Challenging knowledge divides: Communicating and co-creating expertise in integrated knowledge translation

by
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Abstract

To solve complex problems, it makes sense to seek diverse perspectives to develop research-based solutions. In the Canadian health sector, this collaborative approach to research is often called integrated knowledge translation (IKT). This thesis is concerned with how boundaries are both essential and obstructive in IKT. While the goal of partnering is to leverage different expertise, diversity also presents some of the most significant challenges to success, creating barriers that block communication and constrain knowledge sharing. Using situational analysis to explore interview and case study data, I explore how knowledge boundaries are experienced within IKT projects. I outline four discursive positions that emerge, and argue that recognizing their distinct characteristics is important for progress in IKT. I also compare and contrast concepts of boundary work and boundary objects as theoretical lenses for IKT analyses, and argue that broadening our conceptual toolbox is beneficial for the study and practice of IKT.

Keywords: Integrated Knowledge Translation; Boundary Work; Boundary Objects; Research Collaboration; Health Research Funding; Situational Analysis
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Table of Contents

Approval ........................................................................................................................................ ii
Ethics Statement ......................................................................................................................... iii
Abstract ....................................................................................................................................... iv
Acknowledgements ................................................................................................................... v
Table of Contents ........................................................................................................................ vi
List of Tables ............................................................................................................................... ix
List of Figures ............................................................................................................................... ix
List of Acronyms .......................................................................................................................... ix

Chapter 1. Introduction .................................................................................................................. 1
  1.1. Research problem ................................................................................................................ 2
  1.2. Setting the scene ................................................................................................................ 3
     1.2.1. The mess of terms ........................................................................................................ 3
     My choice of terms .................................................................................................................. 4
     1.2.2. Note about the term knowledge .................................................................................. 5
     1.2.3. Canadian health research context .............................................................................. 6
     Health Focus .......................................................................................................................... 6
     Canadian Focus ..................................................................................................................... 7
     CIHR’s integrated knowledge translation funding ................................................................. 7
  1.3. Overview of chapters ......................................................................................................... 8

Chapter 2. IKT background & literature review ........................................................................ 10
  2.1. Introduction ........................................................................................................................ 10
  2.2. The phenomenon of IKT .................................................................................................. 11
     2.2.1. IKT addresses important problems ........................................................................... 11
     The great novelty debate ...................................................................................................... 14
     Roots of integrated knowledge translation .......................................................................... 15
     Action research ..................................................................................................................... 15
     Evidence-Based Medicine ................................................................................................... 16
     Interdisciplinary research ..................................................................................................... 17
     Mode 2 research .................................................................................................................... 18
     Partnership ............................................................................................................................ 19
     Funder institutionalization of IKT ......................................................................................... 20
  2.2.3. Potential and benefits of integrated knowledge translation ......................................... 21
  2.3. Study and practice so far .................................................................................................... 22
     2.3.1. Barriers and facilitators .............................................................................................. 23
     2.3.2. Drawbacks of an IKT approach ............................................................................... 23
     2.3.3. Problems with current research ............................................................................... 24
     State of the evidence ............................................................................................................. 25
     Two-communities theory ..................................................................................................... 29
     Critiques of two-communities theory .................................................................................. 30
     Other integrated knowledge translation assumptions ......................................................... 33
     Assumes the value and goal of unified knowledge ............................................................... 33
     Assumes complexity ............................................................................................................. 34
     Ideas of relevance and the role of expertise in society ........................................................ 35
5.2. Views on integrated knowledge translation ................................................. 82
  5.2.1. Trends and grantsmanship ................................................................. 84
5.3. Axes & Positions ..................................................................................... 86
  5.3.1. Recognize-and-handle (A): Most dominant discursive position ........ 89
  5.3.2. Respect-and-clarify (B): Also dominant discursive position .......... 92
  5.3.3. Blur-and-integrate (C): Idealized discursive position ....................... 95
  5.3.4. Challenge-and-embrace (D): Alternative discursive position ........... 97
  5.3.5. Other possible positions .................................................................... 101
5.4. Comparing and contrasting conceptual tools ......................................... 101
  5.4.1. Comparative point: Communication .................................................. 101
  5.4.2. Comparative point: Collective action to co-produce knowledge ........ 104
  5.4.3. Comparative point: Understanding of boundaries ............................ 107
5.5. Conclusion ............................................................................................... 110

Chapter 6. Discussion .................................................................................... 111
  6.1. Introduction ............................................................................................. 111
  6.2. Balancing positional perspectives ......................................................... 111
    6.2.1. Turn up the volume on quieter, alternate positions ......................... 112
    6.2.2. Values and drawbacks of other positions ........................................ 114
  6.3. Add to the conceptual toolbox ............................................................... 116
  6.4. Building nuance into communications discussions .............................. 119
  6.5. Conclusion ............................................................................................... 121

Chapter 7. Conclusion .................................................................................... 123
  7.1. Relevance of study & contributions ..................................................... 123
  7.2. Limitations and suggestions for future research ................................. 124
  7.3. Summary and concluding remarks ....................................................... 125

References .................................................................................................. 126
Appendix A. Summary of current CIHR IKT grant programs .................... 158
Appendix B. Interview sampling and recruitment process ......................... 160
  B.1. Sampling strategy ................................................................................. 160
  B.2. Recruitment process ........................................................................... 163
Appendix C. Interview participant information ............................................. 165
Appendix D. Interview guide .......................................................................... 166
Appendix E. Case study data sources ............................................................ 168
Appendix F. NVivo Nodes & positional map axes ......................................... 169
  F.1. Open code examples ............................................................................ 169
  F.2. Second-round coding: NVivo Node structure ..................................... 171
  F.3. Positional map axes selection process ................................................ 175
Appendix G. Example maps .......................................................................... 177
Appendix H. Key concepts operationalization ............................................. 179
  H.1. Boundaries (in general) ....................................................................... 179
  H.2. Integrated knowledge translation ....................................................... 180
  H.3. Boundary work ................................................................................... 183
  H.4. Boundary objects ................................................................................ 184
Appendix I. Participants’ understandings of IKT ........................................ 187
List of Tables

Table 1.1 Dual thesis focus ........................................................................................................ 2

List of Figures

Figure 1. Positional map of boundaries in IKT ................................................................. 89
Figure 2. Boundaries as metaphorical obstacles in Position A ................................. 90
Figure 3. A jigsaw puzzle represents views of knowledge in Position B ............... 93
Figure 4. Baking provides a metaphor for IKT and boundaries in Position C ....... 96
Figure 5. Opposable thumbs as a metaphor for productively conflicting ideas in
Position D .......................................................................................................................... 98

List of Acronyms

<table>
<thead>
<tr>
<th>Term</th>
<th>Initial components of the term (examples are below)</th>
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<tbody>
<tr>
<td>CIHR</td>
<td>Canadian Institutes for Health Research</td>
</tr>
<tr>
<td>CLARC</td>
<td>Collaborations for Leadership in Applied Health Research and Care</td>
</tr>
<tr>
<td>CSCW</td>
<td>Computer Supported Cooperative Work</td>
</tr>
<tr>
<td>EBM</td>
<td>Evidence-based medicine</td>
</tr>
<tr>
<td>IKT</td>
<td>Integrated knowledge translation</td>
</tr>
<tr>
<td>KT</td>
<td>Knowledge Translation</td>
</tr>
<tr>
<td>KU</td>
<td>Knowledge-user</td>
</tr>
<tr>
<td>PI</td>
<td>Principal Investigator</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized controlled trial</td>
</tr>
<tr>
<td>SPOR</td>
<td>Strategy for patient oriented research</td>
</tr>
<tr>
<td>STS</td>
<td>Science and technology studies</td>
</tr>
<tr>
<td>PUS</td>
<td>Public understanding of science</td>
</tr>
<tr>
<td>PEST</td>
<td>Public engagement with science</td>
</tr>
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</table>
Chapter 1.

Introduction

How can we close the gap between what we know through research and what we do in healthcare practice? Over the last 20 years, there has been an explosion of effort to answer this question (Davis et al., 2003; Jacobson, 2007). A growing obsession with the know-do gap has spawned diverse attempts to better move evidence into practice, ranging from writing better research summaries (Moat, Lavis, & Abelson, 2013) and best-practice guidelines (Berta et al., 2010), to designing eye-catching infographics (Crick & Hartling, 2015) and gamifying the latest research (McKeown, Krause, Shergill, Siu, & Sweet, 2016). However, there has been a growing recognition that most research-to-action efforts have not achieved widespread success. Whether conducted as one-way dissemination of information, or even as more interactive, two-way exchanges, many knowledge translation activities fail to demonstrate significant, positive results (Hofmeyer, Scott, & Lagendyk, 2012).

More recently, a form of collaborative research - often called integrated knowledge translation (IKT) - has emerged as one potential solution. This version of knowledge translation is deemed “integrated” because it actively involves research end-users (clinicians, patients, policy-makers) alongside academics throughout the research process. This strategy addresses a fundamentally different problem than traditional knowledge-to-action efforts. Rather than seeing the know-do gap as a knowledge sharing problem, integrated knowledge translation addresses a knowledge production problem (Van De Ven & Johnson, 2006). Proponents assert that an integrated knowledge translation approach produces more practice-relevant research results, which are ultimately more likely to be successfully translated into practice.
1.1. Research problem

Integrated knowledge translation is premised on the idea that bringing together diverse experts with specialized knowledge will produce more relevant and useful research results. By definition, expert knowledge must be bounded: specialization is required because there is simply too much to know and too little time to know it all (Evans, 2005). But, diversity and specialization can create some of the biggest barriers to collaborative research (Blackwell, Wilson, Street, Boulton, & Knell, 2009). As Salter and Kothari (2016) expound, “the presence of strong boundaries established along occupational or disciplinary lines is known to constrain knowledge sharing” (p. 7). In other words, knowledge boundaries act as both source and barrier for innovation (Carlile, 2002).

This tension led to my interest in a broad research problem: how do people handle knowledge boundaries effectively when conducting integrated knowledge translation projects? In other words, how do they leverage diverse expertise and still coordinate collective action? How do people think about the boundaries of specialized knowledge in the context of research collaborations, and how do they experience those boundaries day-to-day? My thesis explores this tension by looking more specifically at how boundaries are experienced, handled and contextualized in health research projects taking an integrated knowledge translation approach. To address this research problem, I take a dual-focus approach, outlined below in Table 1.1., which addressing both theoretical and more pragmatic areas.

Table 1. Dual thesis focus

<table>
<thead>
<tr>
<th></th>
<th>Focus 1</th>
<th>Focus 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General focus</strong></td>
<td><strong>Empirical experiences</strong> of boundaries and collaboration in integrated knowledge translation practice</td>
<td><strong>Conceptual tools</strong> to explain and describe experiences of boundaries in integrated knowledge translation</td>
</tr>
<tr>
<td><strong>Mode of exploration</strong></td>
<td><strong>Pragmatic</strong> exploration of problems and goals of IKT regarding communication and collaboration across boundaries</td>
<td><strong>Theoretical</strong> exploration and comparison of concepts drawn from other academic fields, for explanatory and analytical purposes</td>
</tr>
<tr>
<td><strong>Research focus</strong></td>
<td><strong>Discursive positions</strong> emerging in the data</td>
<td><strong>Meta-theoretical</strong> analysis of how various concepts connect to the data (or not)</td>
</tr>
<tr>
<td><strong>Research design</strong></td>
<td><strong>Situational analysis</strong> of combined interview and case study data</td>
<td></td>
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</tbody>
</table>
1.2. Setting the scene

1.2.1. The mess of terms

Terminology is a challenging issue in the study of integrated knowledge translation. In one review, McKibbon et al. (2010) identified more than 100 different terms used for knowledge-to-action processes. Further complicating the messy terminology landscape, debates also arise about collaborative research terminology – such as the difference, similarities, and interrelationships between action research, community based research, and participatory research (Denis & Lomas, 2003). So, the label of collaborative research is used as a broad umbrella term to subsume many heterogeneous approaches (Denis & Lomas, 2003; Kieser & Leiner, 2012).

Some scholars care a lot about terms. They passionately argue that establishing a common nomenclature is vital to the advancement of the field (Cordero et al., 2008; Gagliardi, Fraser, Wright, Lemieux-Charles, & Davis, 2008; Kerner, 2006; McKibbon et al., 2010). This group argues that each term entails important methodological, ontological and epistemological differences, which must be appreciated. Resulting from these concerns, there have been many attempts to situate the multitude of terms within indexes, matrixes, and glossaries in order to highlight differences in meaning between the terms (Graham et al., 2006; Ottoson, 2009).

Others use terms interchangeably as synonyms (Canadian Institutes of Health Research, 2012; Lapaige, 2010). This group argues that terminology and jargon should not be a central concern, rather research should focus on more important matters than mere labels, such as empirically researching best practices (Levin, 2008; Shaxton et al., 2012).

The diverse and contested terminology not only hinders understandings, it makes it difficult to review and search related research areas, often creating disciplinary and sometimes geographic silos (Contandriopoulos et al., 2010; Tabak, Khoong, Chambers, & Brownson, 2012; Ward, 2016). For example, “knowledge mobilization” is the go-to term for Canadian social scientists (Social Science and Humanities Research Council., 2009), whereas “knowledge transfer” dominates the UK technology and commercialization space.
While I recognize the importance of language and the respective histories of these different terms, each collaborative research approach is itself heterogeneous, so the labels are somewhat beside the point. Often, one participatory action research project may look – for all intents and purposes – more like a so-called integrated knowledge translation project than another participatory action research project. Therefore, rather than dividing the collaborative research literature based purely on terms used, it is more meaningful to probe the specifics underlying particular cases of collaborative research for similarities and differences.

**My choice of terms**

I chose to use integrated knowledge translation for several pragmatic reasons. First, integrated knowledge translation - and its root term, knowledge translation – are the most common in the Canadian health landscape, because they are used by the Canadian Institutes of Health Research (CIHR), Canada’s major federal health research funding agency. I also chose integrated knowledge translation in part because its limitations as a term have been well explored and outlined (for an extended discussion, see Greenhalgh & Wieringa, 2011 and Engebretsen et al., 2017). These limitations include an over-emphasis on language-based problems, and insufficient attention to power and tacit forms of knowledge that may be more difficult to translate (Greenhalgh & Wieringa, 2011). However, being explicitly aware of these limitations can help me recognize and mitigate them. Lastly, I chose integrated knowledge translation because it explicitly states and emphasizes its collaborative focus with the “integrated” prefix. I endeavour to minimize acronyms and instead write out integrated knowledge translation in full for easier, more intuitive reading.

Integrated knowledge translation is defined in this thesis as collaboration between academic researchers and knowledge-users\(^2\) in a mutually beneficial project or programme, for the purpose of producing research that will be used for decision-making and action (Kothari & Wathen, 2013). The term has been promoted widely by CIHR

\(^2\) CIHR defines knowledge-users loosely and uses the term synonymously with stakeholders and coming from multiple groups, such as clinicians, managers, policy-makers, patients (Graham et al., 2014).
since 2005 (Tamblyn et al., 2016). Integrated knowledge translation aims to co-produce research by leveraging collaborative partnerships across professional and disciplinary boundaries (Greenhalgh, Jackson, Shaw, & Janamian, 2016; Smith & Ward, 2015).

This definition builds on the foundation of (regular) knowledge translation, defined by CIHR as:

The exchange, synthesis and ethically-sound application of knowledge – within a complex system of interactions among researchers and users – to accelerate the capture of benefits of research for Canadians, through improved health, more effective services and products, and a strengthened health care system. (Canadian Institutes of Health Research, 2004, p. 4)

CIHR’s is the most commonly cited definition of knowledge translation, and has been widely used by other organizations such as the World Health Organization and scholars (Azimi, Fattahi, & Asadi-Lari, 2015).

1.2.2. Note about the term knowledge

Further complicating the mess of terms, how one defines knowledge has a significant impact on how one understands integrated knowledge translation. The nature of knowledge has been a central philosophical question since the very beginnings of philosophy (Peters, 2014), and it will certainly not be answered in this thesis.

Varied, and sometimes conflicting implicit or explicit definitions of knowledge appear throughout knowledge translation literature, sometimes all in a single paper (Greenhalgh, 2009). Knowledge can be understood variably as tacit, owned, produced

3 Not surprisingly, co-production also has varied meanings. In one use, Jasanoff (2004) developed a concept of co-production as an idiom, to capture philosophies about the inextricable intertwinement of science and society, stating that: “the ways in which we seek to know the world both reflect and constitute the ways in which we choose to live in it” (p. 1). However, I do not use co-production in Jasanoff’s idiomatic sense. Instead, I use co-production to refer to the process of experts and users producing shared knowledge at a project or program level (van Kerkhoff & Lebel, 2015).

4 Although often credited with coining knowledge translation, the Canadian Institutes of Health Research (CIHR) was not the very first to use the term. Greenhalgh and Wieringa (2011) highlight that the first article indexed on Medline under knowledge translation was published in French in 1972: Royer’s “Medical applications and therapeutic prospects deduced from knowledge in molecular pathology” in Biochimie issue 54, pages 789–99.
and distributed, created, constructed, embodied, performed, enacted, situated, collectively negotiated, and acquired through participation in communities of practice (Asimakou, 2009). These different understandings of knowledge often stem from different worldviews. For example, positivism assumes that knowledge can be “uncovered and expressed in generalizable laws,” while constructivism assumes “knowledge is socially constructed and that there are multiple truths” (Davies, Powell, & Nutley, 2015, p. 35).

At this point, I do not seek to predefine knowledge, because how knowledge is used within the IKT-related literature is indicative of elements central to my research interests. I am more interested in seeing how these varied conceptions and questions are addressed in integrated knowledge translation, and less interested in settling on one single definition.

1.2.3. Canadian health research context

**Health Focus**

Many different fields have rich histories of research approaches that involve diverse groups throughout the process, such as feminist community based research, social work, and international development (Balka, 1991; Heinsch, Gray, & Sharland, 2016; Patton, 2016). However, I chose to focus on integrated knowledge translation projects in health research for several reasons.

The life-or-death stakes of healthcare make it arguably one of the more urgent settings for research to be translated quickly into action, and healthcare is one of the most-studied contexts for knowledge translation to date (Azimi et al., 2015). But, despite this large body of work, collaborative approaches - such as integrated knowledge translation - have been relatively less explored in mainstream health research. I seek to add to this underexplored area.

Also, collaborative health research projects present some potentially interesting clashes of worldviews and research perspectives. Health research often takes more traditional biomedical positivist perspectives, but integrated knowledge translation projects can also involve more constructivist social sciences, and more local, tacit lived-
experiences (Greenhalgh, Jackson, et al., 2016). Therefore, health research collaborations can present particularly extreme and interesting cases of knowledge boundaries.

**Canadian Focus**

I also chose to focus on the Canadian context for two main reasons. The first is convenience – I live and work in Canada, and have access to Canadian integrated knowledge translation projects. The second is that Canada is actually a world leader in knowledge translation. Many researchers in other countries note Canada is on the leading edge of integrated knowledge translation research, theory and practice, and that the Canadian Institutes of Health Research (CIHR) is a champion for knowledge translation on the world stage (e.g. Goldner et al., 2011; Smith & Stewart, 2016; Ward, 2016).

It has also been argued that Canada’s focus on knowledge translation may stem from our parliamentary system and institutions being particularly ill-suited to moving health research evidence into use (Lomas, 1990). Contrasting Canada with the United States and Britain, Lomas (1990) has argued that, because of the constitutional split of powers between the provinces and the federal government:

[Canada has] chosen, from the perspective of speedy uptake of research information, the worst of both worlds. It is hard to gain access to decision-making for research information; even after access has been gained, its influence depends upon the public’s acceptance and view of it as “knowledge” integrated into their belief systems. (p. 353)

These macro-level factors both necessitate and constrain better research-to-action work in Canada.

**CIHR’s integrated knowledge translation funding**

The Canadian health research landscape is dominated by CIHR, which operates a $1 billion annual budget to support more than 14,100 researchers and graduate students (Canadian Institutes of Health Research, 2017; Ellis, 2014).
When CIHR was created in 2000, it incorporated knowledge translation as a key piece of its organizational mandate (Bowen & Graham, 2013). The *Canadian Institutes of Health Research Act* (2000) states that:

The CIHR’s aim is to excel in the creation of new knowledge and to *translate that knowledge from the research setting to real-world applications* in order to improve the health of Canadians, provide more effective health services and products and strengthen the health care system [emphasis added]. (Canadian Institutes of Health Research, 2004, p. 3)

Over time, CIHR has introduced a growing number of funding programs for researchers that explicitly require integrated knowledge translation.

In 2016-2017, CIHR has five granting programs that explicitly require integrated knowledge translation, operationalized in this case by CIHR as the “meaningful engagement of a knowledge-user and/or partner” facilitated by requirements for having peer reviewers, a knowledge-user principal applicant and/or partnership contribution, and adjudication criteria for potential impact or the importance of the idea for applied problem solving (Bourgon, 2015, p. 6). These five grant programs are summarized in Appendix A.

### 1.3. Overview of chapters

Here, issues related to knowledge boundaries in integrated knowledge translation projects are addressed through applications of theory from science and technology studies (STS) to interviews of researchers who conducted IKT projects.

In Chapter 2, I explain why integrated knowledge translation is a significant phenomenon worth studying, and contextualize it within a long and diverse history of collaborative research traditions. I then review the study of integrated knowledge translation to date, outlining key IKT assumptions and highlighting relatively underexplored areas.

In Chapter 3, I make the case that the field of science and technology studies (STS) is a fruitful source of concepts for the study of integrated knowledge translation, in
particular for issues of boundaries. I then explain the theoretical underpinnings of my work, and justify my choice to explore boundary objects and boundary work as potentially useful concepts. In Chapter 4, I describe and explain my methodological choices and procedures, including data collection and analysis.

Then, in Chapter 5, I present the findings from my empirical work, which addresses each of my research questions. Section 5.3 presents the results of a positional map, showing distinct discursive positions on boundaries that emerged from the data. Section 5.4 compares and contrasts boundary objects and boundary work with each other, and with the more dominant conceptualizations of integrated knowledge translation boundaries.

In Chapter 6, I explore how these findings connect with each other, and discuss their implications for integrated knowledge translation scholarship and practice. Finally, in Chapter 7, I summarize the central argument of this thesis: that recognizing and broadening our conceptions of boundaries can help advance the study and practice of integrated knowledge translation. I close by outlining the limitations of this thesis and highlighting future research directions.
Chapter 2.

IKT background & literature review

2.1. Introduction

In this chapter, I first make the case that integrated knowledge translation is an important object of inquiry, as an increasingly popular approach to address central problems in modern society. Then, I argue that several key aspects of integrated knowledge translation remain relatively underexplored, and finally point to ways in which these gaps can be addressed.

As integrated knowledge translation has become more salient over time, a growing body of academic research\(^5\) has emerged to explore this important phenomenon.\(^6\) I do not attempt a comprehensive review of all relevant theory and practice in the field of integrated knowledge translation. Rather, I examine key underlying assumptions of integrated knowledge translation, and then focus on several areas to move the discussion forward in productive ways.

---

\(^5\) Davies, Powell and Nutley (2015) have described understanding and mapping the research that links knowledge, knowing and change as “a challenging and boundary-less task” because relevant findings emerge chaotically across a variety of disciplines and issues (p. 17).

\(^6\) This is part of an emerging genre of meta-research, or “research on research” to examine how research is conducted and applied (Greenhalgh, Jackson, et al., 2016)
2.2. The phenomenon of IKT

Although integrated knowledge translation is not a novel concept, it is an important contemporary phenomenon\(^7\), which has grown to reach unprecedented levels of support, awareness and funding in the health research space over the last 15 years (Greenhalgh, Jackson, et al., 2016). This section provides historical context on the emergence of integrated knowledge translation, and makes a case for why it is worth studying.

2.2.1. IKT addresses important problems

Integrated knowledge translation grapples with some of the most pressing issues we face today. More than ever before, we culturally embrace the concepts of knowledge workers, in a knowledge-based economy where an exponentially growing body of knowledge is regarded as our most critical resource, at constant risk of being lost or underused (Liyanage, Elhag, Ballal, & Li, 2009; Stehr & Grundmann, 2003). Can closer partnerships between research producers and users in IKT optimize our societal use of knowledge?

The increasing quantity of information necessitates specialization\(^8\), and our society depends on placing trust in experts. As Peters (2014) poetically explains:

Most knowledge is hidden to any single knower. Embedded in every shoelace or laptop, every light bulb or medication are years of labour and research, most of which we are privileged to take for granted. Modern life rests upon vast encyclopaedias of knowledge we have not read and cannot explain. Indeed, many thinkers have described modernity as the retreat of knowledge from our immediate lifeworlds and the need to put our trust in expert systems. (Peters, 2014, p. 5)

However, we are simultaneously growing more suspicious of expertise, especially when confronted with the inability of non-experts to meaningfully evaluate experts’ claims.\(^9\)

---

\(^7\) Where phenomenon is defined as “a fact or situation that is observed to exist or happen, especially one whose cause or explanation is in question” (“Phenomenon,” 2017).

\(^8\) The sheer volume of relevant information is daunting – in formal, academic health research alone, over 20,000 healthcare journals are published each year (Grimshaw, Santesso, Cumpston, Mayhew, & McGowan, 2006).
The authority of science is often challenged, and increasingly its “its values [are] more contested, its methods more diverse and its boundaries more ragged” (Nowotny, Scott, & Gibbons, 2001, p. 2). What is the role and purpose of expertise in society, what counts as expertise and who decides? What are roles and goals for inclusion, participation and engagement of so-called non-experts are beneficial in the knowledge society? Integrated knowledge translation as a phenomenon brings these questions to the forefront of health research discussions.

Another key problem that IKT engages with is how to use research evidence that already exists, and why we – as a society – so often fail to act on what the evidence suggests is best. These questions spark additional and important clarifications – what does it mean to use research evidence? The influential work of Carol Wiess (1979) in the field of research utilization introduced a taxonomy of mechanisms by which research evidence influences policy decisions. She argued that rather than using research evidence directly and instrumentally, more often utilization occurs through long-standing exposure to each other’s ideas, supporting a process mutual enlightenment (Weiss, 1979)

2.2.2. The prevalence & growth of IKT

Participatory approaches have long existed in research, they are becoming popularized, institutionalized and formally funded at levels not before seen (Traynor, Dobbins, & Decorby, 2015). Understood in this light, integrated knowledge translation represents a relatively new label for the old process of people with different expertise collaborating to create knowledge and solve problems. In other words, while the concept

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9 This anxiety has a long history. In Plato’s dialogues, Socrates suggested a man would not be able to distinguish between a real doctor and a false one, with the paradox: “Who is to be the judge of skill? Presumably, either the expert or the non-expert. But it cannot be the non-expert, for he does not know what constitutes skill (otherwise he would be an expert). Nor can it be the expert, because that would make him a party to the dispute, and hence untrustworthy to be a judge in his own case. Therefore, nobody can be the judge of skills” (Plato, 1997, p. 657).

10 Weiss' (1979) work seven different models of meaning associated with the concept of research utilization: knowledge-driven, problem solving, interactive, political, tactical, and enlightenment. Exploring the concept in this way, Weiss’ (1979) highlighted the complexity of research use and importantly distinguished between instrumental or knowledge-driven use, political or symbolic use, tactical use and conceptual use of research.
of integrated knowledge translation is not new, it has increased in popularity and significance over the last 15 years (Mitton, Adair, McKenzie, Patten, & Perry, 2007).

Knowledge translation responded to the growing awareness that research findings are not making their way into practice in a timely fashion (by fast-paced, modern standards), which in turn has stimulated interest in finding ways to maximize and hasten knowledge translation (Graham et al., 2006; Solomon, 2015). However, as broad interest in moving research into practice grew, so too did criticism of the most common end-of-grant approach to knowledge translation, where research results would be disseminated to potential knowledge-users only after the end of a research project (Dixon, Elliott, & Clarke, 2016).

So, around 2005, funding agencies in general, and CIHR in particular, began aggressively positioning integrated knowledge translation as an essential – and often ideal – strategy to address the problem of underutilized research knowledge, which regular knowledge translation efforts have so far failed to solve (Kothari & Wathen, 2013; Manojlovich, Squires, Davies, & Graham, 2015; Smith & Ward, 2015). Again, this criticism is not new: “It has long been known (though not always acted upon) that proactive linkage and exchange introduces researchers and the intended users of research to one another’s worlds, builds two-way bridges between them, and develops the mutual trust on which collaboration depends” (Greenhalgh, Jackson, et al., 2016, p. 408). However, the push for IKT in Canada was compatible with an international shift by research funders towards favouring co-creation of research as a popular approach (Greenhalgh, Jackson, et al., 2016; Rycroft-Malone, Burton, Bucknall, et al., 2016). For example, CIHR’s (2004) first strategic plan states:

> It is well documented that bringing users and creators of knowledge together during all stages of the research cycle is fundamental to successful KT. In fact, Canadian John Lavis\(^{11}\) has studied knowledge translation and believes this

\(^{11}\) Lavis has been deeply involved with the development and research of KT at CIHR. He currently holds the Tier 1 Canada Research Chair in Evidence-Informed Health Systems and is the Director of the McMaster Health Forum, Co-Director of the World Health Organization (WHO) Collaborating Centre on Evidence-Informed Policy, and Professor in the Department of Clinical Epidemiology and Biostatistics at McMaster University.
activity is so important that it should become a recognized integral part of research. (p. 4)

The central argument is that end-of-grant knowledge translation alone is insufficient to share and promote use of research evidence. Gagliardi, Kothari and Graham (2017) argue that “commonly used strategies to address knowledge sharing, often based on one-way communication of research syntheses or summaries, have had inconsistent impact on the actual use of research and associated outcomes such as improved healthcare delivery and health gains” (p. 1).

In contrast, integrated knowledge translation addresses the upstream problem of knowledge production, where knowledge-users are actively involved in shaping and conducting the research (Gagliardi et al., 2017; Rycroft-Malone, Burton, Wilkinson, et al., 2016). However, this approach to identification of the problem and appropriate solutions has existed for some time.

**The great novelty debate**

The observation that integrated knowledge translation is nothing new is made frequently and repeatedly throughout the literature (e.g. Bowen & Martens, 2005; Gagliardi & Dobrow, 2016; Greenhalgh, 2009; C. Mitton, Adair, McKenzie, Patten, & Perry, 2007; Reback, Cohen, Freese, & Shoptaw, 2002). However, CIHR itself states that integrated knowledge translation is not a new idea: “IKT has a longstanding tradition in many disciplines but has usually gone by other terms, such as collaborative research, participatory action research, community-based participatory research, co-production of knowledge or Mode 2 research [emphasis added]" (Canadian Institutes of Health Research, 2012, p. 2). Despite this, there is somehow still the sense that integrated knowledge translation is understood to be a fad, or a trend falsely presented as a novel approach.\(^\text{12}\)

\(^{12}\) In fact, it's hard to find anyone claiming that integrated knowledge translation is new, except in rare instances of scholars striving to emphasize the importance of their chosen research topic with wording such as “Integrated KT represents a more modern way of conducting research studies” (Moodie, 2012, p. 53).
For this thesis, it is not useful to offer the observation that integrated knowledge translation is not new and stop there. A meaningful review should go on to point out where integrated knowledge translation has detrimentally disregarded related approaches, and outline how these other areas might contribute to current understandings. Novelty alone does not determine integrated knowledge translation’s significance as an object of study. The fact that collaborative research has long existed makes it all the more important to explore why this approach is gaining unprecedented prominence and support.

**Roots of integrated knowledge translation**

Integrated knowledge translation’s complex relationship with other approaches is part of what makes it interesting to study. Here, I outline five key roots that have contributed to the current conception of integrated knowledge translation, and discuss their implications for how IKT is practiced and understood today.

**Action research**

Action research represents a diverse and divergent set of practices that aim to use research to help bring about democratic social change (Greenwood & Levin, 1998). Following Reason and Bradbury (2001), action research is broadly defined as “the whole family of approaches to inquiry which are participative, grounded in experience, and action-oriented,” such as participatory action research, and community-based action research (p. xxiv).

Importantly, action research is oriented towards social justice, and necessarily includes elements of research, action and participation (Balka, 2005). An action research approach assumes that the best way to understand something is to try and change it (Denis & Lomas, 2003). Some branches of action research also see collaboration as necessary to empower marginalised groups and support the democratisation of knowledge production. Furthermore, in action research, “the distinction between scientist and non-scientist is neither privileged nor valued” (Denis & Lomas, 2003, p. S2:2).

