

Université de Montréal

Évaluation d'un programme de formation sur le courtage de connaissances :

*Le cas des centres intégrés de santé et de services sociaux en région au Québec*

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intervention option Psychologie du travail et organisations

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Université de Montréal

Département de psychologie, Faculté des arts et des sciences

Cette thèse intitulée

Évaluation d'un programme de formation sur le courtage de connaissances :  
*Le cas des centres intégrés de santé et de services sociaux en région au Québec*

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## RÉSUMÉ

Cette thèse a pour objectif d'évaluer un programme de formation visant à doter les professionnels de la santé d'outils de courtage de connaissances afin d'assurer l'intégration des meilleures pratiques dans les établissements de santé et de services sociaux. Elle vise à évaluer la fidélité de sa mise en œuvre et les effets du programme de formation sur les participants et leur cadre professionnel. Le programme est composé de huit ateliers de 2 heures, dispensés sur une période de trois semaines. Il a été construit et offert par le Consortium InterS4, dont l'objectif est de développer et d'intégrer les meilleures connaissances et pratiques dans les établissements de santé et de services sociaux de cinq régions administratives du Québec, par le biais d'activités de courtage de connaissances. Le programme de formation a été évalué auprès de quatre de ces régions en utilisant le modèle de Kirkpatrick.

La collecte de données de ce projet d'évaluation comprend deux parties menées en parallèle, employant des méthodes mixtes pour recueillir des informations complètes. Les données ont été collectées au moyen d'une combinaison de questionnaires quantitatifs et d'entretiens qualitatifs, en tirant parti du modèle d'efficacité de la formation de Kirkpatrick, du *Theoretical Domains Framework* (TDF) et du *Behavior Change Wheel* (BCW) pour évaluer à la fois l'impact du programme de formation et les facteurs plus larges influençant le transfert de connaissances et le changement de comportement. Tout au long du processus d'évaluation de 24 mois, trois animateurs et 46 participants répartis en 7 cohortes ont pris part au projet de recherche.

La mise en œuvre du programme a été évaluée à travers le contenu utilisé pour chaque cohorte ainsi qu'à travers les discussions avec les animateurs suite au dernier atelier de formation de chaque cohorte. Concernant les effets du programme, les réactions des participants, les apprentissages, les comportements et les résultats ont été mesurés à quatre moments différents ; avant le programme,

après le dernier atelier, trois mois et six mois après le dernier atelier. Les facteurs contribuant au changement de comportement, à savoir la motivation, l'opportunité et la capacité, ont été évalués à ces multiples moments afin de déterminer leur influence sur la mise en œuvre des activités de courtage de connaissances.

Les résultats mettent en évidence la satisfaction des participants concernant l'utilisation du courtage de connaissances dans leur travail. Tous les participants recommandent le programme à leurs pairs et parfois à d'autres professionnels de leur domaine. L'analyse thématique des verbatims suggère l'importance de conditions spécifiques pour la mise en place efficace de pratiques de courtage de connaissances au sein de ces établissements.

Concernant les facteurs liés au changement de comportement, les données recueillies lors de l'évaluation font état d'une perception de gains de capacité par les participants à l'issue de la formation. Les participants avaient des convictions positives concernant le courtage de connaissances et ses effets. Cependant, beaucoup d'entre eux n'ont pas eu l'occasion de mettre en pratique les apprentissages en raison de priorités différentes dans leur rôle professionnel et de leur environnement de travail. Les recommandations consistent notamment à garantir que la direction connaît et exploite les capacités en courtage de connaissances, que les objectifs sont bien définis et que les parties prenantes sont alignées dans l'exécution des mandats.

**Mots clés :** transfert de connaissances, mobilisation des connaissances, courtage de connaissances, évaluation de programmes, santé, formation, changement de comportement, mise en œuvre

## **ABSTRACT**

This thesis has for objective to evaluate a training program aimed at equipping health professionals with KB tools to ensure that best practices can be integrated into health and social services institutions. It aims to assess the fidelity of its implementation and the effects of the training program on the participants and their professional setting. The program is made up of eight 2-hour workshops, administered over a period of three weeks. The training program was built and offered by the InterS4 Consortium, whose objective is to develop and integrate best knowledge and practices in the health and social services institutions of five Québec administrative regions, of which four were evaluated in this study, through KB activities.

The research design of this evaluation project includes a two-part investigation conducted in parallel, employing mixed methods to gather comprehensive insights. Data was collected through a combination of quantitative questionnaires and qualitative interviews, leveraging the Kirkpatrick Training Effectiveness Model, the Theoretical Domains Framework (TDF), and the Behavior Change Wheel (BCW) to evaluate both the training program's impact and the broader factors influencing knowledge transfer and behavior change. Throughout the 24-month evaluation process, three animators and 46 participants spread into 7 cohorts took part in the research project.

The implementation of the program was evaluated through the content used for each cohort as well as through discussions with the animators following the last workshop for each cohort training. Regarding the effects of the program, the reaction, learnings, behaviors and results were measured at four different times; before the program, following the last workshop, three months and six months after the last workshop. Factors contributing to behavior change—namely motivation, opportunity, and capability—were assessed at these multiple time points to capture their influence on the implementation of KB activities.

