem. Furthermore, by explicitly interrogating the notion of transdisciplinarity, including examining personal assumptions and language, IMPART members have been able to develop a shared language to facilitate their ability to work across disciplines.

Specific to transdisciplinary training, Nash (2008) supported a focus on a well-defined research problem, the use of an individualized training plan, a team mentoring structure, and "meta training" about the transdisciplinary research process. IMPART includes all of these features. All members of IMPART have a research focus on gender and addictions and each individual research project has a specific focus within this area. Each trainee develops an individualized learning plan to map his/her specific training process and ensure program objectives are met. While each trainee does have one primary mentor, he/she also has access to the entire cadre of mentors through mentor attendance at IMPART seminars and Research Day and through the mentors' availability to meet with trainees on an "as needed" basis. "Meta training" in the form of presentations and discussion at Research Day serves to help trainees "to understand the conceptual distinction of transdisciplinary training, manage the obstacles and capitalize on the facilitators" (Nash, 2008, S139) of transdisciplinarity.

Several authors (Hall, Feng, Moser, Stokols, & Taylor, 2008; Kessel & Rosenfield, 2008; Nash, 2008) advocated for transdisciplinarity training early in an individual's research career, which allows graduate students and postdoctoral fellows to learn "to respect the value and values of others and worry less about submerging their professional identities in the

team process" (Kessel & Rosenfield, 2008, p. S231) before becoming too deeply embedded in the rigidity of their home discipline. Nash (2008) noted that transdisciplinary training early in one's career could lead to insufficient grounding in discipline-specific skills, although this is not the case with IMPART as it is provided in addition to, not in place of, the trainee's disciplinary training. It is also noted that training in transdisciplinarity for senior investigators should occur, as these individuals both mentor trainees early in their careers and hold responsibility for the management of large research institutes (Hall et al., 2008). In addition to training for graduate students and postdoctoral fellows, IMPART has also exposed senior (and junior) investigators, as mentors, to transdisciplinary work.

Past and present IMPART trainees consistently note the value that IMPART adds to their research training beyond that in their home disciplines. "Interaction with experts working within the same field but on a very different level informs the theoretical basis for my neurobiological experiments with rats," notes a PhD trainee. "What I find most useful about my involvement with IMPART is the opportunity to connect with peers and mentors from many disciplines to truly connect clinical work with academic work. At IMPART, we get to debate theories and new research and to really be critical about our work and its relevance to improving the health of women with addictions issues," commented a Masters trainee, while another said, "IMPART plays an essential role in my development into a more skilful clinician-scientist and is preparing me well for my eventual work in the diverse field of women's health care and research."

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