The field of action research has contributed many models characterizing possible forms of participation in research. For example, Arnstein’s (1969) ladder of citizen power
and Oliver, Liabo, Stewart, and Rees’ (2014) and colleagues’ framework address the various types, degrees, and contexts of knowledge-user integration into research (Arnstein, 1969; Oliver et al., 2014).

Some argue that action research, in its diverse forms, provides the “social science roots” of knowledge translation (Graham, Tetroe, & McLean, 2014; Reimer-Kirkham et al., 2015). However, a key difference between broad action research approaches and integrated knowledge translation is the former tends to focus on goals of social change and justice, whereas the latter is more about supporting use of research evidence to inform better decisions, where better is understood as based on research evidence.

**Evidence-Based Medicine**

Evidence-based medicine is defined as the “conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71). The evidence-based medicine movement gained momentum in the 1990s, growing from a small rebel group into an energetic intellectual community committed to challenging unproven practices in medicine and standardizing evidence-based care for safer, more cost effective health systems (Contandriopoulos, Lemire, Denis, & Tremblay, 2010; Engebretsen, Heggen, Wieringa, & Greenhalgh, 2016; Greenhalgh, Howick, & Maskrey, 2014; Stefan Timmermans & Berg, 2003).

Evidence-based medicine’s influence both inside and outside the realm of clinical practices has been massive (Contandriopoulos et al., 2010). The evidence-based movement both responded to and created a wider sense of responsibility for practitioners and policy-makers to use available research and increase accountability and transparency in decision-making (Denis & Lomas, 2003; Salter & Kothari, 2016). These tenants of evidence based medicine quickly spun out into broader applications - such as evidence-based practice, policy, health systems and management - popularizing the idea that research should be used in practical decisions (Nilsen, Ståhl, Roback, & Cairney, 2013). Now, “we live in an era of evidence-based everything: what matters is what works...[and] in health care especially, using evidence to support policy and
practice has become a shibboleth of the highest order” (Davies, Nutley, & Walter, 2008, p. 188).

The evidence-based focus has been heavily critiqued from many sides, for issues including its rigid rationalization and standardization of medical practice, naïve unwillingness to accept uncertainty, and harmfully narrow conception of what counts as evidence (Balka, 2003; Baumbusch et al., 2008; Greenhalgh, Snow, Ryan, Rees, & Salisbury, 2015).13

In response to the evidence-based movement, Green (2006) asked: “to advance our evidence-based practice, can you help us get more practice-based evidence?” (p. 406). Integrated knowledge translation is part of the answer to this request. Thus, the discourse of evidence-based medicine is deeply linked to discourses of integrated knowledge translation (Ellis, 2014). However, Ellis (2014) points out that the nature of the relationship between knowledge translation and evidence-based medicine is contested. Some emphasize that IKT overcomes the limitations of evidence-based medicine, but more critical examinations suggest that discourses of evidence-based medicine are still deeply embedded in knowledge translation, providing a thick “biomedical root” of thinking, characterised by the “logico-positivist assumptions” that research is a discrete process to develop generalizable evidence which is shared with rational decision-makers (Graham et al., 2014, p. 12).

**Interdisciplinary research**

Interdisciplinary research is not defined as a unified or distinct phenomenon, but rather “as the sum of all the challenges offered by researchers to their own disciplines or to the structure of disciplines in general” (Salter & Hearn, 1996b, p. 174). Not all interdisciplinary research is necessarily team research – a single researcher can seek to incorporate different disciplines in their work (Salter & Hearn, 1996b). However, interdisciplinary research is more often about researchers from different fields working together in different ways. The practice of interdisciplinarity research continues to gain

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13 These critiques have also sparked some softened terminology, adding the suffix evidence *informed*: evidence-informed medicine, evidence-informed policy (Baumbusch et al., 2008).
more and more attention, in step with the growing emphasis on collaborative approaches (Rylance, 2015; Salter & Hearn, 1996b; Van Noorden, 2015).

Some discussions of interdisciplinarity also address the topic of collaborating with non-academic knowledge-users. For example, Frodeman and Mitcham (2007) argue that the move towards producer-user collaboration in integrated knowledge translation is a natural extension of interdisciplinary logic, by transcending the walls of universities and bringing “the academy into dialogue with the public and private sectors” (p. 506). Alternatively, Hearn (2003) has suggested this extension of interdisciplinary logic could be called “extradisciplinarity,” because it goes beyond the disciplinary structures of the university altogether (para. 53). Many of the same rationales, debates, benefits and challenges listed in discussions of interdisciplinarity also extend and apply directly to integrated knowledge translation. In particular, discussions of interdisciplinarity offer insights into a parallel tension within IKT: namely, that interdisciplinary work simultaneously challenges disciplines, but also depends on them. Similarly, integrated knowledge translation both depends on and challenges knowledge boundaries and expertise.

Mode 2 research

In 1994, an influential book called The New Production of Knowledge proposed the thesis that our society has transitioned away from traditional Mode 1 knowledge production in the domain of academic science, towards Mode 2: nonlinear, trans-disciplinarity and co-produced knowledge by heterogeneous groups (Gibbons et al., 1994; Nowotny, Scott, & Gibbons, 2003).

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14 For example in 2015, the prominent science journal Nature published an entire special issue on the topic of interdisciplinarity. In addition, the Global Research Council chose interdisciplinarity as one of its two annual themes for 2016 (Rylance, 2015, p. 314).

15 Based on this evolution of interdisciplinary logic, some have suggested we are now in a post-disciplinary stage, following the disciplinary and interdisciplinary stages of the nineteenth and twentieth centuries and the pre-disciplinary stage of the seventeenth and eighteenth centuries (Stehr & Weingart, 2000).

16 The book was partially sponsored by the Swedish Council for Planning and Coordination of Research, and used to directly inform Swedish research funding policy.
This idea has generated considerable debate especially around its empirical basis, novelty and accuracy (Hessels & van Lente, 2008; Swan, Bresnen, Robertson, Newell, & Dopson, 2010). For example, Weingart (1997) has critiqued the idea of Mode 2 knowledge production as an idealized call-to-action, rather than an accurate and rigorous empirical analysis. However, many policy-makers and research funders, in their drive towards socially relevant research, have engaged in Mode 2 thinking. Swan et al. (2010) argue that Mode 2 “is more than just a convenient rhetorical device or ideology” and it has formed the basis for consequential decisions around the funding and organization of academic science (p. 1313).

These debates are directly relevant to discussions in integrated knowledge translation. It is difficult to distinguish any meaningful differences between integrated knowledge translation and Mode 2 knowledge production, except perhaps that integrated knowledge translation focuses more on collaboration as a means to the end-goal of knowledge use, whereas Mode 2 focuses more on the mode of knowledge production as the end in itself.

**Partnership**

There is a huge literature on partnership in general, and more specifically on partnerships for research (Hastings, 1999; Mitchell, Pirkis, Hall, & Haas, 2009; Newman, Biedrzycki, Patterson, & Baum, 2011; Ross, Lavis, Rodriguez, Woodside, & Denis, 2003; Sibbald & Kothari, 2012; Tomlinson, 2005). Discussions of research partnership in health are basically indistinguishable from discussions of integrated knowledge translation, except that they have been happening for much longer, and in more diverse fields.

However, partnership literature contains a controversial thread, which questions the modern “tyranny” of partnership and participatory approaches (Cooke & Kothari, 2001). For example, Baum (2000) argued the growing enthusiasm for research partnerships in international development can “exaggerate partnerships’ potential, minimize their requirements, and ignore evidence that development is often disjointed and tenuous” (p. 234). In a longitudinal ethnographic case study of a German education research partnership, Schmachtel (2015) argues partnerships are best understood as
“rationalized myths” in common policy and research narratives (p. 448). Here, rationalized myths are defined as taken-for-granted concepts that are regarded as appropriate, rational and modern solutions to the complex problems of today. The partnership, however, ultimately legitimized a neoliberal strategy that “consolidated the partnership’s structural status quo rather than leading to innovation” (Schmachtel, 2015, p. 448).

Despite these and other issues, McLaughlin (2004) suggests arguing for partnership is akin to arguing for “mother love and apple pie,” because “the notion of partnership working has an inherently positive moral feel about it and it has become almost heretical to question its integrity” (p. 103). A similar normative tone permeates many conversations around integrated knowledge translation.

**Funder institutionalization of IKT**

Although integrated knowledge translation emerged after and exists alongside the diverse approaches discussed above, Greenhalgh et al. (2016) argue that health research today does indeed involve “increasingly complex inter-sectoral networks in which university scientists engage with policy-makers, civil society, and industry to a far greater extent than in the past” (Greenhalgh, Jackson, et al., 2016). Now, a number of research funding agencies require that knowledge-users be named as collaborators on funding applications, or act as “relevance reviewers” of grant applications (Kothari & Wathen, 2013, p. 187).

In addition to CIHR’s integrated knowledge translation funding programs outlined in Appendix A, many other granting agencies in countries around the world have introduced programs requiring collaborative, IKT-style research. Soon after the introduction of integrated knowledge translation in Canada, a 2006 report in the UK acknowledged that current approaches were likely insufficient to close the gap between research and practice, and called for more nuanced co-production strategies (Cooksey, 2006). This lead to the Academic Health Science Networks and Collaborations for Leadership in Applied Health Research and Care (CLAHRC) programs. Similarly, many other countries have emphasized funding programs that address knowledge gaps by promoting partnerships, including the Netherlands’ Academic Collaborative Centres for
Public Health, the United States’ Agency for Healthcare Research and Quality, the National Health and Medical Research Council in Australia, and the Health Research Council in New Zealand (Reimer-Kirkham et al., 2009).

It is also important to look at the unique role of patient engagement and the Strategy for Patient Oriented Research initiative put forth by CIHR. An increased explicit focus on patient engagement seems to have been added alongside, or somewhat later than integrated knowledge translation. Technically, patient engagement is by definition included in integrated knowledge translation. The definition of knowledge-users in integrated knowledge translation includes “patients and the public” alongside policy-makers, health system managers, healthcare professionals, and industry (Graham et al., 2014, p. 11). However, most work on knowledge translation and integrated knowledge translation seems to have been targeted predominantly towards decision-makers and practitioners (Ramsden et al., 2016), rather than patients.

2.2.3. Potential and benefits of integrated knowledge translation

Integrated knowledge translation offers many potential benefits, although the degree to which these benefits are proven is hotly contested. Still, the potential benefits are both rationally appealing and well-rehearsed (Bowen, Botting, Graham, & Huebner, 2016).

Collaborative projects are assumed to support the creation of more user-relevant research questions, and therefore produce findings that can be more readily implemented (Kothari & Wathen, 2013). An integrated knowledge translation approach is not about “‘build it and they will come’ but rather ‘build it with them, and they are already there’” (Greenhalgh, Jackson, et al., 2016, p. 414). This is achieved by creating a broader range of choices in defining research problems and assembling methodologies, along with better interpretations of data, to provide improved quality of solutions, and greater research relevance (Bowen et al., 2016; Denis & Lomas, 2003; Gagliardi & Dobrow, 2016).

Another key benefit is that involving end-users can reduce conflict around research evidence, increase its credibility, and build trust (Macaulay & Nutting, 2006;
Shearer, Dion, & Lavis, 2014; Walter, Davies, & Nutley, 2003). In other words, “proactive linkage and exchange introduces researchers and the intended users of research to one another’s worlds, builds two-way bridges between them, and develops the mutual trust on which collaboration depends” (Greenhalgh, Jackson, et al., 2016).

Additionally, the promise of integrated knowledge translation is premised on the idea that more heads are better than one, especially when solving complex problems (Yasuoka, 2015). “By exploiting multiple perspectives, the robust features of reality become salient and can be distinguished from those features that are merely a function of one particular view or model” (Van De Ven & Johnson, 2006, p. 815). For example, Jasanoff (2003) argues that experts are valuable within their own domains, but their ability to look beyond their field is constrained, and “disciplinary rigor is often purchased at the price of imaginative narrowness” (p. 161). Therefore, IKT can productively broaden how researchers think and the solutions they produce (Denis & Lomas, 2003). Additionally, end-users of knowledge might gain deeper insights into their own practices and better information to support decisions, as a result of participating in IKT (Elliott & Popay, 2000; Lomas, 1993; Roos & Shapiro, 1999; Ross, Lavis, Rodriguez, Woodside, & Denis, 2003).

Integrated knowledge translation is also touted as more efficient, by providing previously unavailable access to practical knowledge, communities and data for researchers and providing new or additional resources in terms of time, research capacity and funding for knowledge-user partners (Sibbald & Kothari, 2012).

2.3. Study and practice so far

As funding for integrated knowledge translation has increased, so too has research on the process itself. Below, I outline key themes and topics which have been addressed in IKT research, and then I will examine the salient assumptions underlying integrated knowledge translation.
2.3.1. Barriers and facilitators

Much of the research on integrated knowledge translation starts by assuming the benefits of the approach (outlined above), and then seeks to highlight detailed lists of the barriers and facilitators to success. This means the most frequently addressed area of empirical research on integrated knowledge translation is focused on identifying those factors that can block or enable IKT projects (Mitton et al., 2007). As Smith and Ward (2015) point out, “the literature is rich with diagnoses of the barriers to collaborative partnership and how these can be overcome” (p. 225).

Practically, the biggest challenge with these lists of barriers and facilitators is that they have – at least so far – failed to be synthesized into a one-size-fits-all approach. There is no cookbook for perfect integrated knowledge translation, or a complete checklist of best-practices. Generally, the research literature suggests that integrated knowledge translation is difficult to initiate and sustain, and, “it appears that even under favourable resource conditions, IKT is challenging, and desirable outcomes are not easily achieved” (Gagliardi & Dobrow, 2016, p. 2).

Many of the key factors that positively or negatively influence an IKT project’s success are similar to those in any collaborative endeavour. For example, Camden et al., (2015) conducted a systematic review of integrated knowledge translation in rehabilitation research, reviewing 19 articles and concluding that establishing clear roles, expectations and a common language were all important, along with ensuring ongoing and open communication. Other factors identified in the literature include leadership and attitudes about research, incentives and funding, differing needs, priorities, and timelines among participants, avoiding jargon, power sharing and integrated knowledge translation capacity (Camden et al., 2015; Gagliardi & Dobrow, 2016).

2.3.2. Drawbacks of an IKT approach

In addition to identifying barriers and facilitators, research on integrated knowledge translation has also identified potential drawbacks of the approach. An integrated approach is often much more time consuming, demanding, and resource intensive than other research strategies because it requires both researchers and
knowledge-users to develop new skills and perspectives (Gagnon, 2011). Even with its growing popularity, there are often insufficient incentives for doing integrated knowledge translation in either academic or practice settings (Kothari & Wathen, 2013). And, despite taking significant time and resources, integrated knowledge translation cannot guarantee positive, actionable research findings for those involved (Kothari & Wathen, 2013).

Additionally, other fields using similar collaborative approaches for research suggest there may be other drawbacks that have thus far been underappreciated in the integrated knowledge translation literature. For example, participatory research approaches in international development have been critiqued for co-opting marginalized voices and ultimately reinforcing the status quo. In discussing Mode 2 knowledge production, Gibbons et al. (1994) predict that collaborative IKT-style research will actually increase world inequalities in terms of access to and use of the results of the research activities, because even if knowledge production is more socially and globally dispersed, “its economic benefits will be disproportionately re-appropriated by rich countries and those who are able to participate” (p. 166). It is important for those embarking on an integrated knowledge translation project to be aware of these potential drawbacks.

2.3.3. Problems with current research

So far, most of this research has assumed a neutral, pragmatic tone, which has obscured the theoretical underpinnings and motivations of integrated knowledge translation (Reimer-Kirkham et al., 2015). These unstated assumptions have significant implications for how and why integrated knowledge translation is conducted, yet they are rarely examined (Nowell, 2015).

A key problem with this barriers-facilitators approach is that it assumes the benefits of integrated knowledge translation in advance. But, even if you also assume benefits of IKT a priori, simply identifying and describing what potential barriers and facilitators exist does not adequately explain how or why they might operate.
State of the evidence

A review of the literature reveals starkly different views on the existing evidence base for integrated knowledge translation, largely divided by fundamentally different opinions of what counts as evidence.

The first group argues the current evidence is non-existent or insufficient to prove the value of an integrated knowledge translation approach in terms of proving outcomes (Rycroft-Malone, Burton, Wilkinson, et al., 2016). They are not necessarily against the idea, but argue the evidence is insufficient to justify its wholesale support by funders. For example, in a narrative review of the literature, Cvitanovic et al. (2015) argue that the vast majority of studies in the integrated knowledge translation field are based on qualitative and theoretically-oriented evidence, which they deem insufficient to prove causal benefits. Thus, “filling this gap and developing an empirical understanding of knowledge exchange is crucial for understanding the full extent of the problem” (Cvitanovic et al., 2015, p. 31). Similarly, in a seminal review of the literature on health care policy, Mitton et al. (2007) find that support for collaborative knowledge-to-action approaches “seem to be based, at best, on anecdotal evidence but mostly on experience and even rhetoric rather than on rigorous evidence” (p. 731).

In contrast, the second group argue the importance of integrated knowledge translation “is known” or “has been shown” to have various positive benefits (e.g. Oborn, Barrett, & Racko, 2013). For example, Gagnon (2011) writes that actively involving knowledge-users as partners in the research process is “a strong predictor that the research findings will be used and that the research endeavor overall will achieve a greater impact” (p. 28). Many of these arguments are indeed based on evidence from qualitative research designs, including literature reviews, case studies, interviews and personal reflections of researchers (Cousins & Simon, 1996; Kothari, Birch, & Charles, 2005; Ramsden et al., 2016; Ross et al., 2003).

After reviewing hundreds of empirical research articles on integrated knowledge translation, I follow Greenhalgh et al.’s (2016) balanced argument that research co-creation models “have high potential for research impact, though such impact is by no means guaranteed” (p. 421). Although the approach is not a panacea, I agree with
Walter, Davies and Nutley (2003) that a “reasonable and robust evidence base” supports the use of partnerships as one means of increasing research uptake (p. S2:58). And, I view the critiques of insufficient evidence as opportunities for further empirical and theoretical exploration.

Need for empirical work

Regardless of one’s stance on the state of the evidence for IKT, more empirical study is still needed – in particular to further operationalize the concept, challenge assumptions, and test theories (Gagliardi & Dobrow, 2016; Henderson, Sword, Niccols, & Dobbins, 2014; Schmachtel, 2015). In a recent scoping review of the integrated knowledge translation health literature, Gagliardi et al. (2016) found that “IKT was poorly and inconsistently described, evaluated, and reported in most studies, making it challenging to identify strong thematic areas” (p. 10). Hinchcliff, Greenfield and Braithwaite (2014) also note that many reports of collaborative research do not contain sufficient detail about the messiness and complexity of the process. They speculate that: “while draped in the formal collaborative language and procedures prescribed by funding agency protocols, participants may in reality view each other pragmatically as consultants, clients or even competitors, rather than partners engaged in productive [multi-stakeholder health services research collaborations]” (Hinchcliff et al., 2014, p. 128).

Interestingly, of the relatively few experimental-style empirical studies that have been conducted, many have produced counterintuitive or surprising results. For example, Dobbins et al. (2009) conducted a randomized controlled trial of knowledge translation interventions, including knowledge brokering. Surprisingly, they found increased personal interactions did not improve outcomes as much as expected, and

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17 In their scoping review, Gagliardi et al. (2016) found that studies on integrated knowledge translation often failed to describe or detail the IKT activities involved, and therefore encourage future researchers “to capture and report the full extent of IKT activities, including the nature or mode of interactive activities (i.e., brainstorming sessions, data interpretation sessions, passive dissemination through websites), who is involved in which activity, who is leading the activity, and how often activities take place” (p. 10).

18 Knowledge brokers are “are people or organizations that move knowledge around and create connections between researchers and their various audiences” (Meyer, 2010, p. 118).
achieved comparable effects as tailored written messages (Dobbins et al., 2009). The authors caution that this finding should not be taken as evidence against knowledge brokering, but it remains a provocative suggestion that more and more engaged knowledge sharing might not always be better. Masuda, Robinson, Elliott and Eyles (2009) found that aiming for high interpersonal interaction and taking a community focus were not necessarily prerequisites for effective dissemination and research use at organizational and system levels. Instead, their mixed-method, multiple-case study of seven provincial projects found that “widely divergent dissemination strategies can each have considerable influence on the effectiveness of health promotion uptake at the provincial/state level” (Masuda et al., 2009, p. 1047). Additionally, in an in-depth case study of academic collaborative centers for public health in the Netherlands, Wehrens et al. (2010) observed that “although a partnership structure may facilitate interactions, it does not automatically render them meaningful" (p. 458).

These studies, along with other notable examples (e.g. Schmachtel, 2015; Smith & Ward, 2015; Wehrens, 2013), point to the important role of empirical research to provide new data that can challenge or support theories and assumptions about integrated knowledge translation.

**Need for theoretical work**

The nature and role of theory in integrated knowledge translation is also contested (Kitson et al., 2008). Disagreements tend to arise from fundamentally different views on what theory means. The natural-science model of ideal scientific theory\(^{19}\) - as something explicit, universal, abstract, discrete, systematic, complete and predictive - is very different than a social constructivist view of theory - as non-predictive, contextual, contingent, often focusing on issues of power and values (Flyvbjerg, 2001). My general understanding of theory and theoretical approach in this thesis will be discussed more in Chapter 3. However, there have also been specific debates about the role of theory in integrated knowledge translation study and practice.

\(^{19}\) Flyvbjerg (2001) identifies that “positivism, functionalism, structuralism, cognativism and neopositivism” all share this ideal of a natural-science model of theory (p. 26).
Models, frameworks and theories to guide IKT practice proliferate in the knowledge-to-action world. However, these have been critiqued for their basis in conceptual developments rather than on real-world applications (Crilly, Jashapara, & Ferlie, 2010; Mitton et al., 2007; Ward et al., 2014). Possibly because of their lack of empirical basis and testing, many existing models and frameworks have been critiqued for being “overly complex, hard to operationalize or limited in scope” (Davies et al., 2015, p. 65).

Despite the number of theories available for use, some argue that integrated knowledge translation remains dangerously under-theorized. Those doing and studying integrated knowledge translation projects have been critiqued for ignoring the theoretical underpinnings of their work, to the detriment of the field (Rycroft-Malone, 2007, p. S79). Eccles et al. (2005) argue that the current lack of robust theory means knowledge-to-action interventions and projects become simply, “an expensive version of trial and error” (p. 108). In their scoping review of 13 integrated knowledge translation health studies, Gagliardi et al. (2016) argued that a major gap “was the lack of explicit description of underlying theory or logic upon which IKT approaches and associated activities were selected and/ or evaluated” (p. 10).

In contrast, others argue that theory is impractical and irrelevant in applied work such as integrated knowledge translation (Bhattacharyya, Reeves, Garfinkel, & Zwarenstein, 2006). Oxman, Fretheim and Flottorp (2005) facetiously propose the theory that “you don’t need a theory,” and predict the performance of current KT theories as “about as good as tossing a coin” (p. 113). These authors posit that because many existing theories are not empirically based, theory selection can only be arbitrary, there is a lack of evidence to support theory use as valuable: “We are awash in theories, each of which has heroes, proponents, anecdotes and jargon, and all of which lack evidence that they have led to successful strategies for improving quality” (Oxman et al., 2005, p. 113).

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20 In this treatise for the importance of theory in knowledge-to-action work, Eccles et al. (2005) define theory as “a coherent and non-contradictory set of statements, concepts, or ideas that organizes, predicts, and explains phenomena, events, behaviour, etc.” – a definition exemplifying positivist ideals of theory (p. 109).
Theory, however, does not necessarily mean esoteric or inaccessible models. Instead, I hold the view theory is vital to human understanding: “the urge to find and use reasons—and thus to theorise—is irresistible; people look for explanations, understandings and causes easily and almost automatically, virtually every minute of the day” (Davidoff, Dixon-Woods, Leviton, & Michie, 2015, p. 229). Therefore, the issue is not deciding whether to use a theory, but rather to identify and examine the theories (including unstated theories) that are currently used (Davidoff et al., 2015).

**Two-communities theory**

This section argues two key points: first, that two-communities theory is a dominant theoretical force shaping integrated knowledge translation thought and discourse, and second, that two-communities theory alone is insufficient to fully conceptualize and explain the phenomenon of integrated knowledge translation.

Two-communities theory was popularized by social psychologist Nathan Caplan (1979). In his work on research use in policy-making, Caplan (1979) found that the most dominant idea in the literature – either implicitly or explicitly – was that policy-makers and researchers operate in two different worlds. Caplan identified and named this idea “two-communities theory,” and although he was describing a general and existing idea, he is often referenced as the key source of the theory (p. 459). Setting out to explore the validity of the two-communities thesis, Caplan collected empirical survey and interview data about how research information was used (Caplan, Morrison, & Stambaugh, 1975). Based on the data, Caplan (1979) concluded two-communities

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21 Davidoff et al. (2015) go on to give the useful concrete definition of theory as: “any account that simply asserts that a meaningful interaction exists between variables (since this is a causal theory), as is any account that provides a coherent picture, in the form of a map or model, of a complex phenomenon or interaction, and that may describe how an independent variable changes the behaviour of a dependent variable (since this is an explanatory theory). Thus, an improver who tells us that ‘Introducing a new guideline on care of urinary tract infections will reduce the rate of infection’ is making a (causal) theoretical claim; she is making a different (explanatory) theoretical claim when she adds that ‘the guideline will do this by describing and justifying to practitioners the correct standards of care’” p. 229)

22 Caplan extended C. P. Snow’s (1959) arguments about the “two cultures” of hard sciences and the humanities and social sciences, to an examination of divides between researchers and policy-makers.
theory was indeed relevant and useful to explain policy-makers’ non-use of research information. He also concluded that there was absolutely a gap between research production and use, and that “the need for reciprocal relations between knowledge producers and knowledge-users in policy-making positions is clear” (Caplan, 1979, p. 461). Interestingly, Caplan (1979) himself does not advocate for collaboration indiscriminately, noting:

> It does not follow from our data, however, that an alliance of social scientists and policy-makers is the panacea which will produce relevant research and allow translation of the results of scholarly analysis into terms of practical politics. The notion that more and better contact may result in improved understanding and greater utilization may be true, but there are also conditions where familiarity might well breed contempt rather than admiration. (p. 461)

Regardless, the logic of two-communities theory now forms the foundational base of integrated knowledge translation.

Two-communities theory resonates deeply with people’s experiences of integrated knowledge translation, and many have observed that the idea continues to permeate the integrated knowledge translation literature (Heinsch et al., 2016; Parent, Roy, & St-Jacques, 2007). Emulating two-communities language, researchers and knowledge-users are described as two tribes, living in the swampy lowlands and ivory tower, on different islands, or even different planets (Feldman, Nadash, & Gursen, 2001; Locock & Boaz, 2004; Marshall, 2014; Orr & Bennett, 2010). Some argue that the differences between these two-communities are insurmountable. For example, Kieser and Leiner (2009) state that, since researchers and practitioners occupy such fundamentally different social systems, they “cannot collaboratively produce research, they can only irritate each other” (p. 516). However, much of the rationale for integrated knowledge translation is fundamentally premised on the idea that researchers’ and knowledge-users’ differences impede research use, but that increasing and sustaining contact between these groups can help overcome this two-communities problem.

**Critiques of two-communities theory**

While two-communities theory has been popular and useful to describe the experiences at the nexus of knowledge and action, it is not sufficient alone to explain all problems and outcomes that result from collaboration (Wehrens, 2013).
A main critique is that two-communities theory oversimplifies the problems at hand. As Flybjerg (2001) argues, “dualisms like these may facilitate thinking and writing, but they inhibit understanding by implying a certain neatness that is rarely found in lived life” (p. 49). For example, Hurley et al. (2016) critique this reductionist framing, arguing that neither academics nor policy-makers are homogenous groups, and positing that the relationship between academia and policy [and practice] occurs along a spectrum of interaction. Two-communities thinking can overemphasize the heterogeneity between groups and the homogeneity within them (Bartunek, Trullen, Bonet, & Sauquet, 2003; Wehrens, 2014). It often over-accentuates the barriers between knowledge producers and users, “rather than the potential to surmount them through collaboration or co-producing knowledge” (Gray, Sharland, Heinsch, & Schubert, 2015, p. 1955).

Despite the intuitive resonance of the theory, when tested empirically, many argue two-communities does not fit the data. Wigens (1990) has gone so far as to state two-communities is “simply wrong as an empirical statement” (p. 34). The argument is that many researchers do understand policy and practice settings, and many knowledge-users have research training and experience. Furthermore, even if lacking experience of the “other community” Wigens (1990) argues that those differences are insufficient to explain the know-do gap. In a recent study, for example, Bowen et al. (2016) conducted 16 semi-structured interviews with an established integrated knowledge translation team, and found that the primary tensions may not always arise between researchers and decision-makers. Therefore, they question the usefulness of the two-communities division, because “differences in cultures (and agendas) were found as much among [knowledge-users] as between researchers and [knowledge-users]” (Bowen et al., 2016, p. 10).

Another problem is that two-communities theory portrays boundaries as set and static. For example, in an ethnographic study of integrated knowledge translation, Evans and Scarbrough (2014) find two-communities narrowly relies on the metaphor of a bridge to depict the boundary-spanning activities involved in collaboration. The problem with the metaphor of a bridge is that it portrays each side as fixed (and, once a bridge is built, it is also fixed). However, compelling empirical research from many fields has demonstrated the boundaries between groups are much more dynamic. In other words, by assuming a separation of groups in advance, the two-communities theory mainly focuses on why the
one community is not the other, rather than on how those distinctions are constructed and maintained, and how they might change over time (Wehrens, 2014).

Discussing research utilization, Wigens (1990) boldly argued all attempts to theorize using a two-communities perspective are bound to fail. In part, Wigens (1990) argues this is because two-communities only addresses non-use of research in practice, but does not adequately explain the use of research, especially not in the absence of interaction between communities. However, research use has and does happen at least occasionally, even without bridges between communities – a phenomenon that two-communities theory cannot explain. Along the same lines, Lin and Gibson (2003) argue the two-communities hypothesis may seem like a reasonable description of the experience of those involved in collaborative research, but it offers a poor explanation for why problems exist in this relationship, and leads to solutions based only on communication, which problematically downplays issues related to power relationships, institutional demands, values and beliefs (Lin & Gibson, 2003).

Stemming from two-communities theory is the assumption that there is a gap between knowledge and practice, and between users and producers (Greenhalgh & Wieringa, 2011). However, focusing on this gap as an empty space has been critiqued (Doane, Reimer-Kirkham, Antifeau, & Stajduhar, 2015). First, this conceptualization problematically “implies that knowledge and practice can be cleanly separated both empirically and analytically” (Greenhalgh & Wieringa, 2011, p. 503). Second, some argue the gap metaphor incorrectly depicts an empty void waiting to be filled rather than a complex social space already occupied by existing practices, knowledge and beliefs. (Doane et al., 2015; van Kerkhoff & Lebel, 2015).

Ultimately, the critique is not that two-communities theory is completely wrong or inappropriate. Rather, two-communities alone offers either unproductive or insufficient explanations of empirical data from research collaborations, meaning it ultimately provides “poor analytic rigour” (Wehrens, 2013, p. 19). In other words, Nutley (2010) argues that “we need a wider-angled lens than that provided by the two-communities thesis to analyse and understand the politics and processes of co-producing research” (p. 264-265). Further critical examination of the integrated knowledge translation literature reveals several additional and related problematic assumptions.
**Other integrated knowledge translation assumptions**

In addition to the dominance of two-communities ideas, integrated knowledge translation includes several other fundamental assumptions that often go unquestioned.