The results highlight the satisfaction of the participants concerning the use of KB in their work. All participants recommend the program to their peers and sometimes to other professionals in their field. The thematic analysis of the verbatims suggests the importance of specific conditions for the effective implementation of knowledge brokering practices within these establishments. Concerning the factors related to the behavior change, the data collected during the evaluation reports a perception of gains in capability by the participants at the end of the training. Participants held positive beliefs regarding KB and its effects. However, many of them did not have the opportunity to put the learnings into application due to differing priorities in their professional role and due to their work environment. Recommendations include ensuring the management is aware of and leveraging the KB capabilities, goals are well-defined and stakeholders are aligned in the execution of the mandates.

**Keywords:** knowledge transfer, knowledge mobilization, KB, program evaluation, health, training, behavior change, implementation

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## **ACRONYMS AND ABBREVIATIONS**

**BCW** : Behavior Change Wheel

**CFIR** : Consolidated Framework for Implementation Research

**CISSS** : Integrated Health and Social Services Centre / Centre intégré de santé et de services sociaux

**CIUSSS** : Integrated University Health and Social Services Centre / Centre intégré universitaire de santé et de services sociaux

**DIBQ** : Determinants of Implementation Behavior Questionnaire

**EBDM** : Evidence-Based Decision-Making

**EIDM** : Evidence-Informed Decision-Making

**EIP** : Evidence-Informed Practice

**HRD** : Human Resource Development

**HSS** : Healthcare and Social Services

**KB** : Knowledge Brokering

**KEC** : Knowledge Exchange Centre

**KTM** : Knowledge Transfer and Mobilization

**MHCC** : Mental Health Commission of Canada

**MSSS** : Ministry of Health and Social Services / Ministère de la Santé et des Services sociaux

**RE-AIM** : Reach, Effectiveness, Adoption, Implementation, and Maintenance

**TDF** : Theoretical Domains Framework

**TPB** : Theory of Planned Behavior

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## **INTRODUCTION TO THE STUDY**

### **Statement of the Problem**

In recent decades, there has been a significant increase in the number of scientists across various fields, leading to a wealth of new research. However, the translation of this research into practice has often been slow and inefficient, with some estimates suggesting that it may take an average of 17 years for evidence-based practices to be integrated into general health care practice (Gera, 2012; Morris et al., 2011). Despite all the efforts invested in knowledge transfer in the last decades to improve this situation, there persists to be an underutilization of the best knowledge available (Shelton et al., 2020; Westerlund et al., 2019;). This is known as the "knowledge-to-action gap", meaning the gap between what is known and what is implemented (Graham et al., 2006).

In the healthcare system, research results are often trapped in the gap between research and practice (Graham, et al., 2018). In addition, health professionals must manage an increasing amount of information related to their work (Dash et al., 2019). The lack of evidence-based practices can have massive implications, especially in the field of health and social services, where the well-being of others is involved.

One reason for such a gap is the lack of reciprocal communication between researchers and practitioners as well as the limited implementation of evidence-based interventions in practice settings (Neal et al., 2015). Although evidence-based practices seem to be embraced by healthcare professionals, different barriers to their implementation include a lack of time to read evidence or implement new ideas, a lack of facilities or resources and a lack of staff experienced or trained in evidence-based practices (Li et al., 2018; Ubbink et al., 2013).

Furthermore, the knowledge-to-action gap persists despite the best efforts of certain people since bridging it goes beyond the capabilities of single individuals (Bansal, et al., 2012). Evidence-based practice requires first the availability of published research that has applicability and the actual adoption of procedures that have been shown to be effective. The process of adoption requires that professionals in healthcare and social services (HSS) be able to utilize research as part of their practice. This translates into having a reasonable understanding of research principles and being able to read literature critically, as well as implement it (Portney, 2020).

One possible solution to the knowledge-to-action gap is knowledge brokering (KB). KB is a set of activities that focuses on identifying scientific evidence and bringing researchers and practitioners together to increase the sharing and therefore the use of such knowledge into practice (Giles-Corti, 2015). This process seeks to ensure that evidence-based practices can be put into application by researching evidence related to a given issue and implementing it into the current context.

### **Purpose of the Study**

Previous research has been done on the effectiveness of KB, with mixed results (Cross et al., 2023; Elueze, 2015). Given the complexity of the role and its implementation into multilayered and interconnected systems such as health care and social services, it is unsurprising that past studies show various levels of effectiveness related to KB.

Little is known on training programs designed to improve knowledge transfer competencies, much less for KB specifically. A recent literature review has identified nine articles describing the development, curriculum or evaluation of knowledge transfer and partnership research training programs (Tait & Williamson, 2019). Of those nine articles, no reports coming out of Canada evaluate the training programs. Training programs benefit from being tailored to specific cultural, institutional and

organizational contexts. Without evaluation data from Canada, it is challenging to understand how well these programs meet the local needs or align with the practices and policies in Canadian contexts.

Indeed, the primary focus of training programs is rarely on assessing their long-term impact on participants. Organisations frequently overlook the importance of setting specific success criteria or objectives for these initiatives (Haddad, 2011). As a result, many training programs have minimal influence on the actual practice of the trainees. This is supported by research indicating that a substantial 60 to 90 percent of the knowledge acquired during training is not subsequently utilized in professional settings (Saks & Haccoun, 2019). In which case, evaluation is necessary to assess whether the expected outcomes materialized as a result of the training.

Moreover, implementation scientists have developed a wide array of frameworks to assist in introducing new practices or altering existing ones in real-world scenarios. Nonetheless, several prominent frameworks, such as the Theoretical Domains Framework (TDF) and Consolidated Framework for Implementation Research (CFIR), do not evaluate the relative importance of their elements in successful implementation (O'Donovan et al., 2023).

This raises critical questions about how these frameworks can be adapted to account for the unique barriers and facilitators in specific contexts. One such context is remote regions, whose difficulties associated with knowledge utilization are oftentimes more pronounced due to expansive territories, sparse population density and inadequate infrastructure (Sanders et al., 2012). Additionally, they face professional isolation and restricted access to and utilization of the most effective knowledge and practices (McDonald, 2001).

A thorough exploration of the most relevant implementation factors and strategies that could promote a better adoption of these practices, taking into account cultural, geographical and organizational specificities, is therefore needed. In this sense, much remains to be explored regarding the barriers and facilitators to KB in HSS, as well as the most pertinent implementation factors and strategies to improve its uptake, particularly in remote regions.

Hence, the objective of this thesis is to assess the implementation of KB activities in remote regions of Québec, specifically through the dissemination of a KB training program, with a focus on understanding the barriers and facilitators that contribute to its successful application on the field.

### **Research Goals**

The thesis has two parts. The first aims to assess the implementation and the effects of the KB training program. The second aims to assess the factors influencing the adoption of KB practices in the context of health and social services institutions in remote regions of Québec.

More specifically, the objectives of this study are to : (1) evaluate the implementation of the training program, (2) evaluate the effects of this training program on the participants and their work environment, (3) evaluate the processes and factors influencing the application of the training program content.



## CHAPTER 1:

### LITERATURE REVIEW

#### 1.1 Knowledge Transfer and Mobilization

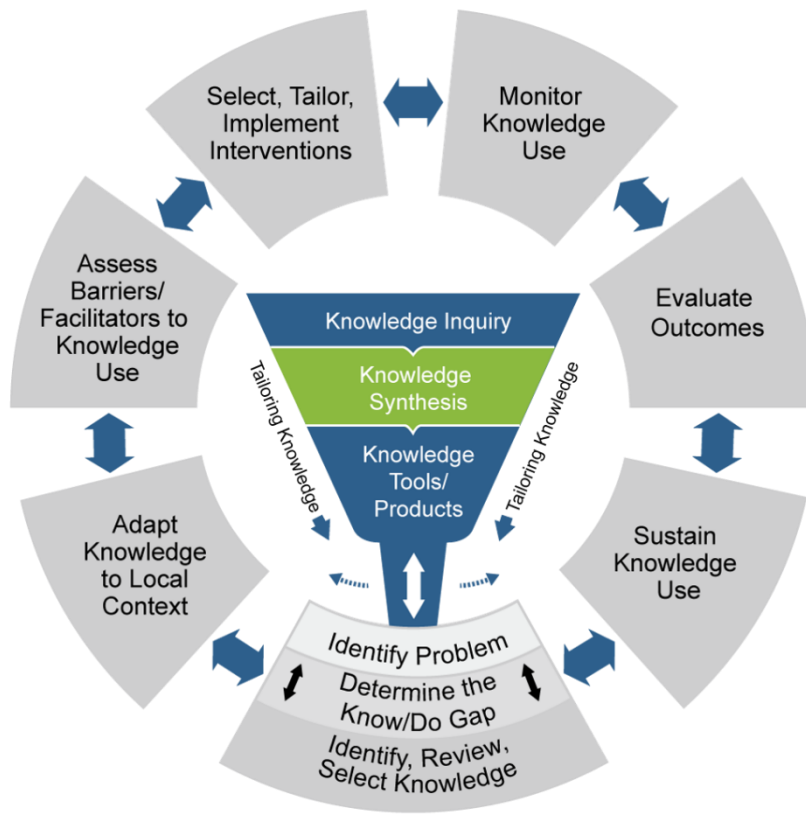
Knowledge transfer refers to all the activities and mechanisms promoting the dissemination and adoption of up-to-date knowledge for use in professional practice (Lemire et al., 2009). There are many different terms describing knowledge transfer processes. The Canadian Institutes for Health Research use the term 'knowledge mobilization', which refers to a broad set of activities encompassing the creation and utilization of research findings. It involves a dynamic and iterative process aimed at delivering evidence into the hands of those who can implement it, thereby facilitating the transition of research into practice (CIHR, 2021).

The objective is to improve current practices with the best knowledge currently available. This thesis will use the term "knowledge transfer and mobilization" (KTM) given that it reflects the more active KB process of not only bringing to attention the relevant information to the right people but also connecting people and adapt the information to enhance its practical application.

There are several different theories and frameworks for achieving KTM. One of the most common frameworks proposed by Graham et al. (2006), the *knowledge-to-action framework* (see Figure 0.1), was built on the commonalities found in a review of planned action theories. It has been promoted by the Canadian Institutes of Health Research as a model to encourage the use of research and for the process of KTM (CIHR, 2023). This framework can be broken down into two concepts: knowledge creation and the action cycle. Knowledge creation involves transforming available information into a concise and understandable format that serves the needs of the end users. The action cycle consists of seven iterative steps and focuses on the processes needed to use knowledge in health care settings

(Straus et al., 2011). These steps include identifying the problem, adapting the knowledge to local context, assessing barriers to knowledge use, tailoring and implementing the intervention, monitoring the knowledge use, evaluating the outcomes and sustaining knowledge use. This framework helps understand and close the gap between what is known from research and what is applied in the field.