**Assumes the value and goal of unified knowledge**

Rationalizing integrated knowledge translation as a way to bring people and specialized expertise together implicitly values achieving a more unified knowledge. For example, Orr and Bennett (2010) argue “many of the refrains about co-production are based on the idea of union. People tend to talk about ‘bridging the gap’, ‘unsealing the borders’, and ‘dissolving the boundaries’…These are ideas and images of a merger” (p. 202). Bucknall (2012) exemplifies this view, writing that integrated knowledge translation is an “international strategy focused on overcoming the fragmentation caused by discipline silos” (p. 193). In the face of this threat, Gibbons et al. (1994) argue the increased interest in collaboration is rooted in nostalgia for a time when the “unification of science” still appeared to be possible (p. 28). Now, intense specialization of knowledge and its fragmentation into narrower areas signal the breakdown of any common understanding across disciplines, and the “impossibility of communication across specialisms” (Gibbons et al., 1994, p. 28).

Like interdisciplinary collaboration, bringing together different knowledge through the process of IKT becomes “a kind of epistemological panacea, to act as a hedge against the threats of epistemological anarchy” (Salter & Hearn, 1996b, p. 8). Levinas and Hand (1989) however, suggest that in the face of otherness, unification is merely a reductionist and an illusory response:

The theme of solitude and the breakdown in human communication are viewed by modern literature and thought as the fundamental obstacle to universal brotherhood…One begins with the idea that duality must be transformed into unity, and that social relations must culminate in communion. This is the last vestige of…idealism. (p. 164)

However idealist, Salter and Hearn (1996b) point out many pro-interdisciplinary arguments are fundamentally premised on the “ideals of a unity and synthesis of knowledge” (Salter & Hearn, 1996, p. 8). I would argue the same for integrated knowledge translation research.
Yet, these ideals should not go unquestioned. Achieving unified knowledge may not be possible, but more importantly, it may not be desirable. For example, Strier (2014) has challenged the dichotomy of dysfunctional conflict versus ideal unity, arguing instead that research collaborations are “complex organizations characterized intermittently by both conflict and collaboration” (p. 157).

Assumes complexity

A certain understanding of complexity constitutes the logic of an integrated knowledge translation approach to research, where problems are constructed as too complex to be solved by one type of knowledge alone (Mollinga, 2010). Bowen and Graham (2013) exemplify the dominant assumption, explaining that “complex problems cannot be solved by researchers working in discipline-specific silos, or without the insight and expertise of those working within the system or the patients the system is attempting to help” (p. S6). Similarly, Van De Ven and Johnson (2006) describe collaboration as creating a more complete picture of problems, because leveraging distinct competencies helps collaborators, “understand complex problems in ways that are more penetrating and insightful than they would be were either scholars or practitioners to study them alone” (p. 802).

However, Bucchi and Neresini (2007) point out that complexity alone is not enough to explain the current popularity of participatory approaches to research and public involvement in science. They emphasize that complex science-related decisions were not uncommon in the past, citing the decision to build the first nuclear weapon or the decision to allow the introduction of pesticides as no less controversial than that of introducing genetically modified organisms more recently (Bucchi & Neresini, 2007). So then, “why was there no call for more public participation on those occasions?” (Bucchi & Neresini, 2007, p. 464).

Furthermore, producing research is often more likely to illuminate the complexity of a phenomenon than produce a simple, “implementable solution” that can be driven into practice (Greenhalgh, Raftery, Hanney, & Glover, 2016, p. 4). In much of the current KT and IKT literature, scholars assume that knowledge inevitably becomes more complete, refined and useful to stakeholders as it filters through each stage of the
process (e.g. Straus, Tetroe, & Graham, 2009). However, scholars in other fields, such as STS, have persuasively described how research and knowledge creation processes are not necessarily straightforward or beneficial to all parties involved. Rather than being linear and value-neutral, research processes and partnerships are fraught with power dynamics and hierarchies, which can also exclude and fragment knowledge as well as produce it.

**Ideas of relevance and the role of expertise in society**

The dominant narratives of integrated knowledge translation contain implicit assumptions about the value of research relevance, and the proper role of expertise in society. Believing integrated knowledge translation is good because it will produce more relevant research implicitly values relevance. For those outside academia, this can seem a somewhat obvious value – of course publicly funded research should be relevant to the betterment of society.

Yet, Dobrow, Miller, Frank and Brown (2017) argue that the meaning of “relevance” is not clearly conceptualized, and the theoretical and practical implications of relevance as a concept should be examined more closely. For example, they point out that it is often “unclear whether relevance is a synonym for or predictor of impact, a necessary condition or stage in achieving it, or a distinct aim of the research enterprise” (Dobrow et al., 2017, p. 1).

Much of the rhetoric of integrated knowledge translation from funders is premised on the idea of increasing the return on taxpayers’ investments in research funding. So, integrated knowledge translation has often been identified as involving neoliberal values (Ellis, 2014). To reduce a great amount of theory, neoliberalism is a set of policies that transfers control of economic factors from the public sector to the private sector (Springer, Birch, & MacLeavy, 2016). Neoliberal governments are characterized by a

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23 It is called neo-liberalism because it is a new resurgence of 19th century ideas of laissez-faire economic liberalism, such as privatization, free trade, deregulation and fiscal austerity. Neoliberal approaches to governance became widespread in the 1980s, under the leadership of Margaret Thatcher in the UK and Ronald Regan in the USA.
both strong accountability to taxpayers as well as the three E’s: economy, efficiency and cost-effectiveness (Heinsch et al., 2016).

Neoliberalism has greatly influenced the role of universities and researchers in society. According to classical liberal theory, academic institutions should promote autonomous inquiry on behalf of individual academics, which means “commodification is nothing but pure intrusion” (Nielsen, 2012, p. 407). However, publicly funded universities are expected to produce a return on investment, and research is understood as a resource to support economic growth and global competition (Frodeman, 2014). In general, society is increasingly “speaking back to science,” and demanding relevant, useful, and socially responsive research (Nowotny et al., 2003, p. 190).

For example, Kitson and Bisby (2008) note a clear shift towards health research relevance in Canadian federal budget documents. In 1998, increased funds for health research were justified “to provide research grants, scholarships and fellowships for advanced research and graduate students” (Kitson & Bisby, 2008, p. 6). But, by 2008, ten years later, the justification shifted to: “the granting councils…will partner with public and private stakeholders to ensure that practical solutions are found” (Kitson & Bisby, 2008, p. 6).

Irrelevant research outputs are seen as wasting funding resources, and failing to implement research findings is seen as wasting opportunities, especially if implementation would mean a more cost-effective healthcare system (Ward, Smith, House, & Hamer, 2012). There is a growing field focused on reducing “research waste,” in part to make the research enterprise more accountable to taxpayers (Foy et al., 2015, p. 3). Ferdinand von Prondzynski, principal of the Robert Gordon University in the UK, notoriously spoke out against irrelevant research, writing “‘knowledge for its own sake’ is no better as a pedagogical statement than ‘spinach for its own sake’ would be as a nutritional one,” to much outcry from the academic community (Matthews, 2013). He criticized the concept as a relic of times, “when education and knowledge were largely the property of a social elite who had no need to justify what they were doing,” and argued that, “today’s society needs something more [from knowledge], and there is plenty to give” (Matthews, 2013).
This logic of increased transparency in governance of public resources can be extended to including non-researchers in research processes as a democratic right and responsibility (S. Oliver et al., 2014). Lehoux et al. (2010) posit that a focus on relevance necessarily gives the power of determining the value of knowledge to the nonacademic knowledge-users, and makes their involvement in research almost mandatory.

However, these ideas of relevance and neoliberalism are not a given. And, although these are persuasive and dominant arguments, they may not actually reflect society’s best interests. For example, Irving and English (2008) note the alignment between discourses of research partnerships and neoliberal efficiency, where collaborative work is understood to maximize funding dollars and make researchers more efficient. However, they pose the critical question: “Efficient at what? Does efficiency become an end in itself?” (Irving & English, 2008, p. 70). In an in-depth discourse analysis of hundreds of CIHR documents, Ellis (2014) identifies a common narrative that “researchers working in a non-KT manner are not producing research in the best interests of the health needs of society” (Ellis, 2014, p. 20). Yet, there are countless examples where non-KT research has produced beneficial social impacts (Ellis, 2014).

Bacchi (2008) argues the common neoliberal assumption of relevance narrows the range of research priorities, so that the: “the focus on ‘problem’ solving (‘what works’) forecloses consideration of how the ‘problem’ is framed” and severely limits the ability of researchers to challenge policy (p. 173). In other words, emphasizing relevance as a prerequisite criterion for research impact has been critiqued for potentially perpetuating the status quo and stifling non-traditional thinking. Ultimately, Bacchi (2008) argues the problem of research use is not the gap between what we know and what we do in practice, but rather “the fit between what the government tells us to ‘research’ and their particular policy agendas [emphasis added]” (p. 173). Similarly, while recognizing and advocating for the benefits of an IKT approach, Kothari and Wathen (2017) caution that research driven by user-defined problems and evaluated by relevance can potentially “serve as a barrier to true innovation, in that major breakthroughs that require paradigm shifts are unlikely to be pursued…The more that funding agencies require partnered, IKT-modelled research projects, the less room there is for curiosity-driven, potentially ‘game-changing’, research” (p. 4).
Assumed links to impact

Integrated knowledge translation assumes certain links to impact that are far from simple or proven. Although my thesis is focused on the processes of knowledge translation – and does not empirically investigate impact or outcomes – assumptions about impact have a significant influence on how the process is undertaken.

For example, integrated knowledge translation assumes that after relevant research knowledge is co-produced, the knowledge will be used to make better decisions in practice, and ultimately improve outcomes. However, this logic is based on the problematic assumption that practice and policy-making “consists more or less of a series of rational decisions on which scientific research findings can be brought to bear” (Greenhalgh & Wieringa, 2011, p. 503). This linear, logic-rational view has been meaningfully challenged by research in other disciplines.

Furthermore, an over-emphasis on the problem solving capacities of research can raise unrealistic expectations about what research can or should achieve in practice (Elliott & Popay, 2000).

Many factors other than usefulness, relevance or the participation of knowledge-users influence evidence use, such as existing political or personal interests (Scheel, Hagen, & Oxman, 2003). For example, Kothari et al. (2005) found that applied use of IKT-produced evidence occurred equally across groups that were actively involved in the research process and groups that were not involved. The more important factor for uptake was whether or not the research findings confirmed existing practice (Kothari et al., 2005).

Additionally, producing more and more relevant knowledge is assumed to help decision-makers. However, there are arguments that it could hinder them instead. For example, some argue that creating more research evidence may cause more harm than

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24 For example, Nobel prize winning work in behavioral economics by Daniel Kahneman and Amos Tversky has demonstrated the many ways in which human reasoning and decision-making can be profoundly irrational and prone to fallacies and systematic errors (The Observer, 2014).
good, by introducing too many considerations and creating a “policy cacophony” (Shelley, 2012, p. 1). Hanney (2004) raises the concern that if increased collaboration does lead to use of the evidence, it might simultaneously encourage a partial selection of evidence based on the personal interactions but not consistent with a systematic overview of the literature.

Philosophically, in their review of health policymakers’ perceptions of evidence use, Innvaer, Vist, Trommald and Oxman (2002) do support the IKT hypothesis that policymakers “find it easier to use evidence they have had a chance to influence” (p. 242). However, they go further to ask a rare question: is this desirable? They worry that “if what is required for research is that researchers do what the policy-makers want them to do, then research may fail to fulfil one of its most important functions, namely to be objective, reliable and unbiased” (Innvaer et al., 2002, p. 242). Partly as a result of these underexplored assumptions, certain key features of integrated knowledge translation have thus far been neglected in scholarship and practice, namely communications and boundaries.

2.3.4. Under-conceptualized communications

Communication is ubiquitous in discussions of integrated knowledge translation, but it is rarely explicitly examined or deeply conceptualized. The possibility, or impossibility, of communication between different communities, different paradigms, and – most fundamentally – different people, is a question at the root of knowledge translation. IKT takes this question one step further – beyond how people can

25 As a society, we tend to assume that more information – especially reliable research evidence - cannot hurt when making decisions, based on the belief that “people have clear and stable preferences” that can only be refined by becoming better informed (Redelmeier, Shafir, & Aujla, 2001, p. 337). However, using surveys to explore healthcare providers’ decision-making outcomes in care situations, Redelmeier et al., (2001) suggest the act of gathering more information itself shapes peoples’ evaluation of the information and their decisions. They conclude that, “the pursuit of information can lead nurses and doctors to weigh information more heavily than if all the information were available at once” which can lead to imbalanced assessments of the evidence and potentially worse decisions (p. 375).
communicate knowledge to each other, to how they can communicate to create new knowledge together.

Fittingly, the observation that “good communication is important” is a commonplace truism throughout the collaborative research literature (Wildridge et al., 2004). The ability to communicate effectively is understood as a vital antecedent to successful collaboration and research (Calder & Beckie, 2016; Henneman, Lee, & Cohen, 1995; McCloughen & O’Brien, 2006; Thompson, Socolar, Brown, & Haggerty, 2002). Conversely, poor or non-existent communication is cited as a major barrier or challenge to integrated knowledge translation (Kieser & Leiner, 2012).

In their studies of collaborative research, Wildridge, Childs, Cawthra, and Madge (2004) identify six key categories of critical success factors, one of which is communication (2004). Sibbald et al. (2014) identify four characteristics associated with successful partnerships, one of which is regular multimodal communication. Similarly, Salsberg et al. (2015) identify frequent communication as one of the five most commonly referenced strategies for effective partnerships. Gibbons et al. (1994) also find communication plays a central role in the emergence of Mode 2 knowledge production, and that the density of communication in knowledge networks appears to be a key variable.

To summarize, the literature suggests good communication in collaborative research should be respectful, regular, timely, relevant, ongoing, user-friendly, and two-way, multidirectional and multimodal with face-to-face meetings as well as telephone, mail, and email, and using accessible, plain language (Denis & Lomas, 2003; Eriksson, Fredriksson, Fröding, Geidne, & Pettersson, 2014; Kothari, MacLean, Edwards, & Hobb, 2011; Reback, Cohen, Freese, & Shoptaw, 2002). McCloughen and O’Brien (2006) caution that, although many of these communication factors appear to be obvious, it is important that they are not so taken for granted as to become invisible.

Yet, despite all these observations, and countless claims around the importance of communication in IKT, somehow, “our knowledge of the factors that shape the emergence of such communication remains vague” (Sosa, Gargiulo, & Rowles, 2015, p. 1061). Kieser and Leiner (2012) find that proponents of integrated knowledge translation
approaches tend to downplay or gloss over potential communication difficulties between practitioners and researchers, and conclude that the research area is still underdeveloped. The literature provides an excellent sense of what successful communication should look like, and sometimes even describes what specific communication practices seem to have helped in previous integrated knowledge translation work. Yet, while these indicators may describe what good communication is, they reveal little about how to actually do it, and often fail to explain why it worked.

More than a decade ago, Golden-Biddle et al. (2003) suggested the value of taking a “communicative perspective” on collaborative health research involving knowledge-users (p. S2:20). Based on their case study of a collaborative Canadian health research project, they argue a communicative perspective\textsuperscript{26} productively de-emphasizes linear, one-way communication strategies and highlights instead how teams employ various “communicative elements” to strategically create, share and use knowledge (Golden-Biddle et al., 2003). Although Golden-Biddle et al.’s (2003) paper is frequently cited as demonstrating that communication is important (e.g. in King et al., 2010; Kothari et al., 2011; Lehoux, Hivon, Denis, & Tailliez, 2008), this subsequent research does not seem to pick up its explicit focus on a communicative perspective.

For example, Manojlovich et al. (2015) reviewed how communication is conceptualized in the knowledge-to-action literature, analyzing 27 prominent theories, models, or frameworks of knowledge translation. They begin by delineating between two major communication paradigms: "(1) communication as a transactional process responsible for information exchange, and (2) communication as a transformational process responsible for causing change” (Manojlovich et al., 2015, p. 2). Based on their review, few existing theories provide any explicit definition of communication, and most implicitly conceptualize communication as a transactional process. Ultimately, Manojlovich et al. (2015) argue that this understanding of communication solely as information transfer misrepresents reality and limits knowledge translation research and

\textsuperscript{26} The communicative perspective involves four key elements: 1) examining the relational stance that researchers and decision-makers assume toward each other; 2) recognizing the purpose for developing and using knowledge in the situation; 3) identifying knowledge-sharing practices; and 4) creating forums in which researchers and practitioners access knowledge. (Golden-Biddle et al., 2003, p. S2:20)
practice. Further, they find that “many communication processes are so embedded into the structure of work that they are invisible, and the relationship between communication and action has been lost” (Manojlovich et al., 2015, p. 6).

However, the authors note that the shift towards integrated knowledge translation is an opportunity to incorporate a broader view of communication (Manojlovich et al., 2015). Whereas previous knowledge translation literature has focused on one-way strategies, such as identifying target audiences, integrated knowledge translation necessarily focuses more on the communicative aspects of relationship building, shared understandings and knowledge co-creation. Manojlovich et al. (2015) also acknowledge that their review broadly dichotomized the communication studies literature as transactional versus transformational, “however, there are interesting nuances within each category that may provide additional explanatory power for implementation phenomena” (p. 9). This is a useful starting point, which begins to highlight how fundamental assumptions about communication – what successful communication is, how to do it, and what it means – underlie integrated knowledge translation. A deeper understanding of traditions in communications thought and theory could bring more explicit awareness and communicative nuance to integrated knowledge translation research and practice.

2.3.5. Under-conceptualized boundaries

For integrated knowledge translation, boundaries appear as a repeat motif, but despite their ubiquity, they are rarely explicitly defined, conceptualized, examined or questioned (Salter & Hearn, 1996b; Wehrens, 2013). Partly stemming from a reliance on two-communities theory, the concept of boundaries is often taken for granted and assumed in advance, as a starting point for the integrated knowledge translation process.

In a commentary titled Are we all co-producers of research now? prominent research-use scholar Sandra Nutley (2010) importantly asks:

Are there dangers in analysing the barriers and experiences of co-production through the lens of the ‘two-communities’ view of academic researchers on the one hand and practitioners (including policy-makers) on the other? And, is
research co-production facilitated by clear boundary maintenance between the relevant communities or do boundaries inevitably become blurred? (p. 264)

Nutley’s questions have received relatively scant attention (with notable exceptions of Evans & Scarbrough, 2014; Smith & Ward, 2015; Wehrens, 2014). Instead, integrated knowledge translation discussions of boundaries are often more normative in focus than empirical or critical. This problematically inhibits our understanding of IKT, because an “unwillingness to examine issues raised by boundaries, possible conflicts, roles and existing power differentials within healthcare contexts limits communication and the exchange or movement of knowledge” (Salter & Kothari, 2016, p. 7).

Boundaries are most often described as undesirable barriers to effective integrated knowledge translation and collaboration in general. For example, Oborn et al. (2013) write that “an important underpinning challenge in enabling KT stems from the knowledge boundaries between stakeholder groups” and that “managing knowledge flows across these diverse boundaries is difficult” (p. 2). The dominant narrative is that boundaries are problematic, and “society has created many boundaries that hinder the implementation of integrated approaches” (Mollinga, 2010, p. S2).

In contrast, scholars from other fields hold more diverse and nuanced views on the nature of boundaries. For example, working in STS and action research, Bjørn and Østerlund (2014) argue that, “boundaries are not our enemies; instead, they are necessary for making meaning” (p. 28). Salter and Hearn (1996a) observe that, in the research world:

Invisible but nonetheless important boundaries are drawn between what deserves systematic study according to the prescribed methodologies of science and the humanities, on one hand, and what falls outside the realm of research and into the domain of popular knowledge, superstition, social values, or folklore, on the other. (p. 160).

These more explicit, nuanced and empirically informed discussions of boundaries draw important attention to thus-far underexplored questions in integrated knowledge translation. Rather than focusing only on how boundaries can be bridged, the study of integrated knowledge translation could benefit from also exploring how and why boundaries are created, maintained, and changed over time (Wehrens, 2013).
2.4. Conclusion

In this review of the literature, I demonstrated the need for a deeper examination of how integrated knowledge translation is conceptualized - in particular around boundaries and communication – to better understand this important growing phenomenon. Both theoretical and empirical work is vital to improving our understandings in these important ways (e.g. Evans & Scarbrough, 2014; Smith & Ward, 2015). As Silverman (1998) comments, “without theory, research is impossibly narrow. Without research, theory is mere armchair contemplation” (p. 107).

IKT-specific research is at a nascent stage, and there is merit in drawing on lessons and insights from other disciplines and sectors about the co-production of knowledge (Davies et al., 2015; Dixon et al., 2016). Integrated knowledge translation is about the creation and contestation of knowledge, expertise, and its application in society. So, I propose turning to other fields that deal also with these issues, and explore what they offer to a study of integrated knowledge translation. In the next chapter, I introduce the field of STS, and argue it provides potentially useful tools to broaden and deepen our IKT understandings.
Chapter 3. Theoretical approach

3.1. Introduction

In this chapter, I argue that the field of STS has much of value to offer a study of integrated knowledge translation, to provide direction for empirical study designs and also theoretical concepts to better explain boundaries and communication across them. After briefly outlining the relevant history and contributions of STS studies and scholars in these areas, I describe my STS-informed theoretical approach. Then, I describe why and how I chose to focus analysis specifically on the concepts of boundary objects and boundary work from STS.

3.2. Linking IKT to STS

STS is a loosely bound field of study, broadly concerning the interactions between science, society, technology and the study of knowledge production and use – many of the same topics at the heart of my thesis. STS has been characterized by “inherent diversity” since its inception (Edge, 1995, p. 4). Today, STS encompasses a “rich tapestry of theoretical and methodological perspectives,” drawing on many disciplines, including history, feminism, labour, environmentalism, philosophy, sociology, politics, law, economics and anthropology (Jasanoff, 2004, p. 2).

However, some specific topics of focus in STS are particularly relevant to discussions of integrated knowledge translation. STS scholarship has long explored phenomena central to integrated knowledge translation, but from a wider range of
different perspectives. This topical overlap makes STS a fruitful source of concepts and ideas that can support a deeper, more critical examination of integrated knowledge translation.

First, I will briefly situate STS perspectives that are particularly relevant to this discussion of IKT, including STS work on knowledge, expertise, and the philosophy of science. Throughout the rest of this thesis, I illustrate how STS can contribute to the study of IKT by introducing fresh insights and promoting critical questions.

Before the 1970s, much of the social study of science was mostly focused on defining ideal science, and distinguishing between scientific and non-scientific knowledge (Sismondo, 2004). For example, the work of American sociologist Robert K. Merton dominated the area, laying out “Mertonian norms of science,” to define what makes scientific knowledge unique and superior: communism (meaning common ownership of scientific discoveries), universalism, disinterestedness and organized scepticism (Merton, 1973; Star, 1995). However, a growing number of researchers began questioning and challenging these ideas around the 1970s and 1980s. Many in Europe were influenced by post-structural theories and the work of Foucault, Deleuze and others (Clarke, Friese, & Washburn, 2016). Additionally, many researchers were deeply influenced by books such as Kuhn’s (1962/1996) *Structure of Scientific Revolutions*, and later Latour and Woolgar’s (1979) *Laboratory Life*. These works and

27 Work in STS has been shaped by a diverse range of early influences and fields. For example, feminist theorists and the labour movement (Cockburn & Ormrod, 1993; Grint & Gill, 1995; Mackenzie & Wajcman, 1985; Wajcman, 2009; Webster, 1996), along with the early environmental movement (Yearly, 2001) have influenced STS development, by arguing for the significance of everyday life technologies and the constructedness of knowledge, among other things. For a more discussion of some of additional diverse sources of STS thought, see Sismondo (2008).

28 It is important to recognize that STS engages with many other topics and areas of study, which are more indirectly related to this thesis, and therefore are not discussed in depth. For example, issues of technology and technological determinism are central to many STS discussions (Gideon, 1948; Mumford, 2010; Thomas, 1995). STS has been greatly influenced by the work of scholars such as Jaques Ellul (1964), who challenged claims that technology is a rational extension of science and modernity, and instead emphasized the design of technology as a product of complex human action.
others critiqued positivist, Mertonian descriptions of science, and fundamentally challenged traditional views of science and society as separate.

This brief summary only addresses aspects of STS most relevant to this thesis, and presents one telling – a more “standard history” of the disciplinary development narrative of STS (Sismondo, 2008, p. 14). However, there are many alternative narratives of this diverse field (Balka, 1987; Jasanoff, Markle, Peterson, & Pinch, 1995). Other perspectives depict STS as growing from more philosophical interests (Jensen, 2014), as rooted in labour, environmental and/or gender politics (Cockburn & Ormrod, 1993; Edge, 1995; Grint & Gill, 1995), and those who focus more on technological implications (Ellul, 1964). Although these important areas and histories of STS are not discussed in depth there, recognizing this inherent diversity in STS is important to appreciate the theoretical richness and potential utility of ideas from STS for the purpose of studying integrated knowledge translation (Edge, 1995).

For example, STS researchers empirically examine how scientific knowledge is produced in a wide variety of settings, focusing on the social mechanisms involved in this production process (Wehrens, 2014). STS scholars routinely grapple with issues of expertise in relation to science and society. A key problem is how expertise can be meaningfully evaluated and acted on by non-experts, in order to make controversial and highly technical decisions on issues such as genetic editing or climate change. Thus, there has been a long tradition in STS around encouraging public understanding of science (PUS). However, PUS has been critiqued for its deficit model, which frames the public as needing more knowledge and education to properly understand science and make informed decisions in a democracy (Davies, 2008). Therefore, many STS scholars now favour a more two-way dialogue, termed public engagement with science (PEST). In contrast to PUS, PEST sees public engagement and participation in science as a vital element to promote a healthy democracy and produce better research and decision-making in the process.

Such issues related to expertise have been a central focus of some prominent STS scholars, including work by Collins and Evans (2007), Epstein (2005), and Jasanoff (2003). Their empirical research and theories can contribute a deeper understanding of the nature of expertise in the context of integrated knowledge translation. Expertise is
conventionally understood as the possession of superior knowledge, mastery, or experience in a specific subject (Hartelius & Mitchell, 2014). However, STS presents alternative ideas of expertise, often describing expertise not as something people have, but as something people do – expertise is viewed as interactional, enacted, performed and constructed.\(^{29}\) It has been observed that bringing diverse groups together in collaborative research complicates how expertise is traditionally assigned: “In communication concerning theory and methodology, the academics are the experts and the practitioners the laypersons. In communication about processes in practice, it is the other way around” (Kieser & Leiner, 2012). STS ideas may serve to better illuminate the complex role of expertise in integrated knowledge translation projects.

Boundaries, collaboration, research relevance and knowledge production are also recurring themes in STS work. For example, Timmermans and Berg (2004) have argued that STS researchers have an obligation to demonstrate relevance by actively engaging with practices and transforming practices. However, these normative claims about research relevance have generated much debate within STS (for a more detailed overview, see Bruun Jensen, 2007).

In the context of integrated knowledge translation and health research discussions, STS offers a “rich tradition” of theoretically robust and empirically supported research that challenges strict dichotomies – the same dichotomies that tend to dominate much of the current integrated knowledge translation discourse (Wehrens, 2014, p. 546). Most importantly, STS takes the approach that the divisions between research and practice are actively constructed, and not pre-determined in advance. In other words, STS thinking can help foreground the constructedness of categories such as research, policy and practice (Jasanoff, 2004).

\(^{29}\) For example, Bereiter and Scardamalia (1993) have defined experts as people who progressively advance on the problems constituting a field of work. Along similar lines, Carr (2010) describes expertise not as a crystallized state of being or knowing, but as a process of becoming.
3.3. Theoretical orientation of this thesis

Theoretically, STS scholarship often takes a broadly social constructivist worldview, in which knowledge is understood as socially constructed through interactions amongst people (Berger & Luckmann, 1966; Guba & Lincoln, 1994). My theoretical approach in this thesis is also couched in a social constructivist worldview, and informed broadly by the STS school of thought.

There is no definitive social constructivism, and social constructivist research instead interprets constructedness to varying degrees (Hacking, 1999). Broadly, a constructivist framework involves understanding knowledge as inevitably mediated by impermanent and imperfect human constructs. Therefore, a constructivist understanding holds that a different knowledge of the world would be produced given different mediating constructs. Constructivist ontology aligns with the postmodern idea that no method or theory has a universal claim to creating the “right or the privileged form” of authoritative knowledge (Clarke, 2005, p. xxvi).

Studying science from this perspective, Star (1995) aptly pointed out that those taking an STS approach are “immediately plunged into philosophical debates about realism and relativism” (p. 9). These debates centre around whether or not understanding facts as constructed will lead to nihilistic relativism, the belief that nothing has intrinsic meaning or truth, so nothing can be known. However, this need not be the result of constructivist inquiry. Gieryn (1983) provides the metaphor of San Francisco to argue “Social constructivism is not nihilism: an absence of hills from that map of San Francisco does not mean that they do not exist (try telling that to the tired tourists looking up)” (p. 19). Extending the point, not everything on a map be found outdoors either, for example border lines between states are invisible to hikers crossing the border in the

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30 This produces variations including social constructionism, constructivism, or deconstructionism, among others. While these terms entail nuanced difference, I approach epistemological constructivism more broadly in this thesis.

31 For example, Star (1995) remarks that she is often asked: “It’s all socially constructed? Doesn’t that mean anything could be true? Isn’t there anything out there? Are you saying that scientists are making it all up? Are you saying germs don’t really make you sick, or gravity doesn’t really make things fall down?” (p. 9).
woods (Gieryn, 1983). Ultimately, socially constructed “maps” of knowledge and facts “not only simplify, distil, and reduce their referents, but then reconfigure, distort and embellish them” (Gieryn, 1983, p. 19). Understood in this way, social constructions both reflect our experiences in the world and shape them.

STS also offers a traditionally critical lens,\textsuperscript{32} examining power relations and social structures, a perspective which some argue is lacking in the integrated knowledge translation literature, which is often framed as power-neutral and goals-driven (Reimer-Kirkham et al., 2009). For integrated knowledge translation, these philosophical issues about who determines what counts as legitimate knowledge are central – although rarely discussed. So, using an STS lens helps bring these important debates to the forefront.

3.3.1. A focus on boundaries from an STS perspective

Boundaries are a ubiquitous but under-conceptualized concept in integrated knowledge translation research, as outlined above in section 2.3.5. However, outside of integrated knowledge translation, boundaries are a phenomenon of broad and increasing interdisciplinary scholarly interest, in diverse areas such as anthropology, social psychology, innovation and organizational studies (Lamont & Molnár, 2002). In an interdisciplinary review of the concept of boundaries, Lamont and Molnar (2002) argue that focusing on boundaries themselves has generated productive new insights in many areas. They conclude that over time, the notion of boundaries has become one of our “most fertile thinking tools” across the social sciences (Lamont & Molnár, 2002, p. 168).

For example, in organizational studies, boundaries are examined for their potential to spark innovation and also constrain inter- and intra- organizational collaboration (Carlile, 2002) - issues which are also central to integrated knowledge translation. Dorothy Leonard (1995) observed that most innovation happens at the boundaries between specializations, suggesting cross-boundary work is a key competitive advantage for institutions, organizations and even nations. Similarly, many

\textsuperscript{32} I use “critical” in the broader sense of a careful analysis and evaluation of issues to form a judgment about them – and not in the formal sense of Horkheimer and the Frankfurt School’s approach to Critical Theory (Wodak & Meyer, 2008)
have observed that boundary crossing often creates new knowledge and discoveries (Carlile, 2002, 2004; Rylance, 2015; Tsoukas, 2009a).

However, boundaries are often cited simply as a barrier for integrated knowledge translation and multi-disciplinary collaboration (Powell & Davies, 2012). In contrast, STS has a long history of engaging directly with boundaries, and has produced a wide range of potential approaches and theories to try and make sense of boundaries and their role in social interactions (Hellström & Jacob, 2003; Lamont & Molnár, 2002). Importantly, much of this work is based on empirical research on the processes of knowledge creation. However, while “STS has lead theorizing about boundaries” (Bucchi & Neresini, 2007, p. 445), STS scholars’ analysis and rich descriptions of boundaries have yet to be broadly applied in the areas of medicine and translational health research (Douglas, Lander, Fairley, & Atkinson-Grosjean, 2014).

So, I follow Smith and Ward (2015) in arguing that we need to develop more nuanced and better understanding of “whether, how and in what circumstances boundary blurring or boundary maintenance are productive or destructive” for integrated knowledge translation efforts (p. 323). In order for the study of integrated knowledge translation to progress, we should move beyond listing pragmatic barriers and facilitators (Mitton et al., 2007), to focus on more fundamental questions around the communication and co-production of knowledge within and across boundaries. For example, in their interdisciplinary review of boundaries, Lamont and Molnár (2002) suggest future work should study the “key mechanisms associated with the activation, maintenance, transposition or the dispute, bridging, crossing and dissolution of boundaries” (p. 187).