**Figure 0.1 Knowledge-to-Action Framework**



Source: Graham et al. (2006)

### 1.1.1 Why Knowledge Transfer and Mobilization: The Importance of Evidence-Informed Decision-Making and Practice

It is necessary more than ever now for organisations to stay up to date on the current knowledge in order to adapt and grow. To maintain competitiveness, they must have the ability to access and

effectively use knowledge (Gera, 2012). The effective use of scientific knowledge is seen as being able to improve the quality of the work of the employees, to develop the capacity of organizational innovation, to allow better services and to increase the overall performance of the organization (Carneiro, 2000).

Evidence-based decision-making (EBDM) emphasizes utilizing the best available research evidence as the foundation for making decisions. It often follows a prescriptive approach, which can sometimes be perceived as rigid, with a heavy reliance on specific methodologies (Brownson et al., 2009; Greenhalgh et al., 2014; Ioannidis, 2016). Evidence-informed decision-making (EIDM), on the other hand, recognizes the importance of multiple sources of evidence beyond research, the presence of situational factors and the interests of different stakeholders involved (Bowen & Zwi, 2005; Brownson & Jones, 2009; Poot et al., 2018; WHO, 2021). The shift from EBDM to EIDM has been driven by the recognition that evidence needs to be considered within the specific context of its application (Bowen & Zwi, 2005; Poot et al., 2018; WHO, 2021;). It promotes a more flexible and inclusive approach, accommodating various types of evidence and the specific context in which decisions are made.

In health and social services, the principles of EIDM naturally extend to evidence-informed practice (EIP) (Haby & Reveiz, 2022). The focus here remains on delivering the most effective and efficient care possible, with the end goal of improving beneficiaries outcomes (Hoffmann et al., 2013). Without the guiding light of EIDM or EIP, practitioners often resort to less reliable sources of information such as intuition or advice from more experienced colleagues, which can sometimes be biased or outdated (Straus et al., 2011). The absence of evidence-informed approaches can manifest in suboptimal service delivery, thereby compromising patient satisfaction and care quality (Grimshaw et al., 2012; Straus et al., 2011;).

Returning to the role of decision-makers, it is crucial to recognize their importance in both EIDM and EIP. By effectively disseminating research findings, expert opinions and experiential knowledge through knowledge translation and mobilization, decision-makers gain access to a wealth of reliable information. This enables decision-makers to have access to current, accurate information, research results and best practises from a variety of areas. In turn, this allows well-informed decision-making informed by solid facts, lowering the risk of bias and possibly increasing the efficacy of programs (Stewart et al., 2019). Additionally, KTM can foster cooperation and communication among academics, practitioners, and policymakers, establishing a feedback loop that deepens comprehension of complex topics and promotes ongoing learning and development (Grimshaw et al., 2012). By utilising KTM, decision-makers may assure the implementation of evidence-based strategies, make informed decisions, and eventually strive towards more effective and significant policies that address the demands and concerns of society.

### **1.1.2 The Challenges of Knowledge Transfer and Mobilization**

One explanation for the knowledge-to-action gap is the distance between the stakeholders involved (Poot et al., 2018). Indeed, many people could argue that researchers and potential users, such as decision-makers or practitioners, are living in different universes (Giles-Corti, 2015) due to their disagreement on different knowledge management issues (Serenko, 2021). Although the values and priorities of both groups can seem contradictory, they are often complementary. Researchers are sometimes more interested in evidence than practicality (Feuerstein et al., 2018). They are knowledgeable about the protocol being tested, the elements of intervention, the target population and the expected outcomes (Feuerstein et al., 2018). They may seek advice from potential users, but it is often minimal. On the other side of the spectrum, potential users are imbedded in the complexities of their domain. They understand the intricacies of implementing a new practice into their routine and may

not feel the evidence produced by the researcher applies to their situation. These implementation challenges may lessen the enthusiasm of decision-makers to apply new evidence into practice (Feuerstein et al., 2018). They may therefore feel the need to adapt research evidence to their own setting since certain recommendations from researchers might not transfer seamlessly into practice (Glasgow et al., 2006). This clash requires that both groups be heard to arrive to a solution both informed by evidence and applicable to the practical context. Both parties must collaborate to recognize the importance of the researchers' rigor and the potential users' understanding of applied issues (Feuerstein et al., 2018). Thus, it becomes imperative to seize the full potential of different solutions to foster the transfer of knowledge. The research and practice communities are looking for more effective KTM strategies to take concrete action that can improve the health and well-being of the population. KTM is an important but complex process that can involve multiple strategies and contexts (Langer et al., 2016). It may be difficult to understand what the most effective KTM interventions are and in which contexts they apply (Cheuk & Kettner, 2013).

In addition, these challenges related to the use of knowledge are increasing in remote areas. Remote areas can share a few realities, which sometimes include larger territories, lower population density, a lack of infrastructure (Sanders et al., 2012), professional isolation and a limit to the access and use of the best knowledge and practices (McDonald, 2001).