Building on work in STS and other fields, my thesis contributes a critical perspective of integrated knowledge translation and its treatment of boundaries. Coming from a social constructivist and STS-informed perspective, boundaries are not understood as objective or independent of people’s perceptions and constructions. Therefore, STS research usefully shifts the analytical focus away from how the boundaries can be bridged, towards how boundaries are constructed and for what purposes (Wehrens, 2013).
Defining boundaries – drawing lines in the sand

Following Akkerman and Bakker (2011), boundaries are defined from an STS perspective as “sociocultural differences leading to discontinuities in action and interaction” (p. 152). The emphasis on consequences in this definition is important because too often, boundaries are used to describe where or when discontinuities might be expected – based on differences – rather than where boundaries are empirically detected. This can lead to a problematic conceptualization of boundaries that do not manifest in any perceivable consequences. Instead, this definition helps us better explore how boundaries are real in their consequences, yet it also makes clear the boundaries are constructed, malleable and able to change over time (Akkerman & Bakker, 2011). In other words boundaries are not meant to “describe an authoritative or artificial border placed by others; the boundary refers to a place of encounters and interactions” (Shanahan, 2016).

3.3.2. Analytical / conceptual tools

Considering the limitations of theories based on the two-communities thesis, a deeper study of integrated knowledge translation requires other conceptual tools. Such tools should draw attention to processes of how boundaries become distinct in some contexts, and blurred in others. Boundary work and boundary objects are two potentially promising tools to aid this investigation.

I have chosen to focus empirical and theoretical work on two specific ideas of boundaries drawn from the STS literature. A social constructivist worldview sees ideas and theories as comprising a “toolbox of useful concepts,” which are not intended as ends in themselves, but as “means of analytical entree” into the data (Clarke & Star, 2008, pp. 117–118). In other words, these concepts act like lenses through which to identify, examine and sort various empirical observations, providing “a kind of machine for making elements cohere as an event,” by enabling “a number of elements to be ordered in time and space” (Brown, 1997, p. 65).

There are many other concepts related to boundaries – both within STS and in other fields – such as boundary-spanners (Long, Cunningham, & Braithwaite, 2013),
boundary organizations (Guston, 2001), boundary concepts (Allen, 2009), and boundary devices (van Egmond & Bal, 2011). However, I have chosen to focus on Gieryn’s (1999) concept of boundary work, and Star and Griesemer’s (1989) boundary objects, because of their prominence, relationship to each other, and relevance to integrated knowledge translation.

To situate these concepts in relation to each other, boundary work is often described as the “conceptual progeny” of boundary objects, which is arguably the more famous concept of the two – at least in many fields (Trompette & Vinck, 2009). Yet, Gieryn’s (1983) initial piece introducing boundary work predates Star and Griesemer’s (1989) seminal introduction of boundary objects. Over the last three decades, the concepts of boundary objects and boundary work have often appeared together in theoretical and empirical studies (Clark et al., 2011; Robinson & Wallington, 2012; Wilson & Herndl, 2007). However, the two concepts are often used unproblematically alongside each other, and are rarely compared or contrasted directly or critically. In the sections that follow, I explore the definitions, developments, critiques and considerations for each conceptual tool.

**Boundary work**

**Definition and development**

The concept of boundary work was developed by Thomas Gieryn (1983), and later extended in his book *Cultural Boundaries of Science* (1999), to describe what happens in controversies where scientific credibility is on the line. Boundary work is the discursive act of defining what science is and what science can do. Specifically, boundary work is defined as the “process through which actors and organisations demarcate and coordinate boundaries around epistemic authority, including the individuals and forms of knowledge/expertise deemed legitimate representatives of that authority” (Edge & Eyles, 2014, p. 286). Hoppe (2005) additionally defines boundary work as a practice attempting to prescribe both proper behaviour for participants and nonparticipants (demarcation) and also proper ways for interaction (coordination).

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33 Gieryn notes that he drew on Bourdieu’s (1975) concept of fields and cultural reproduction, and Giddens’ (1976) theory of structuration to inform the concept of boundary work.
For example, Gieryn (1983) describes a case of boundary work that occurred in congressional discussions about what disciplines would be included in the US National Science Foundation, lasting from post-WWII to the 1970s. Players mapped out cultural spaces such as “natural science” and “social science” in discrepant and changing ways to serve their different interests (p. 71). In another case, Gieryn (1983) explores how British scientist John Tyndall rhetorically separated science from religion and manufacturing—both dominant authorities at the time—to secure professional resources for scientists through his public lectures and advocacy. These examples do not characterize boundary work as a debate or difference of opinion. Instead, boundary work is “a battle for cultural and epistemic authority…with substantial symbolic and material resources at stake” (p. 44).

Boundary work is a verb - an activity that actors undertake (Gieryn, 1983). Boundary work most often arises in settings where:

Tacit assumptions about the contents of science are forced to become explicit: where credibility is contested, where regnant assumptions about boundaries suddenly appear murky or inapplicable; and - most important - where allocations of epistemic authority are decided and consequentially deployed. (Gieryn, 1999, p. 24).

This perfectly describes almost all integrated knowledge translation settings. Defining boundaries serves to construct and maintain distinctions between groups, often justifying one position and discrediting the other (Barrett, Oborn, Orlikowski, & Yates, 2012, p. 1450). In this way, boundary work can help achieve closure to alternative interpretations (Friman, 2010).

Gieryn identifies three different occasions that prompt different kinds of boundary work. First, expulsion is when two rival authorities, each claim to be scientific, and describing the other side as “posers: pseudoscience, amateur science, deviant or fraudulent science, bad science, junk science, popular science” (Gieryn, 1999, p. 16).

34 Gieryn (1999) helpfully clarifies that: “The legitimate right to have one’s reality claims accepted as valid or marginally useful is no plum at all if everybody enjoys it all the time. Epistemic authority exists only to the extent that it is claimed by some people…but denied to others (which is exactly what boundary work does)” (p. 13-14)
Importantly, neither side wants to challenge the authority of science itself, but instead challenges the rights of others to call their work science. Second, expansion is when authorities vie for control of a particular area. For example, when scientists seek to expand to speak authoritatively on less traditional areas like the science of romance, or conversely when spokespersons for religion, politics, ethics, or common sense challenge the exclusive rights of science to judge truth (Gieryn, 1999). Third, protection of autonomy is when scientists’ epistemic authority is at risk of being exploited for political or commercial gain. So, scientists use boundary work to delineate and separate their goals and interests from these outside forces (Gieryn, 1999, p. 17). Hoppe (2005) also argues that boundary work can be empirically studied and analyzed in three areas: discourses, practices, and organizational boundaries or arrangements.

Although boundary work was initially developed to focus only on demarcations between science and non-science, it has since been used in many different areas, and has been praised as a useful way to understand the creation and contestation of knowledge (Guston, 2001; Hoppe, 2005).

Critiques and considerations

The concept of boundary work has been remarkably well-received in the academic literature, both within STS and outside of it in fields including political science, computer supported cooperative work (CSCW), and ethnic and racial studies (Faraj & Yan, 2009; Grey, 2000; Landolt & Goldring, 2009; Lewis, 2012). However, boundary work, like any other concept, has a limited capacity to explain all boundary-related phenomenon. Some have argued that the notion of boundary work is too limited for covering all the facets of collaborative work, because collaboration involves transgressing and dissolving boundaries in addition to building them. To address this point, Nielson (2008) introduced the notion of anti-boundary-work, which implies breaking down existing barriers between science and society. Lander and Atkinson-Grosjean (2011) explain: “If boundary work constructs and polices the margins of authority and jurisdiction, then ‘anti-boundary-work’ seeks to undermine firm distinctions. It implies breaking down existing barriers while establishing new links to reinforce mutual relations” (p. 540). Similarly, Bijker, Bal and Hendriks (2008), propose the idea of “coordination work” to address the same limitation of boundary work (p. 147-148).
I would add the critique that the concept of boundary does not specify the degree of agency involved in doing the boundary work. In other words, the concept of boundary work does not address the degree to which people or institutions are aware they are doing boundary work, as opposed to being unconsciously driven to do it via existing social structures.

However, boundary work usefully highlights important mechanisms that are often invisible, because the most successful boundary work hides any evidence that it took place (Gieryn, 1996). Because integrated knowledge translation aims to bring different groups and knowledge together, it acts as a catalyst for boundary work (Jouvenet, 2013). Therefore, boundary work is potentially useful to inspire new understandings of integrated knowledge translation, by highlighting how actors create and shift dynamic boundaries of epistemic authority in a context of knowledge creation.

**Boundary objects**

**Definition and development**

The concept of boundary objects was first developed by Star and Griesemer (1989). It began with the observation that most models of cooperation often assumed consensus must be reached before cooperation could begin (Star, 2010). However, Star and Griesemer’s past research and personal experience suggested instead that, “consensus was rarely reached, and was fragile when it was, but cooperation continued, often unproblematically” (Star, 2010, p. 604). So, the key question underlying the original development of a concept of boundary objects was: “how do heterogeneity and cooperation coexist, and with what consequences for managing information?” (Star & Griesemer, 1989, p. 414).

Drawing on the work of Latour, Callon, and Law, (1986) and Strauss’s (1978) social worlds, Star and Griesemer (1989) coined the term boundary objects to describe objects that enabled collaboration in the absence of consensus. Boundary objects are defined as either concrete, material artefacts (such as field notes, and maps) or abstract ideas (such as partnership) that are used in different ways by different communities to support collaborative work, especially in the absence of consensus. Boundary objects
are plastic, interpreted differently across communities but still robust enough to maintain a common identity across these sites (Bowker & Star, 1999).

For example, in Henderson’s (1999) study of industrial design, she found that the product design drawings represented an index of parts for inventory staff, while simultaneously acting as an installation guideline for assemblers (and providing still different meanings for accountants, marketers, and other groups). So, as a boundary object, groups use the product drawings to coordinate efforts even when they do not fully understand the ways in which the other groups attach meaning to the drawings (Henderson, 1999).

Boundary objects are created when “two or more differently naturalized classification systems collide” (Bowker & Star, 1999, p. 297). Boundary objects then “inhabit several intersecting worlds and satisfy the informational requirements of each of them” (Star & Griesemer, 1989, p. 393). Boundary objects take two forms – specific and vague. The duality of being both vague and specific is a fundamental characteristic of a boundary object. If that duality stops or changes, then the particular object ceases to be a boundary object and becomes something else (Star, 2010). In other words, they are objects that have flexible definitions so that each social world attaches its own meaning to the objects but that meaning need not necessarily be shared by all collaborators (Shanahan, 2016).

Using the concept of boundary objects alongside boundary work is a deliberate choice. While boundary work emphasizes the mechanisms and processes through which boundaries come into being, boundary objects address how these boundaries are then navigated and coordinated across (or not).

Boundary objects seem to offer a broad appeal to many scholars, and the concept has been praised as a useful way to understand knowledge creation and contestations (Lee, 2007a). Ackerman, Dachtera, Pipek, and Wulf, (2013) identified boundary objects as one of the most important concepts to the field of computer supported cooperative work. Across diverse fields, scholars have productively identified collaboration using boundary objects as diverse as science news stories (Polman & Hope, 2014), physical product prototypes (Bechky, 2003), shared information systems
(Briers & Chua, 2001), engineering sketches (Henderson, 1991) and standardized reporting forms (Carlile, 2002; Star & Griesemer, 1989). For a more detailed discussion of the use and evolution of boundary objects, see Trompette and Vinck (2009).

**Critiques & considerations**

The popularity and success of boundary objects have produced a vast literature, however, some argue the concept has been under-theorised and over-extended (Allen, 2009; Fox, 2011; Star, 2010). There is insufficient space to describe these all of these theoretical discussions (see Trompette & Vinck, 2009; 2010 for a detailed overview). Instead, I outline a few key concerns relevant to this thesis.

For example, when Star and Griesemer (1989) first coined “boundary object,” it was conceptualized as just one factor in a pair, inseparably intertwined with the idea of “methods standardization” (p. 388). Methods standardization, however was “the less glamorous and less innovative of the two concepts,” and it has subsequently been ignored or separated in many discussions of boundary objects (Lee, 2007a, p. 309). Standardization involves creating both “stringent and simple” methods, which can be learned by non-experts, but also render their products useful and amenable to analysis by experts and others (Star & Griesemer, 1989). For example, having a standardized form for data collection means that a non-expert research assistant can, in theory, collect data, which is still usable by other various expert groups. In the original museum case discussed by Star and Griesmer (1989), methods standardization was found to be necessary, but not sufficient for cooperation across diverse social worlds – so the concept of boundary objects was introduced to explain the cases where methods standardization alone was insufficient to explain collaboration across boundaries (Star & Griesemer, 1989).

With an eye to improving knowledge sharing practice, Carlile (2002) warns that boundary objects are not magic bullets, because their unique characteristics are hard to sustain as problems and people change. Theoretically, Lee (2007a) has warned of a “disturbing trend” of using concept of boundary objects as a vague, catch-all name for any object that happens to be used in collaborations between groups (p. 335). Similarly, Star (2010) has responded to and advanced this critique with an article provocatively
titled: *This is Not a Boundary Object*. In the piece, Star (2010) reflects on the origins of the concept and its growth, and emphasizes that questions of *scale* and *scope* of the boundary objects and collective work analyzed are important but often overlooked considerations. While anything could conceivably act as a boundary object, Star (2010) argues that it is more interesting and productive to consider boundary objects used more at an organizational level and scope.\(^{35}\) It is also important to note that collaborators rarely recognize an object as a boundary object; instead, it has primarily been an analysts’ term for describing how collaborating groups are able to proceed (Shanahan 2016).

Star and Griesmer (1989) emphasize that producing boundary objects is just one means of satisfying conflicting sets of concerns, and other (less desirable) means include “imperialist imposition of representations, coercion, silencing and fragmentation” (p. 413). Therefore, boundary objects are potentially promising and useful to explore in this thesis because the concept helps make sense of cases like integrated knowledge translation, where “both heterogeneity and cooperation are central issues for participants” (Star & Griesemer, 1989, p. 387).

### 3.4. Conclusion

This chapter has outlined the relevance of STS research to the study of IKT, and identified the potential value of pursuing the STS concepts of boundary objects and boundary work as analytical tools in studying IKT. In the next chapter, I will explain how I compared and contrasted these concepts with each other and more dominant theoretical perspectives in knowledge translation discourse. The next chapter also provides an overview of my methodological approach more generally, as well as the approach I took in conducting data analysis.

\(^{35}\) For example, Star (2010) explains that, although diffuse, distributed objects such as a national flag entail interpretive flexibility and may be attached to cooperative work arrangements, it is less useful to explore a flag - or the bible, or a word, or the Beatles - as a boundary object in a general, abstract sense. Instead, Star (2010) recommends a more empirical focus: “it would be more interesting to study people making, advertising, and distributing American flags, and their work arrangements and heterogeneity than to simply say that many people have different interpretations of the American flag” (p. 613).
Chapter 4. Methods

4.1. Introduction

This chapter justifies and describes the methods I used to address my research questions empirically. I aim to transparently outline the decisions, rationale and steps taken to collect and subsequently analyze the data for this thesis. First, I explain the research questions, then I describe the rationale and procedures for data collection. Next, I discuss the approach of situational analysis, which I used to interpret the data.

4.2. Research questions

Stemming from my research problem (of both leveraging and overcoming boundaries in integrated knowledge translation), reviewing the literature, and drawing on theoretical links to STS thought, two specific research questions emerged.

RQ1: How do people understand, experience and handle boundaries in integrated knowledge translation projects?

This question responds to the lack of empirical research concerned with how processes unfold in integrated knowledge translation collaborations, and specifically it seeks to identify the mechanisms and processes by which people grapple with boundaries. The second research question which guided my inquiry was:

RQ2: How do the conceptual tools of boundary objects and boundary work connect (or not) to the realities of integrated knowledge translation projects?

This second question addresses the issue of relatively narrow theorizing about integrated knowledge translation to-date, and explores whether or not alternative concepts might (or might not) add value and increased analytical power.
4.3. Data Collection

To address both research questions, I collected data in two ways: 1) by conducting interviews, and 2) constructing a qualitative case study. I took this two-pronged approach because I wanted to observe how people handle boundaries in action (#2), but also gain insights into a broader range of possible integrated knowledge translation experiences (#1). This data collection approach additionally provided a variety of rich empirical data with which to compare and contrast the utility of boundary-related conceptual tools.

4.3.1. Interviews

Semi-structured, qualitative interviews are a core method for many social science fields (Marshall & Rossman, 2006). This interview format uses a guide and prompts, which permit a degree of freedom and flexibility (Naidorf, 2014).

Rationale

I chose to conduct interviews in addition to the case study because I was interested in exploring how one team’s experiences in the single case study connected (or not) with a wider range of integrated knowledge translation experiences across Canada. According to Sterk and Elifson (2004), the underlying assumption of a semi-structured interview is that “the study participants are knowledgeable, have a meaningful perspective to offer, and are able to make this explicit in their own words” (p. 137).

Semi-structured interview methods have limitations. For example, they are based on recollections, and “insiders are not always in a good position to judge the impact of their own work” (Booth, 1990). Additionally, interviews may create conditions where the participants say what they think is socially desirable, or what the interviewer wants to hear, as opposed to what actually happened or how they really feel (Irvine, Drew, & Sainsbury, 2013).

Despite these limitations, conducting interviews was a suitable method for data collection. It allowed me to span geography, gave me a brief taste of other teams’
experiences on projects, and quickly generated a vast quantity of data to address my research questions (Marshall & Rossman, 2006).

**Procedure**

**Sampling & recruitment**

I was most interested in interviewing teams in a similar situation to the team that served as the focus for the case study (discussed below in section 4.3.2.). This is a necessarily narrow scope – rather than seeking to comment on all Canadian researchers using an integrated knowledge translation approach, I defined my sample systematically, through the filter of the case situation: CIHR-funded health researchers, recently funded by a medium-term, IKT-specific grant. Please see Appendix B for a detailed overview of criteria used to construct the sample, including rationales for decisions.

One of the most significant sampling choices I made was to recruit only primarily academic principle investigators as interview participants, as opposed to their knowledge-user co-PIs. I made this decision for several reasons.

First, even limiting to only academic PIs still provided relatively diverse perspectives. The literature suggests that the distinction between knowledge producers and users might be less clear-cut or analytically significant than is often assumed. For example, Bowen et al. (2016) question the usefulness of this division, based on their

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36 Sampling is a somewhat problematic concept in qualitative research. In quantitative methods, sampling is designed to achieve statistical significance and claim that findings are generalizable to a population. However, qualitative researchers often aim for maximum variation or purposive sampling to gain the deepest insights without goals of probabilistic sampling to produce statistical generalizability (Babbie & Benquisto, 2014c). All too often, however, key qualitative terms are glossed over in articles with explanations such as, “Purposive sampling was undertaken to ensure maximum variation according to pre-specified criteria,” followed by, “theoretical saturation was reached” (Rhiannon Evans, Murphy, Scourfield, & Turley, 2017, p. 4). This vagueness leaves the readers guessing about how the researchers actually defined their population, found and chose their interview participants.

37 Many of the CIHR grants require both an academic and knowledge-user to appear as co-PIs on the grant application. In practice, this distinction is more complicated, as many so-called knowledge-users also hold cross-appointments in academic institutions. So, when I identify academic principal investigators, they are often listed as co-PIs
study of established knowledge-user and researcher teams. PIs’ identities were much more complex than being “purely academic,” with many holding multiple cross-appointments, with some seeing themselves as life-long academics, and others seeing themselves as blends with a knowledge-user perspective. At the same time, many knowledge-user co-PIs are themselves seasoned researchers, often with academic cross-appointments as well, complicating labelling them neatly as non-academic, knowledge-user partners.

Second, convenience was a major consideration. Academics are more likely to remain in the same position - with their contact information publicly posted - for a longer period of time. In contrast, their knowledge-user partners tend to have higher job turnover, and many non-academic co-PIs from recent projects (funded in 2011-2013) have since moved into different roles with harder-to-find – and often private – contact information. Considering the limited time and resources of my master’s project, I chose to delve deeply into the sub-section of more accessible academic PI participants, as opposed to doing a broader, shallower exploration trying to capture all perspectives. I also assumed that academic PIs’ schedules might be more accommodating or flexible than potentially busy government officials or clinical practitioners.

Third, I was more confident with the assumption that the academic co-PI would be more meaningfully involved throughout the research project, and would be able to discuss all details of the project more in-depth. Academics are still the driving forces behind applying for and administering these grants (McLean & Tucker, 2013). In contrast, while some knowledge-user co-PIs are very involved, others might not be. The phenomenon of non-involvement (or token partnerships) is important and interesting, however, for the purpose of this thesis, I wanted access into participants’ active

38 This choice is a common trend in integrated knowledge translation, prompting some to argue for a re-balancing of perspectives, with an explicit and exclusive focus on the knowledge-user partner perspective (Kothari et al., 2014). I agree this is a limitation of my sampling, and more research on the perspective of knowledge-users is needed in future work. For work with an exclusively knowledge-user focus, examples include: Innvaer, Vist, Trommald, and Oxman (2002), who conducted a meta-analysis of interview studies with health policy-makers, and Rishworth, Elliott, Dixon and Clarke (2016), who conducted interviews with 14 knowledge-users in Canada.
experiences and operationalizations of integrated knowledge translation, and exploring an \textit{absence} of participation was beyond the scope of my research questions.

However, my assumption that PIs might have the most to say about a project was challenged by the fact that several academic PIs I contacted referred me to postdoctoral or doctoral students who they said were much more actively involved in the process than themselves. This points to another important limitation of my sampling strategy – it does not capture the perspective of other staff and researchers working on the project. My interviews with post-docs (n=4) suggested a very interesting and potentially different perspective on the work, which future research should explore further.

For recruitment, I sent email invitations in batches of 10 until I reached my target of approximately 15 interviews that proportionally represented CIHR’s grant types, regions and recipient genders for my time period included in my sampling frame. Again, please see Appendix B for a detailed overview of criteria used to construct the sample, including rationales for decisions and recruitment process. Potential participants received a follow-up email two weeks after the initial invitation, and a phone call two weeks after the follow-up. In total, 49 potential participants were emailed, 20 agreed to participate, five declined, four declined with caveats (e.g. offering to connect me to someone else on the study, answer questions via email, or suggesting to re-contact them later), and 21 never responded to follow-up emails, for an overall response rate of 57 per cent. This recruitment method has the limitation of a double self-selection bias – limiting the data to participants who first applied to CIHR integrated knowledge translation grants, and then also agreed to be interviewed by me. For a summary of the details of the interview participants, see Appendix C.

\textbf{Interview Protocol}

Once an interviewee gave their consent, I would schedule a convenient time for a phone call. Ultimately, I chose to use phone interviews exclusively because of convenience of time and geographic reach. Side-by-side methodological comparisons have found that telephone interviews provides data of comparable quality and quantity to
in-person interviews, with the added benefit of enabling copious note-taking without detracting from rapport (Cachia & Millward, 2011; Holt, 2010; Muntanyola Saura & Romero Balsas, 2014; Trier-Bieniek, 2012). Especially as a novice qualitative interviewer, I found the unimpeded ability to take notes very helpful. I generated an initial interview guide of questions and prompts after an initial review of related literature. The interview questions were informed by my research objectives. Interviews included probing participants’ background and previous experiences working in collaborative research; interviewees’ reflections of integrated knowledge translation broadly; and their experiences in their particular situation of integrated knowledge translation.

Before conducting an interview, I would conduct research about the participant to learn more about their past work, their CIHR project, and any of their published perspectives on my topic. This pre-interview research allowed me to tailor my interview guide to the participant and maximize my time with the participant. For example, if they had published peer-reviewed journal articles about the history of KT and IKT, I would not ask them in the interview “have you ever heard the term IKT?” Instead, I would ask questions about issues such as what that term meant to them, and why they used it in their paper or grant. Or, if they had published articles or reports about their particular project, I would scan those so that they did not have to spend time explaining the content-specific details of the project to me. For the interview guide, see Appendix D.

All of the interviews were conducted between December 2016 and March 2017. Interview length ranged from 20 minutes to 120 minutes, with an average length of 46 minutes. Verbal or written consent to participate was obtained before each interview.

The role of the telephone in qualitative interviews has been the subject of methodological debate, with conventional wisdom favouring face-to-face interviews as preferable to phone (Novick, 2008). Concerns about using a phone include losing non-verbal cues, more difficulty building rapport, and shorter interviews. However, many qualitative researchers have challenged these concerns as unfounded in empirical evidence (Cachia & Millward, 2011; Muntanyola Saura & Romero Balsas, 2014; Sturges & Hanrahan, 2004; Trier-Bieniek, 2012). Summarized by Holt (2010) the empirical data strongly suggests there is no need to consider the use of telephones for interviewing as a “second-best option” (p. 120).

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Participants were assured that their identities would remain anonymized and any published material would be carefully screened so as not to yield their identity. All interviews were audio-recorded and transcribed verbatim in NVivo version 11. While recording, I simultaneously took notes for each interview, to support more reflexive and iterative data management (Marshall & Rossman, 2006). Immediately after each interview, I expanded upon my initial impressions in a reflective memo, also noting thoughts on the interview process along with major ideas or issues the participant raised (Halcomb, Hons, Cert, & Davidson, 2006). In NVivo, interview transcripts were saved within a larger data repository alongside the case study data.

4.3.2. Case study

Case studies can be broadly defined as rich, empirical descriptions of particular instances of a phenomenon that are typically based on a variety of data sources (Yin, 1994). Case studies have a long and diverse history spanning sociology, anthropology, and medicine, and have been a popular and central tool in STS research methods (Beaulieu, Scharnhorst, & Wouters, 2007).

Rationale

I chose case study methodology to gain an in-depth, contextual understanding of the phenomenon of integrated knowledge translation project within its Canadian health context (Baxter & Jack, 2008). Working as a research assistant on the project, I had both open access and ample time to immerse myself in the workings of an integrated knowledge translation project which served as the foundation for my case study.

Case studies methods have been critiqued for allowing a researcher to confirm their preconceived notions, and therefore promoting an unscientific bias toward verification (Flyvbjerg, 2006). More specifically, case studies have also been derided for their lack of critical power: describing empirical material and applying theories to “exemplify already established analytical points” (Jensen, 2014, p. 196).

However, many of these concerns are either unfounded, or can be mitigated. For example, Flyvbjerg (2006) compellingly argues that case studies in fact contain a greater bias toward falsification of preconceived notions than toward verification, and
furthermore contain no greater bias toward verification than other methods of inquiry. Citing many researchers who have conducted intensive, in-depth case studies, he summarizes that they most often “report that their preconceived views, assumptions, concepts, and hypotheses were wrong and that the case material has compelled them to revise their hypotheses on essential points” (Flyvbjerg, 2006, p. 17).

To address my research questions, the benefits of this method outweigh its potential limitations. Generally, case studies are a good methodological fit when: contextual conditions are likely relevant to the phenomenon under study; the researcher is interested in “how” and “why” questions; the researcher cannot manipulate the behaviour of those involved in the study; and/or the boundaries are not clear between the phenomenon and context (Yin, 1998).

**Procedure**

There is broad disagreement about the nature and number of cases needed to constitute rigorous research. Of many approaches that have been proposed, two prominent and distinct case study methods have been presented by Stake (1995) and by Yin (1998), each employing different methods (Baxter & Jack, 2008; Greenhalgh & Swinglehurst, 2011; Yazan, 2015). Taking various approaches into account, I primarily follow Greenhalgh et al. (2016) and use the “n of 1” case study approach of Stake (1995) supported by Tsoukas’ (2009b) concept of heuristic generalizability.

A single-case study tends to prompt questions of external validity: “How far can one generalize from a particular ethnography or case study or even set of case studies?” (Tsoukas, 2009b, p. 285). In his defense of small-n studies, Tsoukas (2009b) argues one case is less suited to providing analytic generalization, but is excellent for providing analytical refinement. He calls this ability to make more incisive distinctions than hitherto available “heuristic generalization” (p. 298). Greenhalgh et al. (2016) similarly acknowledge that detailed portrayals of specific cases do not deliver statistical generalization like experiments, nor theoretical generalization like realist evaluations or

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40 Heuristic is an adjective meaning “enabling a person to discover or learn something for themselves” (“Heuristic,” 2017)
cross-case analyses. Instead, their heuristic generalization provides “a clearer understanding of what is going on...thereby enabling more productive debate” (Greenhalgh, Russell, Ashcroft, & Parsons, 2011, p. 533). In other words:

Small-n studies do not present a map but a portrait of the world that acts as an aid to perceptions. We notice aspects previously unnoticed and connections previously unseen….If small-n studies achieve anything, it is to help create a more refined debate — to keep the conversation going. (Tsoukas, 2009b, p. 299)

I used several data collection methods to construct my case study, combining data collected from participant observations and project-related documents (see Appendix E for a summary of activities). These data sources were synthesized in the analysis process along with interview data, where “each data source is one piece of the puzzle,” better contributing to the researcher’s understanding of the whole phenomenon to aid understanding (Baxter & Jack, 2008, p. 554).

**Participant observation**

The primary method I used to collect data for the case was participant observation, over the seven-month period from October 2016 to May 2017. Participant observation is an ethnographic qualitative field method in which the researcher acts as a participant in the community or culture that they are studying, systematically noting and recording events, behaviours and objects in the setting of study (Marshall & Rossman, 2006; Tedlock, 2005).

The benefits of participant observation are that it offers a unique understanding of the situation. Participant observation (and ethnography in general) can beneficially enable the researcher to create a more situated and detailed account of action. It allows a potentially deeper level of access to and understanding of the phenomenon in question (Marshall & Rossman, 2006). This approach enabled me to observe, firsthand, some of the minutia and day-to-day happenings in an integrated knowledge translation project.

Participant observation is challenging, with difficulties including finely observing huge amounts of data and negotiating relationships with participants (Marshall & Rossman, 2006). Participant observation is immersive and demanding for the researcher, who must carefully monitor both the situation and navigate their own role
within it (Kawulich, 2005). A potential drawback of participant observation can be that researchers studying their own communities or peer groups may find themselves in the roles of both researcher and researched, creating tension and difficulties in navigating their overlapping roles and relationships (Banks et al., 2013). Therefore, personal reflections are integral to conducting participant observations (Marshall & Rossman, 2006).

I joined the project in January 2016 as a research assistant, and worked for six months before I obtained ethics approval to formally begin data collection. Those introductory months, however, were crucial to building my understanding. After I received consent from team members to be observed, I took detailed fieldnotes at team meetings and events. In total, I spend approximately 500 hours in the field, and formally observed over 50 hours (e.g. at meetings). For a full summary of observations and settings see Appendix E. I focused particularly on team meetings, because meetings are recognized in the literature as key spaces for knowledge sharing and creation, coordination, decision making, problem solving and relationship building, where routines, experiences, and expertise can circulate, reconstruct themselves, support the solution of problems and define new avenues of work (Lopez-fresno & Savolainen, 2011; Oborn & Dawson, 2010; Smith & Ward, 2015).

My process of participant observation included taking jot notes during the observation (Emerson, Fretz, & Shaw, 1995), and then typing long, in-depth versions with thick descriptions (Geertz, 2003) and importing them into NVivo 11. I created identity codes for everyone I observed, and substituted any identifiable references to individuals from my handwritten field notes into these codes for the final electronic documents. During the observations, I divided my notebook page to capture both what happened, and my thoughts and impressions of what happened. I tried to capture as much detail as possible, including attendees, time, and location, spatial features, social interactions, who said what, and body language (Emerson et al., 1995). Following Oborn and Dawson (2010) I soon created an evolving note-taking framework for understanding knowledge sharing, which reminded me to pay attention to how knowledge was displayed, how arguments or ideas were constructed, which details received attention, who participated, and how decisions were reached.
4.4. Description of the case and context

The case study is of an integrated knowledge translation project (termed “the project” to protect confidentiality and sensitive data) for applied health systems research. More specifically, the project team is designing, implementing and evaluating a technology platform to better enable the flow of patients’ health data throughout the healthcare system to improve patient safety.

The project co-PIs (a social scientist and clinician-scientist) worked in the same research centre, where they serendipitously connected. Together, they applied for and won a Partnerships for Health Systems Innovation (PHSI) grant in 2012. PHSI grants are intended to “offer Canada's health system decision-makers evidence-informed answers to their most pressing questions,” and require partnership between researchers and decision-makers (Canadian Institutes of Health Research, 2014b, para. 1). The co-PIs received letters of support and partnership from various levels of decision-makers, including provincial and local health authorities. CIHR provides the majority of PHSI funding, but the grant requires PIs to find 20 per cent of the project budget through their partnerships or other means, such as in-kind time contributions by government partners (for more information on grant specifications, see Appendix A).

As the research project progressed, the co-PIs applied for and won a second grant, an eHealth Innovation and Partnership Program (eHIPP) grant in 2015. eHIPP funding requires partnership with industry, and is intended to help researchers develop, integrate and evaluate eHealth innovations to improve the cost-effectiveness of care and “increase Canada's competitive position in the health-related ICT industry” (Canadian Institutes of Health Research, 2014a, paras. 5–6).

I became involved in 2016, when I joined the team as a research assistant. During the time I was involved (2016-2017), the core project research team consisted of the co-PIs, two research coordinators, and three research assistants (including me), based at a hospital research centre. Prior to my arrival, a post-doctoral research associate, a pharmacist, and others were involved. Additionally, staff working on other projects in the broader research programme would attend meetings and often contribute to the project, including other pharmacists, a doctoral student who was a former staff
member and an additional research coordinator. Lastly, in 2017 the team also expanded to include three patient partners.

The project involves navigating a complex political and technical landscape. The co-PIs partnered with a technology company, to design and program the technology intervention that had been designed through the first grant. Although they received initial letters of support from the provincial health ministry and various health professional governance bodies, maintaining and negotiating those relationships has represented an ongoing and complex task. Piloting, implementing and evaluating an applied health technology intervention means the project has to address data privacy, systems interoperability, quality improvement, ethics (at two universities and a hospital), political and budgetary concerns, and a web of various related committees.

At the time of writing, with two to three years left of funding, the project is in a precarious situation. Red tape at various levels has blocked the implementation phase, which is delaying the team’s ability to test and evaluate the platform. For example, there have been issues related to provincial governance, and also difficulties between the university and industry partner about contracts. It is unclear when the project will be able to move forward, and moving forward may require significant changes to plans.

This complex, interesting and challenging project is an excellent example case of the intricacies and challenges of boundaries of an integrated knowledge translation project. It involves partnerships between clinicians-scientists and social scientists, along with strategic collaboration between government, industry, healthcare and patients in a complex environment to create knowledge and catalyze action.

4.5. Situational Analysis

To analyze this case and the interview data, I chose to use a grounded theory approach developed by Adele Clarke (2005), called situational analysis. Situational analysis involves doing “cartographic exercises” – creating maps – of the qualitative data in different configurations to systematically analyze potential understandings that emerge. The ultimate goal of situational analysis is not to clarify or predict normative
patterns, but to “open up the multiple elements we see in a situation, interrogate them in fresh ways, and allow ourselves to recognize new possibilities for action that may have previously been unintelligible” (Newbury, 2011, p. 95).

Situational analysis is an adaptation of grounded theory, in which Clarke (2005) attempted to address what she sees as the shortcomings of grounded theory methods, including a tendency toward oversimplification, a lack of reflexivity, positivist tendencies, and inattention to power. Situational analysis is presented as a “theory/methods package,” which includes both epistemological and ontological assumptions, and concrete methodological practices (Clarke et al., 2016, p. 87). The roots of situational analysis incorporate the symbolic interactionism and pragmatist philosophy of grounded theory, along with contemporary and post-structural influences such as feminist theory, postmodernist critiques, epistemological debates, and science and technology studies (Clarke, 2005; Clarke et al., 2016).

**Rationale**

I chose to pursue situational analysis for several reasons. First, situational analysis draws deeply on STS, making it an excellent fit for both my attention to STS concepts and my theoretical orientation (Clarke et al., 2016).

Second, it provides a more structured way to explicitly contend with the messiness and complexity of analyzing qualitative data. While there are many approaches to qualitative coding and theme development, there is little agreement (and often little transparency) around how and why coding decisions are made. The process of mapping through situational analysis – although challenging, and sometimes frustrating – foregrounds the subjectivity and messiness of qualitative research without trying to provide falsely objective steps of coding.

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41 According to Clarke (2005) these influences include: Strauss’s (1978) social worlds/arenas theory, the pragmatist theory of Denzin (1996) and Rorty (1982), Foucault’s (1972) emphasis on discourse, C. Wright Mills’ (1940) concern with situatedness, and Haraway’s (1991) concept of situated knowledges.
Third, situational analysis has been used in a variety of contexts, and many other scholars have praised the approach for its usefulness and fresh analysis opportunities (Charmaz, 2016). Researchers have found situational analysis to be a productive and challenging method for exploring complex empirical data (Aldrich & Rudman, 2016; Newbury, 2011; Sen, Spring, & Spring, 2013). As a method, it has been lauded for its “innovativeness, distinctiveness, and willingness to address the messiness of the empirical world and conducting research” (Charmaz, 2016, p. 8). In a review of the method, Mathar (2008) argued that situational analysis productively prompts researchers to reflect on “contradictions and heterogeneities” and importantly challenges them “to live in uncertainty” (pp. 9-11).

Potential drawbacks of the approach include that situational analysis is very analytically demanding, because it rejects “a tidy explanation of a phenomenon… [and] raises more questions than answers” (Licquish & Seibold, 2011, p. 16). Newbury (2011) argues that situational analysis’ refusal to artificially represent reality as tidy is a key strength of the method, yet “it still may feel a little unclear as to how this can inform practice in concrete terms” (p. 102). However these drawbacks are manageable, especially in light of a recent methods guide by Clarke, Friesse and Washburn (2016) which more clearly and concretely outlines the “how-to” of this potentially opaque analysis approach.

**Procedures**

Conducting situational analysis involves making three kinds of maps (situational, social worlds/arenas, and positional) and doing analytic work with the maps including writing analytic memos, examining relations among map elements, and often updating the maps as data collection and understanding progresses (Clarke et al., 2016). The data collection and mapping process is characterized by Clarke et al. (2016) as abductive reasoning,42 defined as “tacking back and forth between the nitty-gritty specificities of empirical data and more abstract ways of thinking about them” (p. 102).

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42 Abduction has been described as a third method of reasoning, in addition to inductive and deductive reasoning (Clarke et al., 2016).
I began data analysis concurrently with data collection, as recommended by Clarke (2005). First, I conducted situational mapping, which is based on a questioning approach, used in conjunction with memoing and grounded theory coding. For examples of open codes, see Appendix I. Key questions to guide analysis in this stage include: Who and what are in this situation? Who and what matters in this situation? What is going on in this situation? What elements make a difference in this situation? What ideas, concepts, ideologies, discussion, symbols, sites of debates, cultural issues, discussions, symbols matter in this situation? What seems present but is unarticulated? (Clarke, 2005). These questions help create messy and exploratory situational maps, which are consciously kept messy because "too much order provokes premature closure, a particular hazard with grounded theory" (Clarke, 2005, p. 96). Situational maps consider the major human, non-human, discursive and other elements of a situation, and can explore the relationships amongst them. Situational maps look most like a typical mind-map or brainstorming map (Sen et al., 2013).

In tandem with creating situational maps, I also created social worlds/arenas maps and positional maps iteratively throughout the analysis process. Social worlds/arenas maps plot the actors, key non-human elements and the overlaps between the arena(s) in which they interact. Social worlds/arenas maps offer interpretations of the broader situation, taking up its social organizational, institutional, and discursive dimensions (Strauss 1978). Although I experimented with analyzing the data using social worlds mapping, I did not end up focusing on the social worlds mapping technique. It was useful for the case study, but proved less relevant to the whole corpus of data including interviews. For example situational and social worlds/arenas maps, see Appendix G.

43 Writing memos promotes ongoing reflection and elaboration of analytic developments, and involves defining, describing and exemplifying coding decisions to allow for more consistent coding and transparency (Babbie & Benaquisto, 2014b).
44 Clarke, Friese and Washburn (2016) clarify that, in doing grounded theory: “the analyst initially codes the qualitative data (open coding)—word by word, segment by segment—and gives temporary labels (codes) to particular phenomena. Over time, the analyst determines whether codes generated through one data source also appear elsewhere, and elaborates their properties. Related codes that seem robust through the ongoing coding process are then densified into more enduring and analytically ambitious ‘categories.’” (p. 112). For examples of the codes and categories generated for this thesis, see Appendix F.
Nearing the end of data collection, the mapping and grounded theory coding had resulted in a large set of provisional codes. Following situational analysis procedure as described by Washburn (2016), I then grouped these codes into categories, explored the categories in analytic memos, and then conducted a second round of more focused coding based on the analytic memos. I paid particular attention to descriptions of how integrated knowledge translation processes worked, the contexts and conditions under which boundaries were understood as problematic, beneficial or otherwise, and the role of communication. This second round of more focused coding informed the creation of positional maps (Washburn, 2016).

Positional maps lay out the major positions taken, and not taken, in the data relative to axes of variation. Sen et al. (2013) argue that positional mapping is not as widely used as the other situational analysis techniques, however for this project I found it generated the most interesting and illuminating analytic results in regard to my research questions. Clarke et al. (2016) emphasize that choosing the most productive and illuminating issues to place on the axes, and which two axes to compare on a map “tends to be the most challenging aspect of doing this kind of map” (Clarke et al., 2016, p. 177). Therefore, they recommend constructing the axes by paying close attention to the topics where disagreements and controversy most often arise in the data (Clarke et al., 2016).

None of the analytical maps is necessarily intended as a final analytic product and analysts need not use all types of map together in every analysis (Aldrich & Rudman, 2016; Clarke et al., 2016; Sen et al., 2013). However, I have included several sample maps in Appendix G for clarity. Ultimately, I found that positional maps did provide useful analytic outputs, which are presented in the results included in the next chapter.

45 At this stage, I also followed Clarke, Friese and Washburn’s (2016) recommendation that analysts write memos about each designated code and category, with reflections guided by the questions “What does it mean? What are the instances of it? What is the variation within it in the data? What does and doesn’t it seem to ‘take into account’?” (p. 122).
Discourse

Discourse is a “common currency” term in many social science disciplines, so common that it is rarely defined, despite its numerous and varied meanings and uses (Cheek, 2004, p. 1141). Following Clarke (2005) and Cheek (2004), my understanding of discourse is influenced by the work of Michel Foucault (1972) and postmodern thought. Discourse refers to a set of statements about reality, that organize and structure the way in which a particular topic, object, or process is talked about or represented (Cheek, 2004).

From this perspective, discourses – or sets of statements – “bring social objects into being” by presenting a particular reality of the world (Shaw & Greenhalgh, 2008, p. 2508). However, the influence of discourse is not unidirectional – discourses both influence and reflect reality. Additionally, a discourse often involves assumptions that, “sometimes, indeed often, may be so taken for granted as to be invisible” (Cheek, 2004, p. 1142). Discourse also involves complex power dynamics, because knowledge is produced, disciplined, legitimated and maintained through discursive practices (Clarke, 2005).

For example, in a discourse analysis of health policy documents, Greenhalgh and Shaw (2008) argue that a knowledge-based economy discourse both shapes and reflects policy changes. This discourse assumes new knowledge is vital to national economic performance (wealth production, productivity and consumption) and global competitiveness. This set of statements is not the only way national research could be discussed – and it has been understood very differently throughout history and in other countries (Shaw & Greenhalgh, 2008). However, the authors find the knowledge-based economy discourse dominates discussion and shapes our modern understandings (Shaw & Greenhalgh, 2008).

Clarke (2005) argues discourses constitute an important form of social action and that “the work that language does in the world is worth understanding on its own terms” (Clarke, 2005, p. 151). However, in contrast to traditional Foucauldian discourse analysis which analyzes only one – and often the most dominant - discourse in a situation, situational analysis seeks to represent the full array of discourses, and specifically “turn
up the volume on lesser but still present discourses, lesser but still present participants, the quiet, the silent, and the silenced” (Clarke, 2005, p. 175).

**Operationalization of key concepts**

Operationalizing my key concepts was important to identify how boundaries, boundary work and boundary objects might manifest in the data. Operationalization followed a process of defining a concept so as to make it distinguishable and understandable in terms of empirical observations, helping the researcher move from an abstract to an empirical level by identifying various empirically observable attributes, indicators and/or dimensions of the concept (Babbie & Benaquisto, 2014a).

Through operationalizing key concepts, I aimed to transparently explain how I identified instances of integrated knowledge translation, boundaries, boundary work and boundary objects within my empirical data (as opposed to just saying “I know it when I see it”). This includes specifying what I will and will not recognize as an instance of the concept. Operationalization creates temporary and provisional definitions for the purpose of clarity, not to set definitive definitions of the concept. They are not intended as ends in themselves, but as means of provisional theorizing (Clarke & Star, 2008). However, there are heated debates about the appropriateness of operationalizing concepts, especially in this kind of qualitative, grounded-theory inspired approach to analysis, and operationalization has been critiqued for limiting and prematurely closing analysis (Blumer, 1954; Hammersley, 1989).

I believe stating my assumptions explicitly is both useful and transparent. I follow Star (1983) in believing that “to work without getting lost in endless contingencies, scientists must draw boundaries and exclude some kinds of artefacts and complications from consideration… In order to actually do the research, lines and boundaries must be drawn around complications, implications, and exceptions” (pp. 206-207). For a detailed breakdown of the meaning, justifications and assumptions embedded in these operationalizations, see Appendix H.
4.6. Validity and reliability

How should context-specific, qualitative work be judged in the absence of traditional research criteria such as replicability and generalizability? Commonly used criteria proposed by Guba and Lincoln (Guba & Lincoln, 1994) are grouped into trustworthiness (including credibility, transferability, dependability and confirmability) and authenticity (including fairness).

Following Gagliardi et al. (2014). I complied with Relevance, Appropriateness, Transparency and Soundness (RATS) principles for the reporting of qualitative research. This included aiming to optimize rigour by integrating data ("triangulation) collected in variety of ways (interviews, observation, documents) from different sources (Clark, 2002). I also sampled participants with various characteristics that could influence their views such as geographical location; fully analyzed and interpreted data including deviant cases; checked findings with participants; and demonstrated responses from an array of participants by including an anonymous identification code with exemplary quotes.

However, it is important to recognize that my results represent my interpretations, and these are not the only interpretations possible. In all qualitative research studies, the analyst is understood as an instrument in the study, and interpretations of the data are necessarily bound to the researcher (Clarke et al., 2016; Wehrens, 2013). However, I have grounded my interpretations with examples and quotes from the data, and I have provided my final NVivo coding node structure, and explanations of my interpretations and examples of situational maps in Appendices F and G respectively. This allows readers to understand how I have reached my conclusions while recognizing that they may reach different conclusions.

4.6.1. Member checking

Member checking (also called participant or respondent validation), is a technique to enhance the trustworthiness and the credibility of qualitative research results and involves returning results to participants to check for accuracy and resonance with their experiences (Guba & Lincoln, 1994).
Although there have been substantial philosophical and methodological debates about the validity, purpose and use of member checking (for a more detailed discussion, see Birt, Scott, Cavers, Campbell, & Walter, 2016), I follow Gagliardi and Dobrow (2016) and distributed a version of the abstract and results chapter to participants shortly after this work was submitted to my senior supervisor. All interview participants had consented (and in fact requested) to see the results, except for one. Of the 19 member-check emails sent out, eight participants had responded to my request for comments by the time the examination copy of the thesis was submitted. Feedback was positive – for example that the results were “interesting” and “comprehensive” – and two requested minimal changes (one participant pointed out a repeated word, and another asked for one detail to be changed to better avoid deductive disclosure).

4.6.2. Researcher position statement

To understand and assess my analysis and findings, it is also important to thoughtfully state and reflect on my own position and orientation. By reflexively considering my values, assumptions, experience, and knowledge using a research journal, I aimed to enhance the transparency to my interpretation and understanding of the study findings (Yanow & Shwartz-Shea, 2007). Reflection was also important, because I occupied the interesting position of “researching the researchers,” which also meant negotiating the power dynamics of studying participants more senior than myself, mostly in principal investigator roles (Bickford & Nisker, 2015; Finlay, 2014).

I came into this research believing that collaboration between academics and non-academics has many potential benefits for the betterment of our world, based on logic, anecdotal evidence, and common sense. However, I also endeavour to test some of my own and others assumptions, and challenge ideas of collaboration and IKT with a friendly critique – to strengthen, rather than solely deconstruct.

4.7. Ethics

This study received ethical approval from Simon Fraser University (2016s0411). However, the ethical issue of confidentiality warrants further discussion. Deductive
disclosure – or internal confidentiality - occurs when the traits of individuals or groups reported in research make them identifiable to fellow insiders, even when traditional anonymity strategies are used (Kaiser, 2009). For example, although using pseudonyms and tweaking the details of a research site may somewhat conceal the identity of the participants, thick description of the spaces, relationships and nature of the research may significantly narrow the range of possibilities of location (Bickford & Nisker, 2015; Walford, 2002). Due to the highly specific and specialized nature of many integrated knowledge translation projects, this was a concern for my participants – there are only so many CIHR-funded, collaborative research projects in a given research area.

I have kept my research reporting in line with the conventions of research ethics boards, participant observations and ethnographic research and attempted to secure the confidentiality of my case participants to the best of my ability (Walford, 2002). I erred on the side of less rich descriptions to better protect their confidentiality. Many are engaged in partnership relationships with people in government and industry, which are often delicate and politically sensitive. Therefore, to protect these relationships, it was important to my participants not to make their identities public and potentially undermine the trust within these relationships. This is even more difficult with my case study, as any particularly motivated person could find out more details about the projects discussed here. Therefore, I have restricted the nature of topics reported, in addition to removing as much identifying information as possible.

4.8. Conclusion

In this section, I have justified my approach to collecting and analyzing empirical data to address my research questions. I have aimed to be transparent about the choices I’ve made, and the limitations these choices create. Collecting and analyzing data produced results that address both of my research questions, which will be described in the next chapter.
Chapter 5. Results

5.1. Introduction

A wide diversity of views and experiences of boundaries were revealed after conducting situational analysis on the data. First, I provide a brief overview of participants’ understandings and perceptions of integrated knowledge translation itself, to better ground and contextualize my findings.

Then, I outline the four discursive positions that emerged along two salient axes of controversy in the data. In section 5.2, I characterize each position and illustrate them with examples. Then, in section 5.3, I compare and contrast the applicability of boundary objects and boundary work with each other and the more dominant concept of two-communities theory.

5.1.1. Presenting quote data

My findings are illustrated with quotes from participants. I transcribed all interviews verbatim, including filler words such as, “umms” and “ahhs,” false-starts, repeated words, and other verbal mannerisms. Although the nuances of speech are important for some kinds of analysis, to best address my research questions I have chosen to omit these verbal ticks from the written quotes for the purpose of clarity and readability. People speak and listen differently than we write and talk, and removing these verbalisms does my participants and their points better justice. When ellipses appear in the quotes below, it is to bridge and omit a section where the participant repeated, reiterated, or half-explained their point.
5.2. Views on integrated knowledge translation

To address my research question of how participants experience boundaries in integrated knowledge translation, it is important to establish how (and if) participants understand integrated knowledge translation in the first place. In this section – before delving into my more specific examination of boundaries – I provide a snapshot of the views and understandings of integrated knowledge translation that emerged in the data.

Near the end of each interview, I asked participants about their familiarity with and definitions of integrated knowledge translation. Many participants were very familiar with the term. When asked if she had come across the term often, and – if so - what it means to her, one participant laughed:

Yeah, I read it whenever we apply to grants and use it when we're trying to win [laughs]...I think it's being thoughtful about what the outputs will be while you're designing the research, so not waiting until afterwards to ask 'what are we going to do with this?' Engaging the [knowledge-users] early in the process to say 'what do you want to get out of this?' and then being thoughtful throughout the process of data collection, checking back to ensure you're on track, and then always delivering information back to your participants as best you can, instead of waiting until the end and then just having a poster at a conference. It's hard to do, I would say. (1009)

This participant and many others understandings closely matched CIHR’s definition of integrated knowledge translation. Another participant echoed the focus on CIHR granting language when asked whether she had encountered the term integrated knowledge translation:

Yes, and we used the term liberally both in our proposal and everything we've written about our project. Because I think our project is exactly that. You know, from the planning all the way through, everybody's been involved and the sort of evolution of the project has been informed by our interactions both with the decision-makers and really with the participants. (1008)

In total, 13 of the 20 interview participants were both familiar with the term, and also offered definitions closely aligned with CIHR’s. Still, some of them preferred terms such as participatory action research, and community based participatory research.
Several others, however, articulated a different understanding of the term integrated knowledge translation. For example, one noted she understands the term in a unique way:

For me, it was just that integrated means that the knowledge is already there within somebody, that it's their experiential knowledge...People have wisdom that they learn through experience and – using things like stories – we're able to understand what that knowledge is. And then we learn from it. So that, to me, is what it means to be integrated...In a way I might call it embodied knowledge, but I'm sure that's not actually by the book because I think people really have different ways they use that term that I don't understand how they're using it, but that's how I think of it. (1014)

Finally, some participants were unfamiliar with the term. For example, when asked if she had come across the term integrated knowledge translation, one participant explained:

Not really, I saw it in your project description, and I think it seems like a good term. With regular KT, 10-15 years ago we were all kind of struggling a little bit with what it meant and how to do it, you know? And we in our proposal, this PHSI one, we certainly put it in there about transferring knowledge back to ministry and to workers and so on, but not in the sense that we really conceptualized it I think very clearly at the time. (1003)

Another responded:

No, in fact only in your email did I get that, I'm not sure what that is - integrated knowledge translation. So no, I'm not familiar with that term. (1016)

Ultimately, many expressed frustration or exasperation with the multitude of terms. For example,

Do I care about the terms? Not really, I care more about what the terms mean to people...and whether they just pay lip service and have tokenism versus really including a variety of stakeholders is more important to me that the terms. (1001)

Another lamented about the terminology:

I find it very confusing. I mean I'm fairly well educated, and fairly well read, but I sometimes read the proposal requirements and I wonder just what language they're talking in because I kind of don't get it. The words kind of look the same but they're different categories. (1013)
For more quotes describing participants’ understanding of integrated knowledge translation, see Appendix J.

5.2.1. Trends and grantsmanship

One consistent theme in participants’ understanding of and experience of integrated knowledge translation was its connection to grants. On one hand, some participants explained integrated knowledge translation’s inclusion in grant requirements as reflecting beneficially “evolving” research understandings (1010) or “maturing” research practices (1012). For example, this participant saw the growth of integrated knowledge translation funding opportunities as an important shift:

The conversation about it has been there for a long time. But, I think the last 10 years; we've seen it burgeon in terms of actually happening. And probably for good reason too. I think a lot of it's out of frustration for not being able to do research that seemed to have any impact...[IKT] is more complicated and more expensive, but I think we've finally recognized, and funders are recognizing it's more rewarding in terms of output. (1013)

Another saw integrated knowledge translation as fully established in the research funding landscape:

A lot of the other programs, especially CIHR-based funding programs seem to have incorporated the ideas of partnerships and interactions with decision-makers as sort of a standard part of all grants. And so I think, in a way it's just kind of become standard practice, and maybe it's labelled in different ways for different types of funding programs, but the basis for that idea of integrated KT or that ongoing interaction to be essential to support the research is I think sort of firmly established. (1018)

In contrast, others felt IKT was more of a trend or buzzword, separate from the central goal of collaborative research with knowledge-users. For example, one participant said:

If you really believe in this model of research, which is what I do, then you do it and you kind of roll with granting agencies’ terms. I think whims at granting agencies come and go, and you have to be true to what you think is important in terms of research. I just roll with whatever language they want. I see them as a means to an end, not the end in and of itself. My goal is to do collaborative research, not to get a grant. So if the grant is how I can do that research, then I will use their label. (1011)
Building on the trend idea, several other participants mentioned that the push for integrated knowledge translation may be waning in favour of patient oriented research, which they also understood as a new label for an existing practice. For example, one participant remarked:

I think that [IKT] wave may have sort of have passed a little bit. I mean it's like there are trends in these things. Now it's all about patient oriented... and yet now we're being handed a different set of terminology to use when we talk about that. And you know funding is specifically targeted to patient oriented research, well of course - why would you be doing clinical research that wasn't patient oriented? [laughs] To some extent it seems to me it's the emperors new clothes, it's just we're dressing the emperor differently every time. (1008)

These impressions of grant requirements and terminology had real consequences for how the integrated knowledge translation projects came together. Often, the pressure of securing funding was linked to the idea of strategically building the grant to look good on paper – but which may or may not manifest in truly active partnerships. For example, one participant explained:

It's really to do a lot with the politics of grantsmanship, which is an intricate art which I have never grasped at all, and brings it's own kind of interpretations of these roles. Yeah. So we write them, but when I look at these CIHR grants, and I'm really pretty unsure about the way they define some of these roles and terms in practice. (1017)

Another explained their strategy of conveying integrated knowledge translation in the grant application:

[In addition to the active partners,] we added the other two partners I guess in part to strengthen the application and they were very interested in the project and wrote a supporting letter, but that was basically their role was to say this is important and we look forward to having this information. (1002)

Similarly, describing a project team, another said:

I guess you could say there are 6 of us. But if you read the grant there are probably 10 or 12 names, for example practicing [clinicians] and they might only attend one or two phone meetings a year, and one in person meeting a year, our annual in-person meeting (1003)
This approach was also reflected in the case study, where many of the co-investigators listed on the grant did not end up being active collaborators or members of the core project team, participating more in an advisory role, if at all. Some participants contrasted these strategic and grant-focused partnerships with authentic partnerships. For example, in discussing a colleague’s PHSI grant, one participant explained:

They had a policy-partner decision-maker partner who basically signed off on the grant but wasn’t really integrally involved, I think part of the difference for us is [our decision-maker partners] really were involved as part of the team… I do think a lot of us at least start out using that language because the funder requires us to use that language and to the extent you really walk the walk I think you get more out of the research. I think if you go into it using the language to get the grant but you don't actually follow through with engaging the decision-makers and the participants in the work I don't think you get information that's as rich as what I think we've been able to do. (1008)

Another participant explained:

It was very important to me to get the ministry of health on board, and not just a signature, but an actual person on board, and to get his input and make sure we're truly ensuring a question that matters for the government. (1015)

And, another said that involving partners beyond signing letters of support was key to his success: “I think that's where that authenticity and sincerity comes through. It's not enough to just do it on paper” (1010).

Just as the literature is diverse, so too were participants’ understandings and experiences of integrated knowledge translation. I was surprised by they wide range of sentiments towards integrated knowledge translation, ranging from optimism and satisfaction to significant frustration and cynicism. Appreciating this diversity is important when considering my research problem of how boundaries – and ideas about boundaries – can affect collaboration and communication in integrated knowledge translation.

5.3. Axes & Positions

The analytical processes of situational, relational and social worlds data mapping revealed salient groupings of views along two key spectrums: the degree to which
participants viewed boundaries as a problem, and the degree to which they believed boundaries should (or could) be challenged. These spectrums form two axes for a positional map to address my first research question: how do people understand, experience, and handle boundaries in IKT?

As flagged in the methodological literature on situational analysis, choosing optimal axes from among the various tensions that emerged in the data was very challenging, and this final map represents just two of many interesting and potentially illuminating axes to explore (Clarke et al., 2016). However, after iterating many other options and configurations, this map fit Clarke et al.’s (2016) criteria of being the most helpful to me in capturing the full range of positions (about boundaries) expressed in the discourse about integrated knowledge translation.

Mapping the data relative to each other along these axes, four distinct groupings of data emerged on the map, Figure 1. Positional map of boundaries in IKT (p. 89). These positions do not represent an individual, collective or institutional actors’ beliefs. Instead, the goal is to represent the full range of positions articulated in the discourse in their own terms. The discourses are “disarticulated from their sites of production, decentering them and making analytic complexities visible” (Clarke et al., 2016, p. 135).

In other words, these findings do not mean that a particular interview subject is “position A” and uses the discursive position A completely or exclusively whenever they talk about boundaries. The positions are not necessarily mutually exclusive. Instead, a key assumption of positional maps is that “individuals, groups, and institutions can and do often hold multiple and even contradictory positions on a given issue of concern” (Clarke et al., 2016, p. 135). The positions represent a discursive menu, which actors select strategically – and often unconsciously – to satisfy their needs in a given situation.

Many integrated knowledge translation discussions frame boundaries through binaries of good-bad or static-dynamic. In contrast, Clarke et al. (2016) argue that “positional maps assist analysts in seeing complexity, variation, and heterogeneity in situations where once only binaries and/or longstanding, oversimplified divisions may have appeared” (Clarke et al., 2016, p. 135).
In the next section, I will use illustrative quotes to characterize each discursive position, and also demonstrate how actors can use each position to make sense of their integrated knowledge translation work. No one position is “right” or “wrong.” However, some discourses are chosen more often, and come to dominate the discursive landscape (dominance is represented on the map by the relative size of the circles). Others are less common and represent alternative or competing perspectives. In the next section, I present each position as they emerged in the data: recognize-and-handle (A), respect-and-clarity (B), blur-and-integrate (C) and embrace-and-challenge (D). After describing each below, in Chapter 6, I discuss the implications of these positions, and challenge some of their key assumptions or tenants.
Figure 1. Positional map of boundaries in IKT

Note. Discursive data on boundaries mapped by the degree to which a discourse understands boundaries as a barrier to IKT, against the degree to which a discourse values the importance of challenging boundaries. The size of circle represents the relative prevalence of that discursive position in the data. The small, unfilled circles represent positions not represented in the data.

5.3.1. Recognize-and-handle (A): Most dominant discursive position

Discourse from this position sees boundaries as practical problems that problematically trap and constrain knowledge. However, this discursive position appreciates that boundaries are inevitable – if inconvenient – results of expert
specialization. So, boundaries that exist should be explicitly recognized and dealt with. In other words, boundaries are an unfortunate but inevitable feature of the integrated knowledge translation process that must be recognized and handled, or else they will hinder success. The problems boundaries create are overcome when IKT collaborators successfully translate their knowledge across the stable divides.

Metaphorically, this position views boundaries as the obstacles in an obstacle course. With the right training and approach, they can be overcome, but they inevitably slow progress towards the end goal.

Figure 2. Boundaries as metaphorical obstacles in Position A


This position emphasizes and prioritizes getting work done in a concrete, real-world context. Philosophical questions about the nature of knowledge and boundaries are somewhat beside the point. Rather, the logic is that boundaries exist (regardless of their degree of “realness” versus “social constructedness”), boundaries make it hard to coordinate integrated knowledge translation projects, and so boundaries must be dealt with. This position was the most commonly taken in the interview data, and throughout
the pragmatically focused literature on integrated knowledge translation discussing barriers and facilitators (Oliver, Innvar, Lorenc, Woodman, & Thomas, 2014; Reid et al., 2016).

In this position, communication is an important (if not the most important) strategy to handling boundary problems. For example, in discussing the challenges of integrated knowledge translation, one interviewee said, “the drawback is that there are different cultures in community organizations and academic organization, so sometimes like there’s a lot of bridge building and communicating that needs to be done to understand each other” (1009). Here, the different cultures are recognized as a problem, and communication-as-bridging is seen as a necessary strategy to overcome it.

From this position, it is understood that boundaries create communication difficulties, which cause collaboration difficulties. One participant explained:

It's important to get to know the terminology of the different environments of the people I'm working with. And that's with the patients too, because with the patients, I have to really speak in non-academic jargon as well. And so with each different partner group, you have to use different languages with them. (1012)

Thus, communication is framed as both a barrier and bridge (Peters, 1999). Effective communication requires both recognizing different languages are being spoken, and then using the appropriate language with each group across relatively stable divides.