### **1.1.3 Factors Influencing Knowledge Transfer and Mobilization**

For research to be translated quickly and have an impact, there needs to be a dissemination and implementation (D&I) process (Shelton et al., 2020). In complex systems such as HSS, the D&I process is far from a straightforward, unidirectional flow from researchers to users (Braithwaite et al., 2018; Cranley et al., 2017). Instead, it requires a bidirectional exchange in which decision-makers and

practitioners not only assimilate information but also provide feedback and articulate their needs to researchers. This evolving paradigm recognizes knowledge creation as a process embedded within and arising from the context in which it is applied, underscoring the importance of mutual respect and understanding of the distinct roles and contexts that each stakeholder inhabits (Rycroft-Malone et al., 2016). Subsequent to this exchange are the many variables influencing the D&I process, including individual factors such as education and attitude, knowledge/innovation-specific factors that address the practical applicability and the pedagogical design of the information, and organizational/contextual factors like social support and the structural environment within the workplace (Cranley et al., 2017; Dearing & Cox, 2018; Tonhäuser & Büker, 2016).

#### **1.1.3.1 Individual Factors**

In the realm of KTM, individual-level factors play a critical role in shaping the effectiveness of knowledge dissemination and uptake. Knowledge producers, such as researchers and academics, are influenced by personal attributes including their status, credibility, reputation, experience, network involvement, interest in transfer activities, and capacity to foster engagement with diverse audiences (Kuiken & van der Sijde, 2011; Lemire et al., 2009). Demographic characteristics and institutional affiliations have also been found to correlate with an academic's propensity to engage in industry cooperation, suggesting that individual career paths, productivity, attitudes, and motivations are influential (Rajaeian et al., 2018). These factors not only establish the groundwork for effective communication but also bolster the perceived value of the knowledge being shared.

Conversely, knowledge users face distinct challenges and incentives. Lack of experience in applying knowledge in professional settings, difficulty in critically analyzing or assimilating new knowledge, opinions about research and resistance to change can hinder the utilization of new

knowledge (Lemire et al., 2009; Lysenko et al., 2015; Tonhäuser & Bükér, 2016). However, positive valuation of research, higher education levels, previous engagement in scientific endeavors, positive prior experiences with similar knowledge, and high motivation for acquiring new knowledge significantly propel the KTM process forward (Lemire et al., 2009). Motivational factors range from cultural beliefs and intrinsic motivations to extrinsic incentives such as financial gains and career opportunities (Dearing & Cox, 2018; Lundmark et al., 2023).

The success of KTM is further facilitated by collaborative efforts between researchers and policymakers, which are strengthened by improved relationships and skillsets (Oliver et al., 2014).

#### **1.1.3.2 Characteristics of the Knowledge/Innovation**

The diffusion, dissemination and implementation of knowledge is significantly influenced by its inherent characteristics. These attributes can either serve as facilitators or barriers to the spread of new ideas and practices.

The relative advantage of an innovation is a primary consideration for potential users. They assess the innovation's effectiveness or cost-effectiveness compared to current practices. An innovation that offers clear improvements is more likely to be embraced (Dearing & Cox, 2018; Greenhalgh, 2004 in Palinkas, 2011; Lemire et al., 2009).

The adoption of innovations is greatly influenced by their trialability, observability, and adaptability. Simpler innovations are generally adopted more readily than those perceived as more complex, due to the ease with which they can be integrated into existing workflows (Greenhalgh, 2004 in Palinkas, 2011; Rabin et al., 2008). Innovations that can be tested, show clear benefits, and are

modifiable to meet specific needs are more likely to be adopted (Campbell & Moore, 2018; Dearing & Cox, 2018; Greenhalgh, 2004 in Palinkas, 2011).

However, perceived risks and a lack of relevance to users' tasks can hinder uptake. Additionally, the ease with which required knowledge for using an innovation can be transferred across contexts impacts its adoption. Barriers like inadequate access to quality research and delays in research availability can further impede the adoption and implementation of innovations (Greenhalgh, 2004 in Palinkas, 2011; Oliver et al., 2014).

### **1.1.3.3 Organizational/Contextual Factors**

Contextual factors can influence the dissemination but also the implementation of new information or methods into an organization. Organizational culture, leadership style, infrastructure, and cultural features are fundamental in determining an organization's capacity to embrace and apply new knowledge (Lemire et al., 2009; Rabin et al., 2008). Innovations become more deeply embedded and enduring when an organization's leadership actively supports the implementation process and ensures a steady flow of funding. This process is bolstered when the innovation is in harmony with the strategic objectives of the organization's upper and middle management.

Whereas a culture that neglects research and innovation, coupled with time restrictions, limited autonomy, scarce resources, and resistance to change, can significantly impede KTM, strong leadership and supportive infrastructure can facilitate it (Greenhalgh, 2004 in Palinkas, 2011; Lemire et al., 2009).

While robust research evidence may support the value of a new method or protocol, an examination of the implementation challenges in each instance will reveal the distinct determinants of implementation and outcomes (Wensing & Grol, 2019). It is therefore necessary to take into



consideration the individuals involved, the context of the organization and the type of innovation/information when looking at the efficiency of a dissemination process.

The use of communication channels is necessary to increase the dissemination of new ideas and practices. Individuals are most likely to consider a new idea if they learned about it through somebody they know (Neal et al., 2015). Ideally, communication should occur directly between two parties. However, in the case of researchers and practitioners, direct communication may not always be possible due to the spatial and social distances separating them (Green et al., 2009). Therefore, one possible solution to bridge the gap between research and practice through mostly indirect communication is KB.