On a deeper level, this discourse also sees the problems created by boundaries as fundamentally explained by misunderstandings. The problem is that boundaries create unclear communication, which spawns misunderstandings. The boundaries obscure common understanding between different groups, and that lack of shared meaning is framed as the source of collaboration problems:

We all have a particular perspective that's informed by our practice experience or training, or gender identity, or the way that we interact with the world and it makes it really hard to see other people's perspectives. I think that clashing of perspectives surround misperceptions. Where you don't share a common definition of the problem. (1019)

Thus, identifying a common goal is presented as a communicative strategy to overcome these kinds of misunderstandings created by boundaries. Extending the obstacle course
metaphor, the common goal is like winning the race. While varying obstacles may prompt different approaches by different team members, the shared goal keeps everyone moving forward in the same direction. For example, one participant explained the team recognized and handled boundaries because of their shared concerns: “we are a very multidisciplinary team, it’s true everybody brought strengths to the projects and specializations, but I think we were all on common ground in being concerned about [the same topic]” (1002). Several others discussed the importance of building a “common vision” (1015) for the integrated knowledge translation project, or identifying research directions of “common interest” (1004) to the research team as well as clinicians and decision-makers. Thus, if existing boundaries can be overcome through better communication and continued efforts, then reaching the goal of mutual understanding is possible.

5.3.2. Respect-and-clarify (B): Also dominant discursive position

Discourse from this position views respecting clear boundaries as essential and beneficial to the success of any integrated knowledge translation project. Boundaries themselves are not seen as a problem – problems only arise from a lack of clear boundaries or respect for them. This position holds that each participant in the integrated knowledge translation project brings a unique expertise to the table, like a puzzle piece, to add to and fit with the other clear pieces. Practically, when it comes to coordinating action, unclear roles create confusion. Setting clear boundaries around people’s roles and the project is understood as a prerequisite starting point for successful collaborative action, and is often discussed in parallel with setting clear expectations around power and contributions. In this position, expertise and teams can be understood metaphorically as puzzle pieces, whose boundaries must be clear in order to fit together cohesively.
Good communication is understood as clarifying and delineating the bounds of roles and knowledge. For example, one interviewee explained that conflict within the integrated knowledge translation team was mostly avoided, “because I'm pretty diligent about clarifying roles and understandings even when we're writing the grant so I think that really helps us later on” (1006). Another said, “Roles have to be defined as much as you can at the beginning, so you know the boundary where the researchers have to make the decisions and where the ministry says 'this is our decision’” (1002).

In contrast, disrespected or blurred boundaries can enable ignorance or conflicts of interest. For example, when asked about whether a government partner was involved in any data collection or analysis, a participant responded:

They weren't involved in data collection or anything like that, because I think it was important for the work that we were doing that the data collection be independent of government, because you know it's a comparative study, and so you know I think as much as possible as a research team we tried to maintain a neutral third party stance because we couldn't be gathering data in a way that was preferentially slanted. (1008)

Boundaries are also understood from this position to enable deeper specialization and unique expertise. For example, an interviewee explained that as a PI on a successful integrated knowledge translation project, she saw her role as “making sure that I'm really respectfully honouring each different knowledge partner group's
positions” (1011). In another interview, respect for the boundaries and differences between groups emerged as a strategy to avoid shallow or token engagement:

It can be very, very time consuming, just to make sure that you're acknowledging other's perspectives and you're listening to them and taking the time to make sure that you're listening to the different perspectives in a meaningful way, really respecting them and their differences, and not just as tokenism. (1001)

This position also values recognizing the boundaries of one’s own knowledge, and respecting others’. For example:

Each project I'm never doing a project just by myself and largely it's because there's a lot of things I'm not good at, so I need all those other people to do those things I don't have the expertise in. (1010)

Thus, different team members bring vital and diverse value to the team – which is best leveraged by acknowledging the boundaries of one’s own knowledge, and respecting the unique contributions (and limits) of others:

I'm limited in terms of my understanding of the day to day interactions that clinicians have with the [patients] that require their services as well as the [families] that are integral to the interventions, so I couldn't do the research unless the clinical team members were part of the team, because they provide the context for what we're doing. It just simply wouldn't happen unless they were part of the project, so they're definitely not figureheads, they're integral team members that really help to ensure that the context is there for the project that the rationale is clear, and the motivation for moving forward with the project remains. So they provide the fuel to the fire, so to speak. (1004)

The respect-and-clarify position sees problems as multi-faceted, so diverse expertise is needed to create similarly multi-faceted solutions. In the words of an interviewee, “any issue or problem we tackle in society can never be done one dimensionally, they're never one dimensional” (1002). Another interviewee echoed:

You know, a project like [this one], it's complex and none of us can do that alone, for those of us who know how to do health research we certainly have no clue how to do anything online. So having a group like this helps. (1012)

Thus, in order for different expertise to be able to contribute, their differences and boundaries must be respected and upheld.
This position emerged in the case study, during a workshop on patient engagement in research, which followed a curriculum specifically delivered to our team. The workshop facilitators explained patient involvement in terms of what expertise patients could add or contribute. For example, the workshop facilitators described patient knowledge as "complementary" to research knowledge (OB11). The benefits of patient engagement were described as stemming from recognizing and respecting the different kinds of expertise that collaborating groups brought to the table.

This position does not view boundaries as primarily an obstacle or barrier to success. While they must be navigated appropriately, boundaries in and of themselves are not a problem – they can and do facilitate success. They should be respected, maintained and clarified through careful respect, made explicit, and navigated through clear, standardized communication across existing divides. A very different position sits in the opposite spot on the positional map, as is outlined below.

5.3.3. **Blur-and-integrate (C): Idealized discursive position**

Discourse from this position views boundaries as problematic obstacles to integrated knowledge translation, which should be de-emphasized and ideally erased. This is the position that removing boundaries to knowledge sharing is the only way to create something truly new and innovative together.

Although some individuals interviewed used this discursive position, it seems to be more common in granting agency language and theoretical discussions, rather than in more practically focused discussions with people conducting integrated knowledge translation projects. For example, a CIHR casebook explains that:

> In multidisciplinary, multicultural or multi-sector partnerships, it may be easy to slip into a hierarchy of knowledge, expertise or power (depending on the objectives of the project or partnership). Such a hierarchy, however, can become an impediment to cooperation. (Canadian Institutes of Health Research, 2005, p. iv)

Instead, traditional boundaries of expertise should be challenged and removed, flipping hierarchies on their head. For example, (2015) argue that collaborative research “seeks to dissolve, rather than bridge, the gap between the research and practice processes
and communities” (p. 1958). This position can fit the metaphor of baking, where different ingredients are combined and (totally, irreversibly) integrated, prompting chemical reactions that create something new and entirely different than the ingredients alone.

Figure 4. Baking provides a metaphor for IKT and boundaries in Position C

In this position, perfect communication becomes a major topic of concern, where the goal is to remove any barriers to understandings and fully integrate diverse ideas. An integrated knowledge translation project is seen as more collaborative and therefore more successful as boundaries between participants blur over time. For example:

It's much more collaborative now, and I think that just speaks to how over time you just get to know each other, you've been working together for a while, and you start working together more collaboratively because those relationships are in place now and the divides that were there kind of become less important. (1019)

This position sees integrated knowledge translation itself as the process of blurring problematic boundaries and challenging the traditional power structures they create. Dissolving artificial, falsely tidy boundaries is a strategy to find better solutions to complex problems. For example:

Most of the issues that we struggle with, as human beings in so called organized, civilized societies, I don't think you can box them, I don't think that we can distinguish mental health problems from social organization or community…I'm calling myself a trans-disciplinarian because my real focus is to produce applied research that actually provides solutions. And I think too much of the disciplinarian approach has lead to almost a counter-productive response to many social problems. And so that's kind of my goal at the moment is to reduce those disciplinary boundaries. (1013)
Relinquishing bounded control over the research process also emerged as a theme. One participant said, “It isn’t about owning the process, it’s about letting go…I would have to say I was just more of a research co-participant, than a traditional PI” (1017). As the IKT project develops, success is realized by enabling evolution and change: “It’s very much of a learning situation in terms of what skills people have or how much they want to invest in the project, so I think you do need flexibility within the boundaries of those roles” (1001). As the project changes, so too does the integrated knowledge translation team. Fittingly, as their knowledge grows and changes, so should boundaries of their roles.

By de-emphasizing and blurring boundaries, integrated knowledge translation projects can create something new. For example, one participant described the power of integrated knowledge translation as its ability to remove the “blinders” created by existing boundaries: “The meaning that you make together is greater than the sum of its parts…you develop a new language together, a new perspective … that’s more comprehensive, kind of like taking the blinders off” (1019).

This position views boundaries themselves as the core problem that integrated knowledge translation seeks to address. Collaborative research is a way to challenge and ultimately de-emphasize boundaries between groups. This builds mutual understandings and helps integrated knowledge translation teams truly think outside the box.

5.3.4. Challenge-and-embrace (D): Alternative discursive position

Discourses from this position see boundaries not as problems, but as vital to producing truly transformative research. However, rather than accepting and respecting boundaries, this discursive position sees the benefit of boundaries’ emerging exactly when they are challenged, pushed and redrawn, and resulting conflicts embraced and encouraged. A possible metaphor for this position is the idea of opposable thumbs, with knowledge boundaries between each digit. The opposing tension between the finger and thumbs is used to productively hold things and do important work.
Communication in this position is seen as an important tool to express and enable conflicts. For example, one interviewee explained the value of conflict as important to IKT. “It’s about honouring that there are going to be dissenting perspectives, and trying to frame it in a way that allows space for those perspectives to clash and that complexity to just be there.” (1019). This illustrates a key tenant of this position – that success in integrated knowledge translation involves being comfortable with inevitable clashes, or at least allowing for discomfort and complexity without necessarily trying to resolve them.

This position understands boundaries as enabling learning and growth. Boundaries are only problematic if they are accepted as given, and therefore should always be questioned and challenged. One interviewee recognized that, while others may see the boundaries created by diversity as challenging, he sees it as the most useful element of the integrated knowledge translation endeavour:

I think other people might view that as a drawback with having all those different agendas and all those different people with different perspectives, but I kind of enjoy that part to be honest with you, because it's those differences and clashes that creates something new each time. (1010)

This position emphasizes the strategy of co-learning, as opposed to cultivating or finding shared interests or mutual understandings. Each group may never truly
understand the other, but they can learn from each other. For example, another participant discussed collaborating with a research partner from a different disciplinary background: “I think our two worlds kind of collide in this somewhat awkward way, but it's been really good, because I think we've learned a lot from each other” (1008). This is the view that conflict and collisions can facilitate productive learning opportunities, but do not necessarily result in mutual or complete understanding of the others’ views.

However, these are the few examples of this position in the interview data. This position was also the least common throughout the IKT-specific literature. It may be that these clashes are hard to articulate, or are cast as undesirable in light of more dominant discourses.

Observing the integrated knowledge translation team in the case study, however, showed many examples where challenge-and-embrace emerged as a key discursive position taken. In the case study project, conflict and disagreement often achieved productive results even if – or perhaps because – complete resolution or agreement was not reached. Conflict and challenging boundaries does not necessarily mean unhappiness, aggression or dysfunction, as the case demonstrates. The project team gets along very well – the co-leads have a long-standing working relationship, many staff have worked on the team for years, and the whole group enjoys retreats and social gatherings. Everyone is polite, open, and maintains a sense of humour.

That said, one example of ongoing conflict was around the ethics and purpose of conducting a randomized controlled trial (RCT) to assess changes resulting from the project’s intervention.46 RCTs are ethically complicated in health systems research.47

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46 RCT’s are often considered the “gold standard” for clinical trials, because people participating in the trial are randomly assigned to receive the intervention, or to receive standard treatment as the control (Greenhalgh et al., 2014). This study design is intended to reduce bias and confounding factors, and ultimately test whether the intervention truly has its intended effects (Chalmers et al., 1981)
Part of the motivation for an RCT stemmed from a deep commitment articulated in the funding call for proposals and prevalent in the medical community, to the scientific positivist value of objectivity, trying to set aside all assumptions and remain completely neutral about whether or not the intervention would actually improve care. Another argument for doing the RCT was the belief that – in order for the intervention to ever be implemented broadly – it needed the backing of a credible RCT study and resulting high-impact journal publications.

On the other side, there were concerns that doing an RCT would seek to produce more credible scientific conclusions at the expense of the study participants in the control group being denied potentially life-saving care. There are also fundamental philosophical and social science challenges and critiques of RCT methodology (for a detailed discussion, see Cartwright, 2013 and Cartwright, Goldfinch, & Howick, 2007). In general, this is a multi-faceted debate, with no simple answer and many complex contextual considerations. More specifically, in relation to assessing health information technology interventions, some argue that given differences in hospitals and implementation environments mean the strict conditions for controls cannot be met when assessing health information technologies (Berg, 2004).

Although discussions about whether and how to conduct a meaningful, ethical RCT continued over the span of years, the ongoing conflict did not cripple the integrated knowledge translation project – if anything, it expanded it. While I don’t think team members’ fundamentally changed their original views, they held their differences over the years in productive tension.

While the conflicts that boundaries create may be uncomfortable, this position holds that embracing the tension that comes with boundaries constitutes the benefits of

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47 RCTs are premised on the assumption of clinical equipoise, which means when “a genuine uncertainty exists on the part of the relevant expert community about what therapy or therapies are most effective for a given condition” (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, 2014, p. 152). This uncertainty justifies the need for research. But, in cases where the expert community have good reason to believe the intervention treatment will be effective, it becomes unethical to withhold that potentially life-saving treatment from the study participants in the control group.
an integrated knowledge translation approach. Using communication to question, challenge and push boundaries is the purpose of collaborations, with disagreement and conflict understood as the desirable and productive result.

5.3.5. Other possible positions

The other letters on the map represent “sites of silence” - those possible discursive positions that were not represented in my data set, but could have been taken. Some of these positions have emerged in other studies. For example, Ⓟ would be the position that the nature of boundaries entirely depends on the context and given situation (Evans & Scarbrough, 2014). Or, position Ⓡ would likely be that boundaries are not an important variable – they are not a problem, and therefore this position is ambivalent about challenging boundaries or not. The implication of these sites of silence could be explored in future research.

5.4. Comparing and contrasting conceptual tools

To address my second research question, I used situational analysis to identify three themes that are salient points of conceptual comparison within the discursive data in general, and across the positions in particular. Then, using these salient themes - communication, collective action and boundaries – I address my second research question by comparing and contrasting the conceptual applicability of boundary work, boundary objects and two-communities using illustrative examples from the data. In Chapter 6, I discuss the theoretical and practical implications of these conceptualizations, and how they link to the different positions identified.

5.4.1. Comparative point: Communication

The integrated knowledge translation literature repeatedly and clearly states the importance of communication (Wildridge et al., 2004). This was absolutely reflected in the data – across all interviews and observations, participants noted that communication is vitally important to integrated knowledge translation. For example, one participant said about communication:
It's just a part of what you have to do when you're working in large teams, if you want to have a team that's going to continue to work together and respect each other; you're going to have keep people informed to keep them involved with almost constant communication. (1001)

The data reflect a view of communication largely framed by a two-communities understanding. From a two-communities perspective, communication is the bridge between different worlds. In the data, this theory resonated and was used by many participants to make sense of their experiences of integrated knowledge translation. Many used a two-communities framing to explain the difficulties of communicating across cultures, and the translation needed to meaningfully communicate.

However, using the other conceptual tools, different possible explanations of the importance of continued communication emerge. For example, continued, ongoing communication is also a prerequisite for boundary work (a rhetorical process used to demarcate and coordinate epistemic authority), and the construction and use of boundary objects (flexible artifacts or ideas used in different ways by different communities to support collaboration). However, these concepts frame the potential benefits of communication in a fundamentally different way.

For example, communication in two-communities theory understands translation in another sense – to move or transport. When communication fails, it is understood as a break or blockade. Therefore, more and better communication is understood as a universal good. One participant described how their team lost a crucial member to turnover, causing breaks in communication: “Once that implementation failure has happened, and once you sort of have had a break in the communications, it's a challenge to come back from that” (1003).

In contrast, both boundary objects and boundary work view communication as a transformative process, which can create both positive and negative outcomes. For example, boundary work and boundary objects conceptualize communication as both constituting and transforming knowledge. When messages go awry, it is because the act of communication has transformed and constructed the knowledge being communicated. So, misunderstandings arise like a game of broken telephone (where the message is
altered as it moves from person to person), as opposed to a breakdown where the message simply isn’t conveyed. For example, one interviewee described:

There were some difference of interpretations – it's kind of like the telephone game where you're in a circle and you've got 10 people and you spread a word around that comes all the way around and what you hear at the end is very different than what was said at the beginning. (1010)

Boundary objects usefully emphasize the dual nature of vagueness and standardization in communication, beyond the two-communities idea of communication as simple translation or transportation of messages. In the above example, the participant sought to meet informational needs by providing a project blog. Rather than pushing out a newsletter (more and clearer communication), this PI and his team opted to provide collaborators with a blog that people could draw on to meet their different informational needs and preferences. For example, the blog served as a way for some stakeholders to stay abreast of all project updates, but it also served for other stakeholders be informed on-demand and without being overwhelmed by information. Additionally, the blog allowed the core project team to share information transparently, while avoiding using a more labour-intensive dissemination format such as a newsletter. This blog was flexible enough to serve different needs for the groups involved in the project, although it was in a standardized form.

In contrast, boundary work frames communication more as a strategic action to build epistemic authority. Conducting boundary work involves using communication to make discursive claims which rhetorically demarcate and coordinate what counts as legitimate knowledge across social worlds (Gieryn, 1996; Hoppe, 2005; Star & Griesemer, 1989). For example, in the case study, the involvement of patients and training about patient oriented research became an explicit site to discuss and construct issues of epistemic authority. One participant asked, “why can patients take their patient hat off and think like researchers, but researchers can’t take their research hat off and speak as patients?” In this instance, communication operated as a tool to police and question the lines of who had the authority to speak from a patient perspective, and who could participate in the research space. Boundary work emphasizes communication as a strategic tool to build or dismantle authority, rather than framing all communication as a utilitarian good.
5.4.2. Comparative point: Collective action to co-produce knowledge

Two-communities theory was still frequently involved to frame and explain collaborative action and its problems. For example, several participants used two-communities to frame the empathy building process that enabled successful collaboration. One participant explained:

In the situation like the ministry, or any kind of government organization, they are just faced with so much pressure and they're putting out fires on a daily basis. But they don't necessarily have the luxury or the long-term thinking or planning that you would have in an academic environment. They're constantly being hit with things that are distracting them or taking them away from what they do and things that they have to be responding to, so I think that's something I've really come to appreciate. That's why I have a lot more patience when I work with knowledge-users. It's very easy to come in and say you're an expert and you're a specialist and you have really amazing skills and talents, and it's easy to think you know how things should be and what's the right thing to do. But you just need to have a little bit of empathy about the fact that they're working in different contexts, and have a different skill set, and there's pressures on them which we as researchers don't either understand or have not had to face. (1006)

However, the data also reflected the arguments in Chapter 3 – namely that two-communities does not explain or help analyze the full diversity of collaboration experiences in integrated knowledge translation. So, boundary objects and boundary work have some interesting conceptual comparisons to offer.

Boundary objects are very useful to explain how collaboration can be possible without consensus, and highlight the important role of intermediary people or things to act as a buffer between groups. For example, in the project case study, the team’s various conference abstracts, presentations and article manuscripts often served as boundary objects. As a boundary object, the abstract is robust enough to be recognizable: it is a short representation of the group’s research, in a familiar academic format. The whole team knows what an abstract is – it is a relatively standardized form. At the same time, the abstract is plastic enough to adapt to diverse needs. For the lead abstract-writer(s), it is a representation of their understanding of the project, targeted towards a specific conference audience. Whereas for the other team members, it is an opportunity to clarify and improve those understandings and get research “out there” into a public forum, so it could be officially cited as official knowledge in conversations with
decisions. For conference organizers, and those outside the team, it is a sales pitch that the research presented will be interesting and important.

Versions of abstracts were often circulated by email multiple times, with team members using standardized communication methods, such as adding comments through Microsoft Word’s track-changes feature. Although this may sound mundane or obvious, the collective history and representation of thoughts and questions in the margins of the document importantly allowed for team members’ concerns to be represented rather than ignored – a key element of a successful boundary object (Tsoukas, 2009a). The abstract itself, as a flexible object, enabled productive dialogue and idea sharing. Although the team often engaged in productive and interesting debates on their different perspectives or views, the abstracts, as boundary objects, provided a more concrete platform to support productive debates, because they introduce something “at stake” (Tsoukas, 2009a). Ultimately, “with each member working on or with the object in their own way, the group is able to move forward and accomplish meaningful outcomes” (Shanahan, Burke, & Francis, 2016, p. 134).

However, it’s important to note that not all abstracts operated as boundary objects – some were broadly accepted without discussion, others were not flexible enough to satisfy different perspectives, and cemented irreconcilable differences and frustration. The disciplinary focus of the abstract, along with the target journal or conference, seemed to play a role in how contentious the abstract would be. For example, abstracts targeted at traditionally epidemiological, biomedical or quantitative outlets seemed to operate smoothly if they acted as boundary objects – not because all team members agreed with the underlying positivist views, but because the informational requirements for that genre was relatively clear: that it should present our research as objective, replicable, generalizable, and rigorous. While not all collaborators necessarily agreed on the philosophical underpinnings, successful abstracts-as-boundary-objects met other needs such as providing strategic legitimacy for the project. In contrast, more social-science-focused abstracts often operated less smoothly as boundary objects, and sometimes were unable to meet the informational needs of all team members, leading to completely scrapping or re-writing the abstract when it was not flexible enough to satisfy the needs of both the social scientists and natural scientists on the team.
In both the case study and the interview data, it is also possible to view the initial grant application as a boundary object, which enables collective action on a broad scale. As discussed in section 5.2.1 above, strategically crafting grant applications is a salient activity in integrated knowledge translation work. If viewed as a boundary object, grants we can see that grants (sometimes) successfully enable diverse groups from different social worlds to work together, despite different views and informational needs. Even outside of the immediate research team or project, a grant-as-boundary-object can enable CIHR to collaborate – both by supporting and funding the project, and also by meeting CIHRs’ informational and strategic needs as a funder.

In comparison to boundary objects, boundary work has less to offer on this comparative point of collective action. Rather than focusing on how collective action can be coordinated, boundary work instead focuses analytically on how knowledge claims are constructed and contested. While this process is part of collaborative work, it deals less with the mechanisms of how collaboration happens. However, boundary work does usefully emphasize the process of contests and collaboration to construct boundaries within the partnership, and it serves as a reminder that there is something at stake at the heart of articulating or breaking down boundaries.

Especially within the respect-and-clarify discursive position, diligent boundary work is understood as enabling collaborative action. For example, in the case study, boundary work emerged as a feature of many discussions around patient involvement in research. At the team’s CIHR SPOR workshop on patient engagement, the session facilitators emphasized the need to respect patients’ unique expertise based on lived experience. However, some of the clinicians and researchers in the workshop clarified knowledge boundaries of their own. One of the project’s co-leads voiced concerns about patients untrained in research “practicing social science without a licence.” The other project co-lead felt that the patient-perspective represented an “n of 1” – an individual view – whereas she, as a clinician, had a broader perspective from interactions with multiple patients. Others in the workshop session both supported and challenged these views. These are examples of a response to expansion boundary work, where the authority of patients’ knowledge is expanding to different areas, and encroaching on the traditional territories of academic and medical expertise.
However, although boundary work was a consistent feature and challenge in the workshop, it also emerged later on as a potential tool to enable trust and collaborative action. The group reached the consensus that a key to collaboration was respecting the expertise of others, and recognizing the boundaries of their own knowledge. One project co-lead explained that she defers to others on matters where she is not expert, with the assumption that they will similarly trust her in matters falling within her area of expertise. This respect-based boundary work seemed to comfort the group – by drawing lines around what each team contributor could or could not meaningfully comment on, it removed the stress that illegitimate knowledge may be unfairly set on equal footing with true expertise.

The data from the case is interesting, in representing expansion-based boundary work around scientific epistemic authority in regards to the legitimacy of lived experiences and patients' knowledge. The SPOR CIHR funding program is perceived as large and powerful, pushing a trend forward on patient engagement, which both reflects and bolsters successful expansion boundary work on the part of patients and patient advocates, carving out their piece of authority within the research enterprise. Using boundary objects as tools to collaborate and performing boundary work within collaborations better explains the complexity of the data than analysis relying solely on the two-communities theory.

5.4.3. Comparative point: Understanding of boundaries

A central premise of the two-communities theory is that the boundaries between the communities in question are static and set in advance. This idea resonated throughout the data, both in the case and interviews. A key lens of understanding was the way in which people's backgrounds, training and work contexts fundamentally shaped their identity, perspectives, and memberships in certain communities. For example, one participant explained her struggles with data collection by drawing lines between researchers and government:

Because the ministry aren't researchers, some things the research team initially took for granted had to be communicated more clearly...so for example, from a government perspective, when their staff had finished entering information out of the confidential government database, they considered that the task would be
complete. And they were somewhat taken aback when the research team explained that data cleaning is part of that process...and to researchers that concept is probably not surprising, but I think to administrators and government staff who don't have a research background of course that's not something that they would expect...so that's an example of just different institutional cultures and different expectations (1003).

Another explicitly identified the resonance of the two-communities thinking: “as much as it is something of a cliché, academia is fairly separate from the messiness of the real world of clinical care delivery, and the world where most individuals receive their care or treatment or support” (1017). Understanding boundaries as existing, set, and separate made sense to participants. Although two-communities thinking dominated, the concepts of boundary objects and boundary work paint a different analytical picture of boundaries.

For example, the concept of boundary work is more useful than two-communities to help explain why time is needed for collaborations. The point that extra time is needed for integrated knowledge translation emerged repeatedly and across literally all of the interviews. For example, one participant explained integrated knowledge translation results in “probably a slower process in research than most of us want” (1013), and another explained IKT in terms of a proverb:

If you want to go quick, you go by yourself, if you want to go far, you go as a team. So I guess it makes things a little bit slower at some points, but I think you get further in the end. (1015)

Appreciating the role of boundary work can explain how boundaries are co-constructed and contested. This may – on top of logistics and other factors – partly explain the extra time needed to do integrated knowledge translation. Collectively, collaborators in an integrated knowledge translation project work together to identify, challenge and sometimes re-draw new boundaries around the knowledge they are working to produce.

Boundary work also usefully highlights key aspects that two-communities theory ignores in this process: the power dynamics and struggles involved. For example, a participant explained IKT projects as complicating traditional power hierarchies: “I think it takes away the power from the lead researchers, which I think is pretty good. It makes their life a little bit more complicated” (1017). These challenges push assumptions to
become more explicit, and credibility contests ensue. In discussing efforts to engage patients in research processes, a participant said:

You don't want to undermine that that person has expertise in living with [the disease], but they may not have the expertise in terms of the research skills that you want, and so how do you compromise in a way so that you honour their expertise but have them recognize that that may not translate into skills that are helpful for that role. (1001)

Boundary work foregrounds the active construction of boundaries and analytically frames them as products of strategic communicative work, done to produce certain results – versus a two-communities understanding of boundaries existing in advance and simply needing to be effectively bridged.

The concept of boundary work is also useful in explaining the positioning and justification of integrated knowledge translation itself as a more legitimate and authoritative form of knowledge production. Many interview subjects expressed that integrated knowledge translation is a special kind of research, with statements such as:

I believe that research is useless quite frankly if you produce it and a bunch of academics it in journals and it's written with jargon, and no one understands it, and it's theoretically argued but it has no practical basis in reality. So for me, I see the value in doing research with people who actually will use it, so it's not just research for research's sake, but it's research for use. (1011)

Extending the boundary work around IKT, several participants also delineated that not every researcher can or should pursue collaborative projects. For example, one participant explained: “I don't think everyone should be doing this type of work...because some people are best at just getting down to the technical elements of the science...and if they don't want to work with knowledge-users they shouldn't be” (1006).

Boundary objects have less to say about boundaries (explicitly using the term), but do introduce the idea of social worlds and arenas (Clarke & Star, 2008). This is a rich, complimentary area of theory that could be explored in relation to integrated.
knowledge translation in future research. As with an understanding of boundary work, an understanding of boundary objects similarly contrasts with two-communities theory, by depicting boundaries as dynamic, changing, contested and constructed over time.

5.5. Conclusion

This chapter first described how participants understand integrated knowledge translation more generally. Then, based on their views, four key discursive positions about IKT emerged relative to each other on a positional map were outlined and discussed. Each position suggests a different understanding of the purpose, nature and problems related to boundaries in integrated knowledge translation. Comparing and contrasting boundary objects, boundary work and the two-communities theory on key points which arose in the data allowed me to explore how each conceptual tool brings a different focus and set of assumptions to the data analysis. The next chapter discusses the implications of these results, and further links them to each other and the broader literature.

Social worlds are defined as “universes of discourse” (Strauss, 1978). Over time, social worlds can segment into multiple worlds, which overlap and intersect with other worlds to create arenas - spaces composed of multiple worlds “organized ecologically around issues of mutual concern and commitment to action (Clarke & Star, 2008, p. 113). Activities within social worlds and arenas include establishing and maintaining boundaries between worlds (Clarke, 2005).
Chapter 6.  Discussion

6.1. Introduction

This chapter links the findings for each research question together and explains their combined implications and significance. Addressing my first research question, these results suggest that people experience and handle collaboration across boundaries by taking different discursive positions, each with distinct implications. Addressing my second research question, boundary objects and boundary work are useful concepts for interpreting discourses of integrated knowledge translation. However, two-communities theory remains a powerful and popular framing of integrated knowledge translation among the interviewees and within the case study.

In this chapter, I discuss what these findings mean for the study and practice of integrated knowledge translation. Recognizing these positions and using alternative conceptual tools can help provide new perspectives about boundaries and communication, and add beneficial nuance to understandings of communications.

Overall, I argue that the findings suggest that integrated knowledge translation would benefit from broadening and critically reflecting on current dominant framings. Explicitly recognising all possible positions on boundaries, and using conceptual tools such as boundary objects and boundary work offer promising ways to support this goal.

6.2. Balancing positional perspectives

The goal of this analysis is not to assess whether a particular discursive position on boundaries is ‘better’ than another in terms of delivering integrated knowledge translation outcomes. Although evaluating outcomes and impacts is outside the scope of this project, linking my findings to empirical studies in the literature reveals that different
approaches to boundaries can be managed and led more or less effectively, and each presents different challenges and advantages (Evans & Scarbrough, 2014; Oborn, Barrett, & Racko, 2013). For example, Kislov’s (2014) case study of a single Collaborations for Leadership in Applied Health Research and Care (CLARC) project suggested collaboration “can promote the reproduction of existing boundaries (e.g. the research–implementation boundary), their blurring (e.g. professional boundaries within implementation teams), or the creation of new ones (e.g. the boundaries between implementation teams)” – all in one team (p. 318). Alongside this finding and others (e.g. Mitton et al., 2007) my research supports the conclusion that determining a single ideal or best-practice approach to boundaries is likely undesirable and probably impossible.

My findings do suggest that striving for more explicit recognition and flexibility of the variety of discursive positions towards boundaries may be productive for integrated knowledge translation practice and study. I do not argue that all discursive positions can or should be taken equally all the time. Instead, I argue that integrated knowledge translation could benefit by not defaulting to dominant discursive positions without careful consideration.

6.2.1. Turn up the volume on quieter, alternate positions

For example, the least common position represented in the data was to challenge-and-embrace boundaries. However, this limited focus may be detrimental. For example, Schmachtel (2015) observes that an illusion of order and democracy is often created around formal research collaborations. Those illusions – or “rationalized myths” – emerge in discourses (like boundary blurring or respecting) that both legitimize the partnership’s setup, yet simultaneously conceal “its complex, contradictory and antagonistic reality” (p. 448). Drawing on the challenge-and-embrace discourse may help balance or remedy resulting problems, by removing the drive toward (potentially false) consensus and integration.

A more balanced focus on the conflict position highlights different pragmatic actions and concerns – such as how to productively frame disagreements and create space for dissent – that may be otherwise overlooked from other discursive positions. For example, drawing more on the challenge-and-embrace discursive position suggests
solutions such as using facilitators to draw out productive conflicts in teams. In contrast, other positions may de-emphasize or seek to dispel conflicts prematurely. Lehoux et al. (2010) conducted an ethnographic case study of a researcher-decision-maker knowledge exchange network, and found that – while it achieved some gains – its full potential was not realized. In part, the network’s “careful, conflict-adverse and centralized governance did not provide much room for members to engage in transformative discussions” (p. 745). When viewing boundaries from this position, the conflicts and the challenges they fuel discussions and innovation to produce transformative new knowledge.

Many other fields provide evidence and advice on how to sustain this challenge-and-embrace discursive position on boundary interaction. For example, in discussing engaged scholarship, Greenhalgh et al. (2016) argue collaborative knowledge production is “invariably power-charged and conflict-ridden; the key to its success is making power relations explicit and encouraging task-oriented conflict (which can be creative and productive)” (p. 397). Similarly, in an editorial commentary, Bartunek and Rynes (2014) argue that, based on their experiences in management, “the correct question to ask about paradoxical tensions is how to sustain them successfully not how to resolve them” (P. 1192). Further, they argue that by learning to recognize paradoxical tensions, managers can learn to hold the dilemmas in generative ways, rather than choosing one side and delegitimizing the other.

Based on empirical research in the field of computer supported cooperative work, Yasuoka (2015) has argued that communications breakdown needs to be viewed as a positive part of the collaboration process, “not as a negative situation to be avoided but as a prudent trigger to lead repair activities…breakdown and repair can be understood as an integral necessity to accomplish communication” (p. 257). Along the same lines, in the field of museum management, Lee (2007b) argues that – based on an ethnographic case study of collaboration – managers should “ensure that conflicts are not "smoothed over" or ignored. Rather, conflicts should be brought out into the open and explored proactively, as they provide an opportunity for mutual learning and cultural exchange” (p. 198). More work from this discursive position – valorizing conflict and challenges as opposed to demonizing them – could benefit integrated knowledge translation practice and study.
6.2.2. **Values and drawbacks of other positions**

The other positions each offer benefits and drawbacks as well. The data suggest that many of the participants who expressed the most satisfaction or fulfillment with their partnerships spoke of the importance of respecting clear boundaries and used a respect-and-clarify discursive position. This finding is reflected in other empirical research. For example, in a reflection on their experiences of doing collaborative research Locock and Boaz (2004) argue that “an artificial suppression or ‘blurring’ of the boundaries between them can be damaging in the long term, similar to the critique of repressing conflicts as masking power” (p. 375). From their empirical case study comparing two integrated knowledge translation projects, Evans and Scarbrough (2014) found evidence where respecting boundaries helped the project team reach their goals. Drawing on the discourse of respect-and-maintain, the team in their case study was able to create a collaboration environment where:

Communities on either sides of the ‘gap’ were not required to radically alter their work-practices. An advantage of this approach is that researchers are not required to develop new skillsets for knowledge translation, but instead rely on supplementary mechanisms (e.g. a knowledge-broker or translational activity) to enact translational processes. This approach allowed project-members to focus on developing greater depth of research expertise. As described, this was important in CLAHRC A, where there was strong institutional pressure from the university partner to produce high quality academic publications. (p. 125)

Similarly, Heaton et al. (2015) found that in a research-clinician collaborative research project, the clinicians did take on the identity of co-researchers. They were actively involved as clinicians or clinical academics, where they contributed distinct expertise and “retained their respective identities and distinct professional positions and objectives” (p. 8). However, both the respect-and-clarify and the recognize-and-handle discursive positions subscribe to more positivist ideas of boundaries as set in advance, as opposed to boundaries as socially constructed and dynamic.

Based on my findings, I suggest that the blur-and-integrate position is the most problematic discursive position – if it goes un-examined. The blurring position often emerges as a more radical and normative ideal. For example, this position is exemplified by Cornelissen, Mitton and Sheps (2011) when they argue that “when hierarchical mandates and influences are removed, collaboration becomes easier. In this structure,
roles become less compartmentalised and boundaries blur, facilitating meaningful two-way KT” (p. 188). Jagosh et al., (2015) also advocate the notion of partnership synergy, defined as combining people’s perspectives, resources, and skills to “create something new and valuable together—a whole that is greater than the sum of its individual parts” (p. 318). Similarly, Pohl et al. (2010) argue that blurring boundaries is a necessary condition for engaging with others and ultimately helping to reshape the involved groups’ perceptions, behaviour and agendas in productive ways.

There are positive empirical examples of the blur-and-integrate discourse in action. For example, in their empirical research about an IKT project, Kothari and Wathen (2013) find that:

Those involved in a researcher-knowledge-user collaboration create a new identity within their particular IKT relationship... As time goes on we have witnessed the generation of common stories related to the research process, a joint sense-making if you will, that leads to a common understanding of the context. (p. 189).

Douglas et al., (2014) similarly argue that blurring the lines between users and producers is an essential facet of successful translational science and that blurred boundaries is a constitutive component of user-producer research collaborations in healthcare. The blur position is also taken in a CLARC case study, where they found the data “reinforce the notion that maintaining collaboration requires...blurring of knowledge producer-user boundaries...It confirms the importance of blurring the boundaries between knowledge creation and knowledge use through integrating multiple stakeholders’ perspectives in research and implementation activity.” (Cooke, Langley, Wolstenholme, & Hampshaw, 2016, p. 1).

This ideal discourse of blur-and-integrate is appealing to draw on, and form the fundamental rationale for much of integrated knowledge translation. However, it should not be held as the unquestioned discursive ideal. In the discussion of blurring in inter-professional health care, Morriss (2008) vehemently argues against blurring boundaries, claiming it creates “only ambiguity and confusion...with the potential to lead to resentment and distrust...clear boundaries are central to the process of integrated working” (p. 77). Importantly, Morriss (2008) distinguishes that a blurred boundary is
imprecision about “who does what when,” whereas a crossed boundary is “the crossing of a boundary that does exist” (p. 81), and argues that crossing is preferable to blurring.

The data and results from research reported here suggest that more reflective recognition and potentially more flexible shifting of discursive positions could be an effective strategy to improve experiences of integrated knowledge translation. The positions relate to conceptual tools as well. Not surprisingly, the most dominant discursive position of recognize-and-handle is most closely aligned with two-communities thinking – where boundaries are assumed in advance and approached as gaps to bridge.

6.3. Add to the conceptual toolbox

I was interested to find that – despite the compelling theoretical critiques of two-communities thinking in the literature – it was comparatively much more resonant in the case study and interview data. In other words, participants used two-communities theory to make sense of their experiences, significantly more than ideas resembling boundary work, objects, or any other conceptual framing. The discursive data both explicitly referenced the idea of two-communities, and demonstrated this thinking more implicitly.

This poses the interesting question of why? Since two-communities has been critiqued for its inability to fully describe or explain empirical data about collaborations, then why does it maintain such a hold on the integrated knowledge translation discourse, including in daily interactions and participant sense-making?

Wehrens (2013) has suggested that Goffman’s (1959/1990) famous front- and back-stage metaphor⁴⁹ as one possible explanation this finding in my data. He argues that integrated knowledge translation teams strategically deploy two-communities theory

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⁴⁹ The metaphor was developed in Goffman’s (1959/1990) influential book The Presentation of Self in Everyday Life, popularizing dramaturgy as a sociological approach, in which social interaction is analyzed in terms of theatrical performance. Goffman (1959/1990) argued that social interaction places individuals in front of audiences, where they must perform to manage impressions. However, when not interacting, individuals can enter a personal, back-stage region, where they can prepare for or set aside their performed roles (Goffman, 1990).
when it benefits their front-stage public image, and then set it aside for backstage conversations. This resonates with the data from the case, where the project co-PIs often referenced their “back-channel conversations” or “behind the scenes” work. For example, this work involved the co-PIs calling on contacts who they knew through personal connections, but who also sat on key committees. Or, it would involve coordinating strategic relationship management with current partners. It also seems possible, given that IKT projects occur in healthcare (and not for the most part STS), that STS critiques of two-communities may be less relevant in a healthcare setting, where there may be more truth to the idea of two cultures than in other sectors. Nonetheless, there are still benefits in applying other concepts to help move forward in integrated knowledge translation projects.

Despite these possible reasons for continued dominance of two-communities thinking, I argue that the tools of boundary objects and boundary work still provide useful different ways of thinking about communication and collaboration across boundaries, which could benefit integrated knowledge translation practice and study.

Overall, the main theoretical benefit of both boundary objects and boundary work as conceptual tools (as compared to two-communities) is that they allow for more explicit attention to the processes and mechanisms through which boundaries are constructed (boundary work) for transcended for different purposes (boundary objects). Through the lenses of boundary objects and boundary work, we can also better understand the seeming inconsistencies or contradictions posed by the diverse positions in the discourse discussed above.

Both concepts come with benefits and limitations. Boundary objects are interesting analytical tools, although their immediate practical value to those in integrated knowledge translation collaboration is less clear. Boundary objects most often arise organically and do not require participants to acknowledge them as boundary objects (Shanahan et al., 2016). For future practitioners and analysts of integrated knowledge translation, it would be interesting to explore the ways flexible boundary objects may be supporting work. For example, Shanahan et al. (2016) propose that an intentional and explicit consideration of a boundary object can facilitate its meaningful use. Studying engineering teams, Barley, Leonardi, and Bailey (2012) suggest that individuals often
deliberately create ambiguous boundary objects to support collaboration, and this may be the case when teams come together though IKT grant proposals as well.

However, I follow Bowker and Star (1999) in speculating that deliberately crafting boundary objects is very difficult, because individuals generally aim to strip the ambiguity from objects they create. Furthermore, I question whether identifying something as a boundary object might ruin its usefulness — pointing out that objects are vague might prompt attempts to remedy the vagueness of the objects, rather than embrace them. Therefore, the conceptual tool of boundary objects likely has more to add to the study of integrated knowledge translation (in post-practice theorizing and analysis) than to helping practitioners make sense of the daily work, although it might be heuristically useful in helping teams thing though their own approaches and the challenges they are likely to face. Future research could explore the practical benefits of conceptualizing boundary objects in integrated knowledge translation work, and there is much value in academic analysis of boundary objects, in particular to explore how productive and successful collaboration can be possible without consensus.

In comparison with boundary objects, boundary work may be a more practically useful concept for those in integrated knowledge translation. Boundary work emphasizes the rhetorical strategies and positioning at play in integrated knowledge translation encounters, and highlights various ways boundary work can be done to the advantage or disadvantage of groups involved. Rather than focusing on why the social scientist is different than the clinician and stopping at surface-level differences, paying attention to boundary work highlights how those differences are constructed and modified to satisfy various needs. Importantly, an attention to boundary work may illuminate possible strategies for the flexible construction of optimal boundaries moving forward in an integrated knowledge translation project, as opposed to falling back on default divisions that may limit sucess.

More broadly, this thesis serves simply as a starting point. This empirical exploration and theoretical exercise served to demonstrate the value of exploring and applying theories and conceptual tools from outside of the health sciences in general, and from STS in particular to the study of IKT. Many other concepts from STS, or other fields altogether, could further support this goal of creating a more nuanced view of
boundaries and how to handle them in IKT. While both boundary objects and boundary work have limitations and drawbacks as conceptual tools, the ultimate contribution is demonstrating the potential value of looking beyond two-communities framings of IKT and outside the integrated knowledge translation field for fresh perspectives.

6.4. Building nuance into communications discussions

The results suggest that different discursive positions and conceptual tools frame communication in importantly distinct ways. First, it is important to recognize that two-communities theory does resonate with participants in practice, and does highlight important culturally focused communication issues, especially around language. For example, one participant described sharing her research:

   Everything I've published I've had to publish two ways. I have to publish it in a language for my practitioner audience, and I have to publish it in a language for my academic audience. So you have to learn to write two very different ways. Talk two very different ways...it's incredibly time and energy consuming. (1011)

This aligns with arguments such as those made by Liyanage et al. (2009), who find that two-communities theory and resulting ideas of translation are vital resources for understanding the knowledge translation context: as knowledge becomes more highly specialized, it develops its own terminology, which, by definition, restricts the accessibility of the knowledge to outsiders who lack fluency in the particular form of specialized language. Two-communities theory highlights translation between communities, and thus usefully emphasizes language as the centerpiece of its work.

The concepts of linguistic repertories and registers also connect to ideas of two-communities theory in IKT communication, while expanding on two-communities thinking in some more interesting and nuanced ways. Salter and Hearn’s (1996a) use of the concept of “registers” ties into two-communities thinking, by using a musical metaphor to emphasize that different groups communicate in different registers, and moving information between registers often results in distortions (p. 170). However, they importantly emphasize that “registers are not just something akin to different languages. They also reflect different structures of authority” (Salter & Hearn, 1996, p. 95). Along the same lines, Wenger (1998) identified shared repertoire as one of the three key
elements for a successful community of practice. Orlikowski and Yates (1994) also use the concept of repertoire, to analyze the communicative practices which enabled and constrained collaboration in a community of distributed knowledge workers.

Tying into this theorizing, the blur-and-integrate position’s idealized goals of synthesis and perfect communication may be counterproductive. If translation activities are implicitly measured against the normative ideal of perfect communication, they may be inevitably “doomed to fail” (Arrojo, 1988, p. 33; Dizdar, 2009, p. 96). Crapanzano (1997) argues the essentially contestatory nature of communication is often hidden by theories that stress reciprocity, harmony, or stated aims of perfect and mutual understandings. John Peters’ (1999) monograph Speaking into the Air traces this pervasive sense that communication is always breaking down, and critiques of the dream of communication as the mutual communication of souls. Instead, Peters (1999) argues that we should avoid the resulting “pathos of breakdown” that permeates communication thought, because the very dream of perfect communication itself inhibits the hard work of real-world connection:

Too often, communication misleads us from the task of building worlds together. It invites us into a world of unions without politics, understandings without language and souls without bodies, only to make politics, language and bodies reappear as obstacles rather than blessings. (pp. 30-31)

This concept of human communication as an inevitably flawed and imperfect means to move the knowledge from one person’s mind to another’s seems to persist in much integrated knowledge translation theorizing based on two-communities thinking (e.g. Azimi et al., 2015; Johnston et al., 2016).

However, both boundary objects and boundary work contribute to a more nuanced view of communications in integrated knowledge translation than the two-communities theory, especially by emphasizing a more transformative idea of communication. For example, both conceptual tools highlight how increasing

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50 The concept of a community of practice (CoP) was introduced by Lave and Wenger in their 1991 book Situated Learning, and expanded by Wenger in his 1998 book Communities of Practice. CoPs are social configurations where people disparate groups develop shared practices, memories and understandings over time.
communication between groups is no guarantee of improving understanding or producing results. As Peters (1989) argues:

Communication sometimes masquerades as the great solution to human ills, and yet most of the problems that arise in human relationships do not come from a failure to match signs and meanings. In most cases, situation and syntax make the sense of words perfectly clear: the basis of conflict is not a failure of communication but a difference of commitment. We generally understand each other's words quite well: we just don't agree. (p. 378)

For example, the concept of boundary objects draws attention to the often-invisible work of coordinating and managing across boundaries to produce knowledge together (Fujimura, 1992). Building on the usefulness of boundary objects in this integrated knowledge translation space, future work could follow Star and expand beyond the two-communities “communication-as-bridge” metaphor into a boundary-object inspired idea of “communication-as-infrastructure.” Star and Ruhleder (1996) characterize information infrastructures as embedded, transparent and invisibly supporting tasks, learned as a part of membership and taken for granted, and becoming visible only upon breakdown. This and other alternative metaphors may better aid our understanding of key integrated knowledge translation communication issues. Similarly, boundary work could shift the metaphor away from bridges towards communication understood as performance, or strategic tactics, which may emphasize alternatives to bridging alone, supported by alternative courses of action and/or activities.

6.5. Conclusion

These results are not about pointing towards one successful discursive position or conceptual tool. Instead, my analytical focus has been on the processes of how boundaries are constructed, challenged, maintained or re-drawn. My research questions were two-pronged: asking pragmatically, how do people experience and make sense of boundaries, and asking theoretically, what tools might be suited to describing and explaining these boundary experiences? In Chapters 4 and 5, I explained how I addressed these questions and what I found in interview and observational data. In this chapter, I argued for how and why these findings matter. To close, in the next chapter I
summarize the significance and limitations of my study, and point towards future
directions for research.
Chapter 7. Conclusion

7.1. Relevance of study & contributions

With this thesis, I contribute a case for pursuing reflection and productive cross-disciplinary linkages, illustrated with empirical evidence. None of the discursive positions on boundaries in IKT projects represents a superior path forward, and many of those involved in integrated knowledge translation do follow my suggestion of employing a nuanced and reflective perspective – only to encounter seemingly insurmountable integrated knowledge translation challenges regardless. Additionally, neither boundary objects nor boundary work present a solution to the challenges people experience in integrated knowledge translation projects. They simply represent different – and potentially useful – ways to think about those problems.

In Chapter 2, I argued that integrated knowledge translation is an important phenomenon to study, but critical issues of boundaries and communication have been relatively underexplored in the literature to date. In Chapter 3, I argued that dominant theoretical framings in integrated knowledge translation are insufficient and suggested that STS theories might provide a way to address these shortcomings. Chapter 4 explained the rationale for a two-pronged data collection approach and outlined the situational analysis method. In chapters 4 and 5, I presented and discussed the results my inquiry.

My findings support the idea that engaging in collective action and knowledge production requires enhanced levels of reflexivity, and that critical reflection is perhaps the most important success strategy in integrated knowledge translation, permeating all layers and dimensions of collaborative research (Lehmann & Gilson, 2015; Smith, Ward, & Kabele, 2014).
Broader insight into the kinds of boundary work being conducted and the boundary objects being used might enable IKT project participants to become more flexible in their collaboration strategies depending on their goals, sometimes choosing to build and strengthen boundaries, and other times aiming to blur or erase them (Wehrens, 2014). Recognizing the diversity of possible discursive positions on boundaries can help those practising and studying integrated knowledge translation identify their own discursive positions in different situations, recognize others’ positions and shift strategically as needed.

7.2. Limitations and suggestions for future research

This thesis is necessarily limited in scope. Topically, it focuses on Canada and health. It also chose to focus deeply on boundary objects and boundary work. However, there are many other STS concepts of boundaries to explore, let alone other potentially useful STS concepts unrelated to boundaries. Due to access and time constraints, I focused my analysis on the integrated knowledge translation process as opposed to outcomes or impacts. The question of research impact and outcomes is a critical topic in integrated knowledge translation inquiry, and an area that deserves further study.

Methodologically, the data are limited to one case study, and 20 interviews, with primarily academic PIs (as opposed to knowledge-user partners) who voluntarily applied for IKT grants and consented to speak with me. This limitation means the views represented might have been more favourable towards integrated knowledge translation than those my sampling strategy did not reach, and contrasting opinions were less likely to be included. More research on the views of knowledge-user partners, and other academics more sceptical of integrated knowledge translation should be explored. Why some choose not to pursue integrated knowledge translation funding, and how they view knowledge boundaries could be an interesting area of future inquiry.

Future research could also explore the application of other theoretical tools from STS, but also from additional relevant fields. For example, the field of computer supported cooperative work (CSCW) has a has a rich history exploring the problem of how “organizations, or other collectivities, can harness and use the knowledge and
expertise that their members have to solve problems or get work done” (Ackerman et al., 2013, p. 531). Therefore, CSCW and many other fields might be a fruitful source for theories to further advance the study of integrated knowledge translation.

7.3. Summary and concluding remarks

Working together is hard. Working with people very different from oneself is hard. So is communicating effectively and doing research. And my master’s thesis provides no solutions on how to make any of it any easier.

What I do contribute is an argument for an important starting point. If integrated knowledge translation shuns the theoretical and philosophical questions, it risks perpetuating a cycle of underperformance and frustration. In contrast, exploring the scope of possible conceptual tools beyond the default two-communities theories and recognizing the range of possible discursive positions on boundaries may offer a more satisfying and productive path forward.
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133


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155


### Appendix A.

#### Summary of current CIHR IKT grant programs

**Table A1.** *Current IKT-specific grant programs at CIHR, as described by Bourgon (2015) and CIHR (Canadian Institutes of Health Research, 2012, 2014b; Sibbald et al., 2014)*

<table>
<thead>
<tr>
<th>Funding Opportunity</th>
<th>Objective / description</th>
<th>Started</th>
<th>Type</th>
<th>Amounts / Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Synthesis</td>
<td>Increase the uptake/application of synthesized knowledge in decision-making by supporting partnerships between researchers and knowledge-users to produce scoping reviews and syntheses that respond to the information needs of knowledge-users in all areas of health. The team must include both an independent researcher and a knowledge-user listed as a Principal Applicant.</td>
<td>2004</td>
<td>Investigator Initiated</td>
<td>$100,000 for a synthesis for 1 year, $50,000 for a scoping review for 1 year</td>
</tr>
<tr>
<td>Knowledge to Action</td>
<td>Accelerate translation of knowledge by linking researchers and knowledge-users to bridge a knowledge to action gap, and increase the understanding of knowledge application through the process. The team must include both an independent researcher and a knowledge-user listed as a Principal Applicant.</td>
<td>2005</td>
<td>Investigator Initiated</td>
<td>$100,000 per year for up to 2 years.</td>
</tr>
<tr>
<td>Partnerships for Health Systems Improvement</td>
<td>The PHSI funding program supports teams of researchers and decision-makers/knowledge-users interested in conducting applied and policy-relevant health systems and services research that respond to the needs of healthcare decision-makers. Partnerships can be project specific (partners that the researchers identify themselves) or competition specific (CIHR negotiated competition partnerships). This funding opportunity requires pre-defined financial or in kind partner contributions.</td>
<td>2005</td>
<td>Investigator Initiated</td>
<td>$400,000 for up to 3 years. Plus, a minimum of either 20% or 30%, depending on the province or territory, of the grant budget must come from external partner sources (i.e., non-CIHR funds)</td>
</tr>
<tr>
<td>Industry Partnered Collaborative Research</td>
<td>Encourage and facilitate mutually beneficial university-industry collaborations in health research; stimulate the health research activities of private sector and promote economic development through health research in Canada.</td>
<td>2011</td>
<td>Investigator Initiated</td>
<td>$250,000 per year for up to 5 years.</td>
</tr>
<tr>
<td>Program</td>
<td>Description</td>
<td>Year</td>
<td>Funding Details</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>eHealth Innovation Partnership Program</td>
<td>Develop, integrate and evaluate eHealth innovations, in collaboration with stakeholders, that will improve the cost-effectiveness of patient and population-centred care using an integrated science approach that incorporates consideration of ethical, legal and social implications; and Increase Canada's competitive position in the health-related ICT industry</td>
<td>2012</td>
<td>Priority-driven / strategic</td>
<td>$500,000 up to $1.5 million over 4 years. Half of this funding will come from industry and/or industry support organizations, economic development agencies and other health funding agencies.</td>
</tr>
</tbody>
</table>
Appendix B.

Interview sampling and recruitment process

B.1. Sampling strategy

My original target number of interviews was 8 – 12, given:

1) My research interests and questions (better enables comparing/contrast ing boundary theories in IKT by adding data from participants doing IKT outside of the in-depth, single case),

2) My relatively short time frame and available resources, and

3) The general expectations of a master’s project in our School of Communication and broader field.

I assumed 1 in 5 potential participants contacted would proceed to completing an interview, so planned to send invitations to 75 potential participants (5 x 12 = 60, +15 extra = 75).

This list of ~75 potential participants was constructed based on the rationale below.

Table B1. Criteria and steps for sample population

<table>
<thead>
<tr>
<th>Criteria / Step</th>
<th>Justification / Rationale / Why?</th>
<th>Citation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Limit</td>
<td>- It's where I currently live, study and research</td>
<td>(e.g. Smith &amp; Stewart, 2016; Ward, 2016).</td>
</tr>
<tr>
<td>participants to</td>
<td>- Canada is a world leader in the push for KT and IKT</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Limit to</td>
<td>- Medicine is one of the most-studied contexts for general knowledge translation to date</td>
<td>(Azimi et al., 2015, p. 98).</td>
</tr>
<tr>
<td>health</td>
<td>- In part, because there is a perceived “ethical urgency”</td>
<td>(Bowen &amp; Graham, 2013, p. S3; Solomon, 2010).</td>
</tr>
<tr>
<td>research</td>
<td>- Health research can provide particularly striking cases of clashing paradigms</td>
<td>(Bowen &amp; Graham, 2015)</td>
</tr>
<tr>
<td>3. Limit to</td>
<td>- This excludes more informal, organic integrated knowledge translation projects, and projects</td>
<td>(Bourgon, 2015)</td>
</tr>
<tr>
<td>CIHR-funded</td>
<td>funded through other means. These are still forms of IKT, but are outside the scope of my</td>
<td></td>
</tr>
<tr>
<td>IKT-specific</td>
<td>thesis.</td>
<td></td>
</tr>
<tr>
<td>research</td>
<td>- I made this choice because CIHR is the primary health research funder in Canada. It means the researchers on the list have – at least in their grant proposals – proposed a vision of IKT somewhat in line with CIHR’s, and provides interesting opportunities to observe how they’ve proceeded to operationalize an explicit IKT approach in practice.</td>
<td></td>
</tr>
<tr>
<td>4. Remove</td>
<td>- Following Gagliardi et al., (2016), I am focusing on integrated knowledge translation for</td>
<td>(Gagliardi et al., 2016)</td>
</tr>
<tr>
<td>recipients of</td>
<td>public/social application, and excluding integrated knowledge translation for primarily</td>
<td></td>
</tr>
<tr>
<td>the following</td>
<td>commercial</td>
<td></td>
</tr>
<tr>
<td>Criteria / Step</td>
<td>Justification / Rationale / Why?</td>
<td>Citation(s)</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>grants: • Knowledge Synthesis • Industry Partnered Collaborative Research</td>
<td>purposes. - I also excluded the Knowledge Synthesis grant because, although it involves collaborative work, the activities involved are primarily synthesizing existing research as opposed to conducting original research.</td>
<td>(Kothari et al., 2011)</td>
</tr>
<tr>
<td>5. Limit to those grants awarded in 2011, 2012, and 2013</td>
<td>- The case study project initially received PHSI funding in 2012. By limiting the timeframe for interviewees to a similar grant-awarding period, I hope to be able to more meaningfully compare and contrast across the different projects. Kothari et al. (2011) found very different characteristics and indicators of success for early versus mature partnerships. So, limiting the time frame in this way means participants are more likely to be in similar research stages to each other and to the in-depth case (although, this is by no means guaranteed). - This time frame (2011 – 2013) also means projects are established enough (2-4 years post-grant submission) to have experienced many different aspects/stages of the collaborative research process. - This choice excludes developing early-stage partnerships, to focus on more mature partnerships. Based on this early-mature distinction, Bowen, Graham and Huebner (2016) focused on early partnerships (in grant development and proposal stages). However, they suggest work focusing explicitly on mid-stage and mature partnerships is needed. This research responds to this need.</td>
<td>(Bowen, Botting, Graham, &amp; Huebner, 2016)</td>
</tr>
<tr>
<td>7. Remove duplicate PIs</td>
<td>- Some PIs are listed twice because they concurrently hold more than one grant and/or type of grant within the time period.</td>
<td></td>
</tr>
<tr>
<td>8. Balance the list for proportional representation by grant type and province</td>
<td>- Calculated proportion by province: - I used the CIHR Research Information System to export CSV files for regional data on the following awards:* - Knowledge to Action (Including targeted programs) - Partnerships for Health System Improvement (PHSI) - eHealth Innovations (Including targeted programs/Catalyst grants) - Then, I divided the number of awards per province by the total number of recipients per award to get the proportion of winners per award for each province.</td>
<td></td>
</tr>
</tbody>
</table>

161
<table>
<thead>
<tr>
<th>Criteria / Step</th>
<th>Justification / Rationale / Why?</th>
<th>Citation (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Next, I did a weighted average (based on numbers of awards per grant type) of each provincial proportion to created pooled average proportions by province for all awards (Ontario 38%, New Brunswick 1%, Newfoundland and Labrador 1%, Quebec 23%, Manitoba 3%, Nova Scotia 5%, Saskatchewan 1%, Alberta 9%, British Columbia 19%).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Then, I created a contingent target number of interviews by province based on the proportional number of winners from each province, to get a “representative” sample. Entering a different target number of interviews would shift the number of participants required by province proportionally.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Proportion by award:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Based on the CIHR Research Information System data,* I also calculated targets based on type of award held during the sample years (PHSI 57%, Knowledge to Action 35%, eHIPP 9%).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- I created a contingent target number of interviews by province based on the promotional number of winners from each province, to get a “representative” sample. Entering a different target number of interviews would shift the number of participants required by award proportionally.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Limitation: Because of the database functionality, I exported data based on all award years and not only the sample years. While it is reasonable to assume that the proportion of awards in 2011-2013 inclusive were similar to the total numbers of awards, I do not know for sure.

| 9. Draw from each category randomly to construct contact list | To construct the final sample list, I assigned random numbers to each potential participant, sorted by number, and then selected from the top down until reaching the correct proportions for provincial and grant-type representation.                                                                                                                                                                                                                                                         |              |
| 9. Add convenience-based potential participants            | Potentially leveraging personal connections, research literature, supervisory committee connections, and/or snowball sampling to add participants, depending on data collection and if the above sampling strategy seems insufficient for questions that arise over the course of research.                                                                                                                                                                                                             |              |
|                                                              | This was done with the four post-doctoral researchers whom PIs referred me to                                                                                                                                                                                                                                                                                                                                                                  |              |
B.2. Recruitment process

Table B2. Recruitment results

<table>
<thead>
<tr>
<th>Researchers Identified</th>
<th>Contacted by email</th>
<th>Responded</th>
<th>Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>49</td>
<td>29</td>
<td>20</td>
</tr>
</tbody>
</table>

- Stopped emailing once 20 interviews was reached, because of the time and resources constraints, and because it was well above the original 8-12 target

- Of the 9 who did not proceed to interviews, three declined (being too busy or away on sabbatical), three offered to connect me to someone else on the study (one of those snowball recommendations never responded), one offered to answer questions via email, and two suggested I suggesting to re-contact them later if I did not reach my target number of interviews

B.2.1. Recruitment invitation email

Dear Dr. [NAME],

I am a master’s student at Simon Fraser University studying how diverse groups work together to conduct, share and use research.

I am writing to invite you to participate in my study, which is titled *Challenging knowledge divides: Communicating, questioning and co-creating expertise in collaborative research*.

If you’re willing to participate, it would involve answering a few interview questions over the phone, and would take no more than an hour of your time.

My goal is to better understand the experiences of people doing research that involves stakeholders from outside academia throughout the research process.

I’m contacting you because you are listed as the principal investigator on the [TYPE] grant, [TITLE OF PROJECT] I hope that the information I might gain by interviewing you will help me identify benefits and challenges associated with these kinds of complex research partnerships, and that this information could help minimize similar challenges in the future. Please see the attached consent form for additional study details, and feel free to contact me if you have any questions.

Please let me know if you are willing to participate in an interview, and if so, what 3 dates and times would be most convenient for you over the next month. If we don’t connect in the next couple weeks, I’ll follow up by email.

Thank you for your time.

Sincerely,

Christine Ackerley
**B.2.2. Proportional sampling**

Speaking with 20 participants resulted in achieving the following targets based on provincial proportions of award winners, type of grant, and gender, compared to the number I interviewed.

<table>
<thead>
<tr>
<th>Region</th>
<th>Proportional Target</th>
<th>Number Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>British Columbia</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Manitoba</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ontario</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Quebec</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Yukon, Nunavut, Northwest Territories</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grant</th>
<th>Proportional Target</th>
<th>Number Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnerships for Health Systems Innovation</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Knowledge to Action</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>eHealth Innovation Partnership Program</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Proportional Target</th>
<th>Number Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>
Appendix C.

Interview participant information

Table C1. Interview participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>Grant</th>
<th>ID</th>
<th>Primary role in project</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>PHSI</td>
<td>1010</td>
<td>PI</td>
</tr>
<tr>
<td>M</td>
<td>eHIPP</td>
<td>1017</td>
<td>PI – But identifies primarily as a clinician</td>
</tr>
<tr>
<td>F</td>
<td>eHIPP (&amp; KAL)</td>
<td>1012</td>
<td>PI</td>
</tr>
<tr>
<td>M</td>
<td>KAL</td>
<td>1007</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1008</td>
<td>Post-Doc</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1019</td>
<td>Post-Doc</td>
</tr>
<tr>
<td>M</td>
<td>PHSI</td>
<td>1013</td>
<td>PI</td>
</tr>
<tr>
<td>M</td>
<td>KAL</td>
<td>1016</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1009</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>KAL</td>
<td>1005</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>KAL</td>
<td>1011</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>KAL</td>
<td>1001</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1006</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1002</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1003</td>
<td>Post-Doc</td>
</tr>
<tr>
<td>M</td>
<td>PHSI</td>
<td>1004</td>
<td>PI</td>
</tr>
<tr>
<td>M</td>
<td>PHSI</td>
<td>1018</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1015</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1015</td>
<td>PI</td>
</tr>
<tr>
<td>F</td>
<td>PHSI</td>
<td>1020</td>
<td>Post Doc</td>
</tr>
</tbody>
</table>
Appendix D.