## **1.2 Knowledge Brokering**

KB is a pillar strategy of KTM to promote the interaction between researchers and end users. It is a set of activities that provide effective access to the best knowledge to solve a problem. The best knowledge refers here to scientific evidence, to best practices such as interventions that are recognized as having added value by contributing to the achievement of a desired result or to expert opinion on the subject of interest (Fleury, 2019).

KB focuses on identifying such information and bringing together researchers and practitioners to increase the sharing of knowledge and bring more awareness about the given topic to practitioners. People practicing KB can work in scientific, advocacy or professional organizations while communicating with the different parties involved, including researchers, practitioners, decision makers and even policymakers. They ensure that researchers are aware of the realities of practitioners and policymakers while facilitating the dissemination of research findings to them (Giles-Corti, 2015). This process of bridging the gap helps build networks, share existing research and stimulate new work (CHSRF, 2003).

The objectives of KB are to facilitate decision-making and to improve the current practices with the best available knowledge, therefore increasing the performance of the organization, answering questions and issues prioritized by end users and in the long-term developing a culture of reviewing the best practices in any change process that aims for improvement (Fleury, 2019).

### **1.2.1 Knowledge Brokering : Role or Activities?**

KB can be done by organizations but it can also be carried out by individuals. The functions of KB can either be performed by individuals specifically hired as full-time knowledge brokers or be integrated as a subset of responsibilities within another professional role (Kislov et al., 2017). However, being a knowledge broker is associated with many challenges. Knowledge brokers are expected to be able to deal with the different brokering functions, be knowledgeable with the different types and sources of knowledge and be able to effectively communicate as well as be understood by the different stakeholders, mainly researchers and practitioners. If such people can be found, there is no guarantee that they are sufficient in numbers and that they can be retained in this position given their vast skillset (Kislov et al., 2017).

Therefore, another approach for more effective KTM has been launched where KB is seen as a collective process of different activities being carried out by a team rather than by an individual and actively supported by the organization at large. In order to maximize the impact of KTM practices, there could be a bigger emphasis on the practice of KB rather than on individual knowledge brokers (Kislov et al., 2017). This shows that in certain contexts, KB might be better practiced as a subset of given activities by a group of people participating in the process rather than by a full-time knowledge broker.

### **1.2.2 Effectiveness of Knowledge Brokering**

A systematic review of 24 articles concluded that KB can be an effective strategy for KTM (Elueze, 2015). The included articles found that knowledge brokers had stimulated a learning environment, facilitated cross-disciplinary learning opportunities, promoted the application of evidence-based clinical knowledge and skills into practice, facilitated an increase in organisational readiness for implementing new practices in health care systems, and more. However, the author stated that a successful transfer of research knowledge did not necessarily result in the use or change in action by the end users. In other words, knowledge brokers might do their job well and transfer knowledge but it does not automatically mean that practitioners will use this new knowledge. Furthermore, Elueze concluded with a need for more empirical studies to compare the effectiveness of different KB approaches.

A subsequent review by Cross et al. (2023) discovered that in 63% of the studies they included, knowledge brokers enhanced adherence to guidelines. However, drawing definitive conclusions is challenging due to the variability across studies, inconsistent use of terminology, and a limited number of randomized controlled trials. Another review by MacKillop et al. (2020) corroborates this conclusion, indicating that while some research exists on the effectiveness and impact of KB, there is still a lot to be done to develop objective evaluations of the effectiveness of KB.

A study by Shaw et al. (2010) found that the barriers to KB included system barriers, a lack of information accessibility and problems with variations in their users' capacity and experience using information. These results suggest that while the use of knowledge brokers can be an effective strategy to help close the knowledge-to-action gap still present in the field of health and social services, the importance of studying other factors influencing the effectiveness of KB behaviors remains.

An illustrative case of the efficacy of KB can be seen in the work undertaken by the Mental Health Commission of Canada (MHCC) through the Knowledge Exchange Centre (KEC). The KEC's scope of activity includes research and research support, as well as interactions with stakeholders and the general public. It creates and shapes ideas and initiatives inside the MHCC and brings this vital work into the public eye (MHCC, 2012).

The KEC utilized knowledge brokers to engage in a myriad of activities for different MHCC projects. The knowledge brokers ensured consistent focus on KTM throughout the entirety of the MHCC studies, not just upon their conclusion. Being integral members of the ongoing project advisory committees allowed them to deeply understand the projects, which in turn, enabled them to effectively assist in identifying target audiences, formulating dissemination plans, and pinpointing suitable venues for research sharing, thus facilitating meaningful and strategic knowledge exchange and impact throughout the project's lifecycle (MHCC, 2012).

This example illustrates the potential of KB in not only bridging the gap between research and practice but also in facilitating the sharing of knowledge and strategies that are informed by a myriad of stakeholders and perspectives.

### **1.2.3 Training in Knowledge Brokering**

KB is a challenging role and few people possess the knowledge and skills needed to carry out this position effectively. To be performant in this role requires knowledge on researchers' domains and end users' requirements, knowledge on how to gather a variety of evidence, validate the information, synthesizing it and interpreting it in the context of the given environment. This usually requires a graduate level education, experience in research and experience with information technology and reference management software to better store and organize all the information. Furthermore, this role

requires a variety of interpersonal skills as well as oral and written communication skills to effectively act as a bridge between the different stakeholders (Dagenais et al., 2016; Dobbins, 2009; Mc Sween-Cadieux et al., 2019).

Considering that KB activities can often be performed by professionals working in fields other than KTM, such as clinicians, managers and researchers, it is necessary to train these professionals on the multitude of knowledge and skills required (Kislov et al., 2017). To increase their appropriation of this role, employees need to know what KB is, why is it important and of course how to do it. Training is necessary to develop the competencies of practitioners in KB. Indeed, critical appraisal training has been shown to be an effective method of supporting decision-makers in their access and interpretation of evidence. Furthermore, accelerated learning, coaching, guided design and just-in-time training seem to be effective training methods (Breckon & Dodson, 2016). However, no academic program exists to train knowledge brokers (Dagenais et al., 2015) and no research to our knowledge has been done on the type of training activities useful for developing specifically knowledge brokers.

### **1.3 Understanding and Facilitating Behavior Change: Bridging Theory and Practice**

Although lack of training was seen as a significant barrier to implementing KB activities by Boutcher et al. (2022), the presence of training does not automatically imply the implementation of learnings into practice (Grossman & Salas, 2011).

Organizations and scholars have long identified the challenge of transitioning from training to actual practice. A plethora of empirical research, evaluations, and comprehensive analyses have provided extensive insights into the training transfer process (Grossman & Salas, 2011). To understand this process, a deeper understanding of the science of behavior change can provide additional insights into how these learnings and skills are internalized and consistently applied in professional settings.

Behavior change in professional and healthcare contexts is a complex and multifaceted process, requiring a comprehensive examination of the processes involved, the factors that either promote or obstruct change, and the results of the implementation. It also requires a deliberate approach to the application of strategies and a grounding in factual research (Barwick, 2020).

The three following sections present how individual capability, motivation and opportunity to apply learnings may influence behavior change and ultimately the transfer of training.

### **1.3.1 Capability and its Impact on Behavior Change**

In the quest to translate training program learnings into effective practice, the concept of capability emerges as a pivotal factor influencing behavior change. Capability represents an individual's psychological and physical capacity to engage in activity (Michie et al., 2011). Beliefs about capabilities, or the acceptance of one's ability to perform a task, has long known to play a role in behavioral change (Bandura, 1977). When combined with the TDF, the concept of capability encompasses a range of determinants including knowledge, skills, behavioral regulation, and the nature of behaviors.

Knowledge, defined as the awareness of the existence of something (Huijg et al., 2014) forms the foundation of capability. It empowers professionals to understand, adapt, and implement new practices, thereby fostering an environment conducive to change (Turulja & Bajgoric, 2020). Complementing knowledge, skills refer to the abilities acquired through practice, enabling individuals to translate theoretical knowledge into actionable behaviors (Huijg et al., 2014). Skills can not only enhance competence but instill confidence, acting as catalysts for sustained behavioral change.

Behavioral regulation, a complex aspect of capability, involves managing or altering behavior through action and coping planning (Huijg et al., 2014). Action planning can be a factor for aligning

behaviors with desired goals by helping to specify the steps needed to implement to achieve those goals (Bailey, 2019), whereas coping planning is a mental exercise aimed at overcoming anticipated barriers to an action (Sniehotta et al., 2005). The nature of the behaviors encompasses the automatic tendency to carry out a certain behavior and may be linked to the presence of a developed habit, if we define habit as memory-based propensities to respond automatically to specific cues (Huijg et al., 2014; Sassenberg & Vliek, 2019).

### **1.3.2 Motivation and its Impact on Behavior Change**

Motivation, a central construct in understanding behavior change, encompasses a complex array of factors, including in the TDF the domains of social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, intentions, goals, and emotions (Coulson et al., 2016).

Social/professional role and identity refer to a set of behaviors and personal qualities of an individual in a social or work setting (Huijg et al., 2014). The study of role theory has historically focused on exploring the impact of social and professional roles within an organization on an individual's behavior, identity, and expectations (Biddle, 2017). A meta-analysis by Rise et al. (2010) further substantiates this perspective by suggesting that self-identity could serve as an additional predictive factor in understanding behavior according to the theory of planned behavior.

Optimism, the confidence in achieving desired goals, has been associated with increased levels of engagement coping, meaning to deal directly with a stressor or emotion stemming from it, problem-focused coping and lower levels of avoidance. It predicts active attempts to change and adapt to stressful situations (Carver et al., 2010).

Beliefs about consequences entail the belief about the outcomes of a behavior (Ajzen, 1991). Recognizing the potential rewards or drawbacks of specific actions can shape motivation. This is achieved by guiding behavior towards perceived benefits or by steering away from negative consequences (Fishbein & Ajzen, 2011). In this sense, trainees who view training as beneficial and worthwhile are much more inclined to utilize these new skills in their professional setting (Grossman & Salas, 2011).

Intention plays an important role in behavior change. One of the most influential theories in this field is the Theory of Planned Behavior (TPB), which states that behavior is driven by intentions, which are shaped by attitude, subjective norm and perceived behavioral control (Ajzen, 1991). Previous research suggests that forming an intention is crucial if people are to initiate new behaviors (Sheeran & Webb, 2016).