Interview guide

1. Can you tell me a little about the [GRANT] you and your team [are/were] working on?
   a. What initially motivated you to apply?
   b. What was the grant-writing process like for your team?
   c. What was your role in the project?
   d. What stage is the project currently at?
   e. [If completed] How do you feel about the end results of the project?

2. What kinds of [stakeholders/partners/knowledge-users/preferred term] from outside of academia [are/were] you working with? Can you describe them?
   a. What professional and academic backgrounds do they have?
   b. Were they involved with your research work? If so, how?
   c. How often do/did you interact with each different [stakeholder/partner/knowledge-user/preferred term]? Please elaborate with examples.
   d. How do/did you communicate with them? Meetings, email, etc.?
   e. When working on the project, did you experience any challenges communicating or reaching shared understandings?
      i. If so, did you have any strategies to overcome them?
      ii. If not, why do you think you didn’t?
   f. I’m also interested in the nature of different collaborators’ roles in the project – how would you describe role flexibility or clarity? (In other words, the extent to which collaborators’ roles were overlapping, clearly defined, or something else?)

3. When you’re doing research with people from so many different academic and/or professional backgrounds than you how do you try and share your specialized expertise with each other?
   a. Any strategies?
   b. Major challenges?
   c. Failures/misunderstandings?
   d. Tools to communicate successfully?
   e. Examples/stories?

4. Have/did you experience benefits of collaborating with co-investigators outside academia? If so, what were they? On the flipside, have you experienced
challenges in collaboration? If so, what kinds? Did you overcome them? If so, how? If not, why not?

5. Do you fund having the formal structure of the [GRANT] makes this project any different from your other funded projects?

6. What motivates you personally to do this kind of research?

7. Have you heard the term integrated knowledge translation very often?
   a. If yes, what does it mean to you?
   b. Would you use it to describe any of your work?

8. Has any knowledge-to-action research or theory been useful to you in informing your work?
   a. Why or why not?
   b. [If so, what work in particular and why?]

9. Over the course of your career, have you observed any changes in awareness about these kinds of participatory approaches to research? (also, have you observed any change in messaging or focus from research funders?)

10. Have you come across any people who are sceptical or critical of including knowledge-users in each step of the research process? If so, what do they say?

11. Is there anything else you would like to add or talk about?

12. Would you like to see a finished copy of the thesis or be updated in any other ways about my research?
Appendix E.

Case study data sources

Table E1. List of participant observation fieldnotes

<table>
<thead>
<tr>
<th>Fieldnote</th>
<th>Date Recorded</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB01</td>
<td>16-10-27</td>
<td>Team meeting</td>
</tr>
<tr>
<td>OB02</td>
<td>16-10-31</td>
<td>Weekly rounds</td>
</tr>
<tr>
<td>OB03</td>
<td>16-10-14</td>
<td>Advisory committee meeting</td>
</tr>
<tr>
<td>OB04</td>
<td>16-11-27</td>
<td>Team meeting</td>
</tr>
<tr>
<td>OB05</td>
<td>16-12-13</td>
<td>Team meeting</td>
</tr>
<tr>
<td>OB06</td>
<td>17-01-16</td>
<td>Team meeting</td>
</tr>
<tr>
<td>OB07</td>
<td>17-01-23</td>
<td>Patient info session</td>
</tr>
<tr>
<td>OB08</td>
<td>17-02-06</td>
<td>Advisory committee meeting</td>
</tr>
<tr>
<td>OB09</td>
<td>17-04-03</td>
<td>SPOR Training</td>
</tr>
<tr>
<td>OB10</td>
<td>17-04-04</td>
<td>Team meeting</td>
</tr>
<tr>
<td>OB11</td>
<td>17-04-11</td>
<td>SPOR Training</td>
</tr>
<tr>
<td>OB12</td>
<td>17-04-12</td>
<td>SPOR Training</td>
</tr>
<tr>
<td>OB13</td>
<td>17-03-01</td>
<td>Weekly rounds</td>
</tr>
<tr>
<td>OB14</td>
<td>17-05-17</td>
<td>Team meeting</td>
</tr>
</tbody>
</table>

Table E2. List of internal and external project documents

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001</td>
<td>Project Business Case</td>
<td>D014</td>
<td>PHSI grant application</td>
</tr>
<tr>
<td>D002</td>
<td>Briefing note</td>
<td>D015</td>
<td>eHIPP grant application</td>
</tr>
<tr>
<td>D003</td>
<td>Article Manuscript</td>
<td>D016</td>
<td>Article Manuscript</td>
</tr>
<tr>
<td>D004</td>
<td>Conference abstract</td>
<td>D017</td>
<td>Conference abstract</td>
</tr>
<tr>
<td>D005</td>
<td>Conference abstract</td>
<td>D018</td>
<td>Conference abstract</td>
</tr>
<tr>
<td>D006</td>
<td>Conference abstract</td>
<td>D019</td>
<td>Poster presentation</td>
</tr>
<tr>
<td>D007</td>
<td>Article Manuscript</td>
<td>D020</td>
<td>Poster presentation</td>
</tr>
<tr>
<td>D008</td>
<td>Slide deck</td>
<td>D021</td>
<td>Website text</td>
</tr>
<tr>
<td>D009</td>
<td>Workshop materials</td>
<td>D022</td>
<td>Patient engagement plan</td>
</tr>
<tr>
<td>D010</td>
<td>Slide deck</td>
<td>D023</td>
<td>Email threads</td>
</tr>
<tr>
<td>D011</td>
<td>Workshop materials</td>
<td>D024</td>
<td>FOI requests and releases</td>
</tr>
<tr>
<td>D012</td>
<td>Workshop materials</td>
<td>D025</td>
<td>Meeting Minutes</td>
</tr>
<tr>
<td>D013</td>
<td>Press release</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F.

NVivo Nodes & positional map axes

Grounded theory coding (Strauss & Corbin, 1990) was conducted in conjunction with situational analysis mapping (Clarke, 2005). Strauss and Corbin (1990) suggested three coding stages: open (initial labels and grouping), axial (relationships between categories), and selective coding (core category established).

F. 1. Open code examples

In open coding, events, actions and interactions in the data are compared with others for similarities and differences and given conceptual labels (Corbin & Strauss, 1990). Open coding happens through multiple re-readings of the texts. Then, conceptually similar “events/actions/interactions” are grouped together to form categories and subcategories (Corbin & Strauss, 1990, p. 12).

Some examples of initial open code labels and groupings from this stage of analysis include (but were not limited to) those in Figure F1. Open code labels (p. 165).
Figure F1. Example of open codes and category grouping
F. 2. Second-round coding: NVivo Node structure

Open and axial coding alongside situational mapping exercises prompted many subsequent re-readings, to further explore possible labels, categories, and relationships between categories.

The resulting categories were explored in analytic memos. Based on the analytic memos, a second round of more focused coding was conducted.

The NVivo node coding structure from this second round of more focused coding is described in Table F2 below. The descriptions apply both to data from interviews, and from case study observations.

Table F2. Focused coding NVivo node structure and descriptions

<table>
<thead>
<tr>
<th>Node</th>
<th>Description of Node</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOUNDARIES</strong></td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>Aggregate: Examples/stories/instances where differences lead to discontinuities in action and interaction</td>
</tr>
<tr>
<td>Expertise boundaries</td>
<td>Specialized knowledge/expertise has lead to discontinuities in action and interaction (e.g. not being able to understand someone in another field; bringing in outside expertise to add required knowledge to the team)</td>
</tr>
<tr>
<td>Role boundaries</td>
<td>Roles for people and organizations involved in the IKT project specifically, and the social worlds in general, are discussed or defined as bounding actions (e.g. the expected role of a PI; the desired role of research funders; the role of the university; the roles of various professions in IKT discourse)</td>
</tr>
<tr>
<td>Delimiting research</td>
<td>When research (as an activity, concept, and knowledge-production method) is separated and defined</td>
</tr>
<tr>
<td>Other</td>
<td>Examples where differences lead to discontinuities in action and interaction that do not fit in the above child-nodes (e.g. moral boundaries of ethical research; temporal and geographic boundaries)</td>
</tr>
<tr>
<td>Boundary drawbacks</td>
<td>Aggregate: problems, issues and concerns discussed/experienced to stem from various types of boundaries that hinders IKT success (<em>however success is defined by that participant / case</em>)</td>
</tr>
<tr>
<td>Lack of respect</td>
<td>Falling to respect boundaries is discussed as a problem (e.g. not respecting a groups’ expertise; not valuing professionals’ tacit skills; not respecting research from a different discipline)</td>
</tr>
<tr>
<td>Lack of boundary clarity</td>
<td>Boundaries are discussed/experienced as unclear, and the lack of clarity is seen as a problem (e.g. confusion caused by poorly defined roles; ethical issues about who is responsible for what data)</td>
</tr>
<tr>
<td>Create conflict</td>
<td>The discontinuities in action/interaction created by boundaries cause conflict for the IKT project (e.g. disagreements over research methods; arguments about desirable expectations and goals)</td>
</tr>
<tr>
<td>Limiting/narrowing</td>
<td>The confines of knowledge boundaries are discussed/experienced as limiting or narrowing perspectives in a harmful way (e.g. having blinders on; failing to appreciate complexity and producing one-dimensional and ineffective solutions)</td>
</tr>
<tr>
<td><strong>Boundary benefits</strong></td>
<td>Aggregate: advantages and desirability perceived/experienced to stem from various types of boundaries that help IKT success (<em>however success is defined by that participant / case</em>)</td>
</tr>
<tr>
<td><strong>Boundaries as expertise</strong></td>
<td>Expertise is discussed as necessarily bounded and valuable (e.g. takes years of lived experience to build professional expertise; academic training and specialization as expertise; peer-review structures)</td>
</tr>
<tr>
<td><strong>Boundaries as order</strong></td>
<td>Clear, well-defined boundaries are discussed/experienced as creating productive structures to facilitate IKT (e.g. knowing who is responsible for what tasks; writing job descriptions for partners; producing memos of understanding as valuable)</td>
</tr>
<tr>
<td><strong>Boundaries as identity</strong></td>
<td>Boundaries are discussed/experienced as ways to build individual/organizational identity (e.g. drawing on unique personal history; self-identifying as in a bounded group or spanning bounded groups)</td>
</tr>
<tr>
<td><strong>Boundary approaches</strong></td>
<td>Aggregate: strategies to optimize/minimize the discussed/experienced benefits/drawbacks of boundaries for IKT success (<em>however success is defined by that participant / case</em>)</td>
</tr>
<tr>
<td><strong>Respect/accept</strong></td>
<td>Respecting and/or accepting various boundaries is discussed/experienced as a strategy to optimize boundary benefits and/or minimize drawbacks (e.g. it is important to respect what each unique group brings to the table)</td>
</tr>
<tr>
<td><strong>Manage</strong></td>
<td>Continuous management and handling is discussed/experienced as a strategy to optimize boundary benefits and/or minimize drawbacks (e.g. systematically ask clarifying questions to track and manage perceptions of boundaries, hold routine meetings to minimize boundaries between separate working groups)</td>
</tr>
<tr>
<td><strong>Recognize</strong></td>
<td>Explicitly recognizing boundaries (seen as either existing/innate or constructed) in contrast to ignoring boundaries is discussed/experienced as a strategy to optimize boundary benefits and/or minimize drawbacks (e.g. seeing that different groups have different needs; using different language with different people)</td>
</tr>
</tbody>
</table>
Explicitly questioning and challenging boundaries (seen as either existing/innate or constructed) in contrast to accepting boundaries is discussed/experienced as a strategy to optimize boundary benefits and/or minimize drawbacks (e.g. challenging the value of academic expertise; questioning who should set research questions).

<table>
<thead>
<tr>
<th>Challenge/question</th>
<th>COLLABORATION / COLLECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Perceptions / concept of</strong></td>
</tr>
<tr>
<td></td>
<td><strong>collaboration</strong></td>
</tr>
<tr>
<td></td>
<td>Descriptions or definitions of</td>
</tr>
<tr>
<td></td>
<td>what collaboration means in</td>
</tr>
<tr>
<td></td>
<td>integrated knowledge translation</td>
</tr>
<tr>
<td></td>
<td>(e.g. working together to a</td>
</tr>
<tr>
<td></td>
<td>shared goal; all having a stake in</td>
</tr>
<tr>
<td></td>
<td>the outcome of the project;</td>
</tr>
<tr>
<td></td>
<td>bringing unique expertise)</td>
</tr>
<tr>
<td></td>
<td><strong>Experiences</strong></td>
</tr>
<tr>
<td></td>
<td>Described/observed experiences of</td>
</tr>
<tr>
<td></td>
<td>collaboration in integrated</td>
</tr>
<tr>
<td></td>
<td>knowledge translation (e.g. feeling</td>
</tr>
<tr>
<td></td>
<td>about the process; motivations</td>
</tr>
<tr>
<td></td>
<td>and expectations to do IKT work</td>
</tr>
<tr>
<td></td>
<td>vis a vis experience; perceptions</td>
</tr>
<tr>
<td></td>
<td>of the results/outcomes)</td>
</tr>
<tr>
<td></td>
<td><strong>Problems</strong></td>
</tr>
<tr>
<td></td>
<td>Described/observed problems</td>
</tr>
<tr>
<td></td>
<td>encountered during process of</td>
</tr>
<tr>
<td></td>
<td>collaboration that inhibit IKT</td>
</tr>
<tr>
<td></td>
<td>success (however success is</td>
</tr>
<tr>
<td></td>
<td>defined by that participant / case )</td>
</tr>
<tr>
<td></td>
<td>(e.g. frustrations with lack of</td>
</tr>
<tr>
<td></td>
<td>clarity; politics between groups;</td>
</tr>
<tr>
<td></td>
<td>lack of resources)</td>
</tr>
<tr>
<td></td>
<td><strong>Strategies/solutions</strong></td>
</tr>
<tr>
<td></td>
<td>Described/observed solutions to or</td>
</tr>
<tr>
<td></td>
<td>strategies to mitigate problems</td>
</tr>
<tr>
<td></td>
<td>encountered during process of</td>
</tr>
<tr>
<td></td>
<td>collaboration that inhibit IKT</td>
</tr>
<tr>
<td></td>
<td>success (however success is defined</td>
</tr>
<tr>
<td></td>
<td>by that participant / case) (e.g.</td>
</tr>
<tr>
<td></td>
<td>sign contract with partners;</td>
</tr>
<tr>
<td></td>
<td>encourage clear lines of</td>
</tr>
<tr>
<td></td>
<td>communication; embrace conflicts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMMUNICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceptions / concept of communication</strong></td>
</tr>
<tr>
<td><strong>Experiences</strong></td>
</tr>
<tr>
<td><strong>Problems</strong></td>
</tr>
<tr>
<td><strong>Strategies/solutions</strong></td>
</tr>
<tr>
<td><strong>Temporality</strong></td>
</tr>
<tr>
<td><strong>Media / formats used</strong></td>
</tr>
<tr>
<td>CONCEPTUAL TOOLS</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Two-communities?</td>
</tr>
<tr>
<td>Implicit</td>
</tr>
<tr>
<td>Explicit</td>
</tr>
<tr>
<td>Boundary work?</td>
</tr>
</tbody>
</table>
F. 3. Positional map axes selection process

The process of settling on the two axes for the positional map consisted of much experimentation producing many iterations and possibilities, with analytic memoing throughout. I ended up experimenting with an analogue solution: swapping out possible axis and mapping positions using post-it notes and paper to experiment with how the data would fall on various axes in different combinations. The resulting iterations were labelled, dated and saved.

Figure F3. Photograph of paper-based approach to axes iteration
Some (but not all) of the other axes I experimented with were the degree to which (on a scale of more or less so):

- Integrated knowledge translation is understood as an beneficial evolution of research practices
- Researchers and non-researchers are understood as comprising two different communities
- Communication is understood as a process of information transfer
- Communication is understood as a process of information transformation
- More communication is seen as better (for IKT)
- Maintaining boundaries is seen as vital (for IKT)
- Boundaries can be changed
- Boundaries are set in advance
- Existing boundaries should be adapted to
- Boundaries are problematic barriers in IKT
- Boundaries are productive facilitators in IKT
- Communication is a barrier to integrated knowledge translation
- Communication is a facilitator of integrated knowledge translation
- Problems are complex and solutions cannot be bounded
- The only way to solve problems is by defining and solving pieces of them (reductionist approach)
- Dissolving boundaries is important
- Blurring boundaries is important
Appendix G.

Example maps

Figure G1. Example of messy situational map
Figure G2. Example of social worlds/arenas map for IKT situations
Appendix H.

Key concepts operationalization

H.1. Boundaries (in general)

Following Akkerman and Bakker (2011, p. 152): In this thesis, boundaries are defined from an STS perspective as “sociocultural differences leading to discontinuities in action and interaction.”

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Rationale / explanation</th>
<th>Citation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociocultural differences</td>
<td>In the literature, most boundaries are identified in terms of social and/or cultural difference. For example, Clark et al. (2011) identified boundaries between: - New discoveries and established knowledge, - Research disciplines, - Context-specific and generalizable research, - Scientists and national policy-makers, Lamont and Molnar (2002) similarly identify both symbolic and social boundaries: “Symbolic boundaries also separate into groups and generate feelings of similarity and group membership. They are an essential medium through which people acquire and monopolize resources. Social boundaries are objectified forms of social differences manifested in unequal access to and unequal distribution of resources (material and nonmaterial) and social opportunities… Only when symbolic boundaries are widely agreed upon can they take on a constraining character and pattern social interaction in important ways” (p. 168-169)</td>
<td>(Akkerman &amp; Bakker, 2011, p. 152)</td>
</tr>
<tr>
<td>Leading to discontinuities in action or interaction</td>
<td>This is important because many studies seem to use the term boundaries when discontinuities are expected or could exist – based on differences in groups - rather than where boundaries are empirically detected. This can lead to a problematic conceptualization of boundaries, namely one that completely resides in the existence of sociocultural differences but does not manifest in any perceivable consequences. “We therefore stress that boundaries, as a meaningful analytical concept, are about sociocultural differences leading to discontinuities rather the about sociocultural diversity per se. Defining boundaries in this way, it become clear how</td>
<td>(Akkerman &amp; Bakker, 2011, p. 152):</td>
</tr>
</tbody>
</table>
boundaries are real in their consequences, yet it also makes clear the boundaries are malleable and dynamic." (Akkerman & Bakker, 2011, p. 152).

The term is not meant to describe an authoritative or artificial border placed by others; the boundary refers to a place of encounters and interactions. (Shanahan, 2016)

These discontinuities are not inherently “good” or “bad”

Boundaries can have various properties and exist through various mechanisms. As such, the discontinuities they create may be helpful and/or harmful, depending on the circumstances and goals.

H.2. Integrated knowledge translation

In this thesis, integrated knowledge translation is defined as collaboration between academic researchers and the ultimate users of the research evidence in a mutually beneficial research project or programme of research, for the purpose of producing research that will be used in applied decision-making and action.

Basis for my operational definition: “The development of a relationship between academic researchers and practitioners and/or policymakers for the purposes of collaboratively engaging in a mutually beneficial research project or programme of research” (Kothari & Wathen 2013, p. 188).

Modifications:

Removed – “development of a relationship” (see explanation below)

Changed - “and practitioners and/or policymakers” – inspired by CIHR’s “ultimate users of knowledge” (which they patients and the public, policy-makers, health system managers, healthcare professionals, industry or others inside or outside of the healthcare system), I opted for “ultimate users of research evidence” to include patients and the public, and avoid the problematic confluations between knowledge and research evidence.

Added – for the purpose of producing research that will be used applied decision-making and action.

I am also interested in how participants themselves operationalize integrated knowledge translation, and how they position it in relation to similar terms. Many other labels or terms also encompass these attributes to varying degrees, including: co-production of knowledge, participatory research, linkage and exchange, Mode 2 knowledge production, engaged scholarship, and community based research (Bowen and Graham, 2012; Denis and Lomas, 2003; Gibbons et al., 1994; Jogash et al., 2012; Macaulay et al., 1999, Salsberg et al., 2014).

These attributes (below) are based on a paper by Gagliardi et al., (2016, p. 1), who reviewed how integrated knowledge translation was operationalized in the literature.
Following these authors, I am concerned with defining integrated knowledge translation by who initiates the collaboration (academic/non-academic), the numbers of people or organization involved, the timelines of the projects, or the presence of secondary goals in addition to facilitating research use.

<table>
<thead>
<tr>
<th>Attribute of IKT</th>
<th>Rationale / explanation</th>
<th>Citation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It involves collaboration between academics and non-academics throughout the research process</td>
<td>Although participants very likely operationalize “throughout” and “collaboration” differently, some conceptualization of these ideas has to be present in discussion of the research project/programme. I define collaboration as “working jointly on an activity, especially to produce or create something”</td>
<td>(Kothari &amp; Wathen, 2013, p. 187) (Graham et al., 2014)</td>
</tr>
<tr>
<td>With the goal of producing research (and not only products, programs or services, quality improvements, evaluations, empowerment and/or social justice for participants – although these goals may exist alongside the primary goal of producing research)</td>
<td>There are many overlaps between integrated knowledge translation and related collaborative research approaches in terms of the processes involved. So, a key distinguishing factor becomes the primary end goal. In the case of integrated knowledge translation, the primary end goal is to facilitate research use by producing more relevant research evidence (e.g. as opposed to social justice, empowerment, systems change, and/or design).</td>
<td>(Gagliardi et al., 2016, p. 1)</td>
</tr>
<tr>
<td>Its ultimate aim is support use of research findings in practice or policy decisions and actions – with the assumption this will improve practice and help people make better decisions</td>
<td>A key assumption of integrated knowledge translation is that using relevant research evidence to inform decisions and action will achieve better results. Integrated knowledge translation aims to achieve this goal by simultaneously “making users aware of research evidence and researchers aware of information needs of society”</td>
<td>(Kothari &amp; Wathen, 2013, p. 188) (Bourgon, 2015)</td>
</tr>
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<td>It is a process</td>
<td>Some definitions, such as Kothari and Wathen (2013) define integrated knowledge translation as the “development of a relationship between…,” but I think operationalizing integrated knowledge translation involves looking at the process that happens during and after developing the relationship. Process is defined as “a series of actions or steps taken in order to achieve a particular end”, which maintains the goal-oriented nature of integrated knowledge translation, and I think stays truer to the literature. Whether the emphasis in integrated knowledge translation should be on collaboration as an ends or a means to an ends remains controversial, but in the</td>
<td>(Kothari &amp; Wathen, 2013, p. 188) (Bourgon, 2015)</td>
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In the integrated knowledge translation literature, the dominant view is unquestionably of IKT as a means to an end. It involves (a flexible view of) collaboration, but one that is not only end-of-grant knowledge translation.

| It involves (a flexible view of) collaboration, but one that is not only end-of-grant knowledge translation | CIHR identifies the minimum requirements for a project to count as integrated knowledge translation as when academic and non-academic collaborators work together to:
1) shape the research questions,
2) interpret the study findings and craft messaging around them
3) move the research results into practice |
| | CIHR adds that integrated knowledge translation projects may also include working together to deciding on the methodology, help with data collection, tools development, selection of outcome, and achieve widespread dissemination and application. However, these are not required. |
| | Similarly, Gagliardi et al. (2015) operationalize IKT as including one or more of these functions for non-academic collaborators: establishing the research questions, deciding on the methodology, recruiting and/or collecting the data, interpreting the results, and disseminating the findings implementing the findings |
| | “Decision-makers could take part in one or more of these functions but not solely in dissemination or implementation.” (Gagliardi et al., 2016, p. 3) |

| It addresses problems of relevance to knowledge-users by producing research, and focuses on application (of the research findings) in real world contexts | Ultimately, knowledge-users’ / stakeholders’ interests and priorities are the main driver in setting the research agenda. |
| | Mutual benefit (at least potentially) is key to the discourse of IKT, where all participants in the research project stand to gain something of value. |
| Its participants all see (potential) benefits of participating | The ideal vision of integrated knowledge translation is |

(Bourgon, 2015)

(Kothari & Wathen, 2013, p. 188)

(Kothari & Wathen, 2013, p. 187)

(Graham et al., 2014, p. 11)
H.3. Boundary work

In this thesis, boundary work is defined as the “process through which actors and organisations demarcate and coordinate boundaries around epistemic authority, including the individuals and forms of knowledge/expertise deemed legitimate representatives of that authority.” (Edge & Eyles, 2014, p. 286)

<table>
<thead>
<tr>
<th>Attribute of boundary work</th>
<th>Rationale / explanation</th>
<th>Citation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is done by actors and organizations</td>
<td>Boundary work is an activity that actors undertake – it doesn’t exist by itself or separate from the people who do it</td>
<td>(Gieryn, 1983)</td>
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<tr>
<td>It advances somebody’s interests</td>
<td>It can achieve closure to alternative interpretations</td>
<td>(Friman, 2010)</td>
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</table>

When doing boundary work, people use “ideological strategies and epistemological positions” whereby agents...aim to justify their own position and the strategies they use to maintain or improve it, while at the same time discrediting the holders of the opposing position and strategies” (Bourdieu, p. 19, 22, 40).
It is the various processes (usually rhetorical) which episodically establish, sustain, enlarge, police, breach, and sometimes erase boundaries in the defense, pursuit, or denial of epistemic authority

(Gieryn, 1983)

It is motivated by “disputes over credibility” (Gieryn, 1999, p. 340)

It “takes place in settings where tacit assumptions about the contents of science are forced to become explicit: where credibility is contested, where regnant assumptions about boundaries suddenly appear murky or inapplicable; and - most important - where allocations of epistemic authority are decided and consequentially deployed."

“For example, people engage in boundary work involving boundary-defining acts of exclusion, which serves to construct and maintain distinctions between themselves and others (Lamont 1992, Abbott 1995)."

(Gieryn, 1999, p. 24)

(Barrett et al., 2012, p. 1450)

It can achieve various goals

Gieryn identifies three functions/goals of boundary work: 1) expulsion, 2) expansion, 3) protection of autonomy

(Gieryn, 1999, pp. 15–17)

Doing boundary work helps people make sense of their world and their place in it

(Gieryn, 1999)

H.4. Boundary objects

In this thesis, boundary objects are defined as either concrete, material artefacts (such as specimens, field notes, and maps) or abstract ideas/concepts (such as partnership) that are used in different ways by different communities to support collaborative work, especially in the absence of consensus. Boundary objects are plastic, interpreted differently across communities but still robust enough to maintain a common identity across these sites.

They key question underlying the development of a concept of boundary objects was: “how do heterogeneity and cooperation coexist, and with what consequences for managing information?” (Star & Griesemer, 1989, p. 414). Importantly, the concept of boundary objects is paired with the concept of standardization.

<table>
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<td>They take two forms – specific and vague.</td>
<td>Basically, all this means is that the duality of being both vague and specific is a fundamental characteristic of a</td>
<td>(Star, 2010, pp. 604–605)</td>
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</table>
They are tied to ideas of standardization.

**boundary** object. If that duality stops or changes, then the particular object ceases to be a boundary object and becomes something else.

From the literature:

“Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites.”

“They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation”

“When necessary, the object is worked on by local groups who maintain its vaguer identity as a common object, while simultaneously making it more specific, more tailored to local use within a social world, and therefore useful for work that is NOT interdisciplinary.”

Groups that are cooperating without consensus **tack back-and-forth between both forms of the object.**

“They are weakly structured in common use, and become strongly structured in individual site use”

“For example, when the movement between the two forms either scales up or becomes standardized, then boundary objects begin to move and change into infrastructure, into standards (particularly methodological standards), and into things and yet other processes”

“Over time, people (often administrators or regulatory agencies) try to control the tacking back-and forth, and especially, to standardize and make equivalent the ill-structured and well-structured aspects of the particular boundary objects.”

They are objects that “both inhabit several intersecting worlds and satisfy the informational requirements of each of them” (Star & Griesemer, 1989, p.

In other words, they are objects that have flexible definitions so that each social world attaches its own meaning to the objects but that meaning need not necessarily be fully shared by all collaborators.

(Chanahan, 2016)
They may be either abstract or concrete OR simultaneously abstract and concrete

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<td>In other words, boundary objects are defined by the situation in which they exist, and not their particular characteristics. From the literature:</td>
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<td>Boundary objects “simultaneously concrete and abstract, specific and general, conventionalized and customized. They are often internally heterogeneous”</td>
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<td>“Boundary objects need not be material. Concepts, words, processes, and cultural practices can be boundary objects under the right conditions.” (Shanahan, 2016)… Objects as diverse as climate simulations (van Pelt et al., 2015), science news stories (Polman &amp; Hope, 2014), science curriculum resources (Pegg &amp; Shanahan, 2015), and medical care pathways (Allen, 2014) have been conceptualized as boundary objects”</td>
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<tr>
<td>(Star &amp; Griesemer, 1989, p. 393)</td>
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<tr>
<td>(Star &amp; Griesemer, 1989, p. 408)</td>
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<tr>
<td>They arise from situations where “two or more differently naturalized classification systems collide”</td>
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<tr>
<td>In other words, where boundaries (as defined above) are present.</td>
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<td>Boundary objects permit an actor’s local understanding to be reframed in the context of a wider collective activity. Effective boundary objects are pragmatic entities valued for their ability to bring collaborators together and facilitate projects and outcomes that might be impossible otherwise</td>
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<td>Bowker &amp; star 1999 p. 297</td>
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<td>When they succeed as boundary objects, they are beneficially useful to collaborators</td>
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<td>It is important to note that the label of boundary object is not necessary for collaborators to employ; it has primarily been an analysts’ term for describing how collaborating groups are able to proceed, especially in the absence of consensus and/or standardization.</td>
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<tr>
<td>Shanahan 2016</td>
</tr>
<tr>
<td>They may arise organically and do not require participants to acknowledge them as boundary objects</td>
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Appendix I.

Participants’ understandings of IKT

Example responses to the question: Are you familiar with the term integrated knowledge translation, and if so, what does it mean to you?

- It's involvement of the end users in the whole research process. Users might be students, it might be people living with [the illness], it might be educators, and so, having them be involved from the early, often from the inception of the idea right through to the end of the project. (1001)

- To me, it's research that partners with key informants or key facilitators in whatever community you're working in...I think it basically is different than just traditional evaluation, you get your money, you go in and collect your data and then you helicopter out again...I take the opposite approach, where you not only work with them to try and develop at least some of their questions of interest, and you'll have maybe your theoretically driven ones but what are some of the issues they want answered? And then I think it denotes an obligation to go back and report you know they don't always like what you found, but you have an obligation to report back and not just to do scientific reporting. (1002)

- To me it means planning and communicating with people. Planning at the onset but then communicating with people along the way as the grant, as the project evolves. That's why the blog is well suited to that, because it's not a one-off end of grant sort of thing. It's something that you do ongoing. And we have a variety of strategies that we use, from teleconferences to in person to email to the blog. (1010)

- It's making sure that the right people are aware of your project and results, and it's sharing what you've come to know along the research project. Now, integrated knowledge transfer, that is what we've done. So including everyone that has something to do with your research question at every step of the research process. Developing the proposal for example, with the ministry, with the clinicians, with the community based people. Those are the two components of knowledge transfer as far as I'm concerned. (1015)

- It's collaborating with knowledge partners at all stages of the research process in order to make the knowledge co-produced be as relevant and usable and acceptable as possible so that it can easily be, more easily be put into policy and practice. (1019)

- In this case it's quite the opposite, we are learning from them, and mainly what we are doing is to paraphrase or reframe their own knowledge through the stories they are telling us. So it's something that they already know, so we are just umm communicating maybe that in a different way. Maybe you need more like -- or create more like -- the stories have this potential to make evident the knowledge that already they have. (1020)