Goal-setting has also been an extensively studied factor and a pivotal component in the realm of behavior change (Grossman & Salas, 2011). The process of defining clear, specific, and challenging objectives serves as a roadmap, guiding individuals towards desired outcomes. According to Locke & Latham (1992), the precision of these goals plays a crucial role in steering focus and effort. Robbins & Judge (2009) echo this sentiment, emphasizing that challenging goals, when paired with constructive feedback, lead to superior performance. The underlying principle is that goal-setting provides a tangible target, fostering commitment and acting as a catalyst for behavior modification and enhancement. While goal-setting often produces positive outcomes, performance-related goals may limit adaptability and creativity when individuals overly fixate on specific outcomes, neglecting changing situations (Robbins & Judge, 2009).



Emotions, both positive and negative, can play a role in shaping intentions and sometimes behavior after controlling for factors of the TPB. The study by Conner et al. (2013) on blood donation provides a compelling example of this dynamic. According to the research, the intention to donate blood was correlated with the emotional responses. Specifically, individuals who exhibited stronger intentions were more likely to experience affective negative and positive reactions when considering the act of giving blood. This study underscores the critical influence of emotional factors in shaping both intentions and subsequent behaviors. In this sense, it is plausible that the emotional states exhibited by professionals carrying out engaged in KB activities may influence their subsequent intentions and behaviors to continue such activities.

In summary, motivation's multifaceted nature offers a big piece of the puzzle in understanding the forces that drive behavior change. In the context of translating training program learnings into practice, the understanding of motivation stands as a vital bridge between theoretical constructs and actionable strategies, underscoring the human dimension of change.

### **1.3.3 Opportunity and its Impact on Behavior Change**

Just as important to understanding the factors related to participants' behaviors is the need to understand the context and contingencies related to implementation, particularly when collaborating with agencies or systems (Stirman et al., 2016). In a nationwide assessment involving public health professionals in the United States, the most significant obstacle to employing EIDM was the lack of organizational incentives (Jacobs et al., 2010). In this sense, opportunity encompasses a broad spectrum of external factors that facilitate or hinder the translation of intentions into actions.

The factors from the revised TDF related to opportunity include innovation, socio-political context, organization, mandator, innovation strategy, and social influences (Coulson et al., 2016). These

factors bear a resemblance to the constructs outlined in the CFIR developed by Damschroder et al. (2009) (O'Donovan et al., 2023). The CFIR model categorizes the determinants of behavior change into five distinct domains: intervention characteristics, outer setting, inner setting, characteristics of individuals and process. This comprehensive framework recognizes that behavior change is not solely reliant on the intervention itself but is influenced by a multitude of factors, ranging from the specific features of the intervention and the external socio-political climate to the organizational culture, individual predispositions, and the strategies adopted for effective implementation. These factors can interact and influence each other, providing a nuanced perspective on the dynamics of behavior change during the implementation of interventions.

A meta-analytic review regarding the impact of predictive factors on the transfer of training identified an effect size of .22 between a general environment construct and transfer (Blume et al., 2010). More specifically, transfer climate (e.g. manager objectives, equipment availability and practice opportunities) showed the strongest correlation (.27) with transfer, then supervisor and peer support (.21), and constraints such as lack of autonomy or situational constraints (.05, reverse-scored). Further analysis suggested that supervisor support (.31) may relate more to transfer than peer support (.14), but these findings came from limited samples.

As an example of the role of transfer climate, in a study tracking technology training over time, employees' beliefs of resources available to support them moderated the association between training and intentions to apply the new skills on the job (Marler et al., 2006). These perceived resources hinged on the beliefs of having enough time to hone these abilities, the expected support from supervisors during the learning phase and the availability of relevant documentation and expert assistance.

In the broader context of translating training program learnings into practice, opportunity underscores the importance of aligning interventions with the context of the organizational environment, ensuring that interventions are not only relevant but also feasible within the specific context.

#### **1.4 Québec Health and Social Services Institutions**

There are two main layers of management for the Québec Health and Social Services System. First and foremost, formulating, controlling, and coordinating strategic orientations, priorities, and objectives is the responsibility of the Ministry of Health and Social Services (MSSS), as well as providing resources to these aims. Second, 22 Integrated Health and Social Services Centres (CISSS, or CIUSSS for those with an academic mission) offer primary care and a few specialized services (Alami et al., 2021). These CISSS were created by combining a number of prior autonomous healthcare organisations that had been located in the same region and offered primary HSS, long-term care facilities, and general acute care hospitals. As a result, the CISSS were given decentralised authority over the organisation of most public health activities that were previously more independent (Alami et al., 2021; Touati et al., 2019) whereas high-level public health capacities were kept at the MSSS level (Alami et al., 2021).

#### **1.5 Knowledge Brokering in Healthcare and Social Services**

The context of remote CISSS or CIUSSS is very specific and can be complex at times. The purpose of these centres is to offer better accessibility, continuity and quality of services intended for the population of the given region (Gouvernement du Québec, 2020). Each centre covers a part of the 16 territories in the Québec province and includes multiple establishments such as hospital centres, local community service centres, child and youth protection centres, rehabilitation centres and residential and long-term care centres. Although these centres can share similar realities as mentioned earlier, each

region and each type of establishment in a given centre also varies in their context and issues. Therefore, it could be challenging for a knowledge broker to step into an unknown system and learn about the current context and procedures before starting to intervene. In this case, a group of people already working in these centres will be well-acquainted with the current practices and could perhaps have an easier time implementing KB activities to improve the overall decision-making.

## **1.6 Evaluation of Training Programs**

According to Mark, Henry, and Julnes (2000), the evaluation of training within a company primarily aims to achieve four objectives: (1) Demonstrating the relevance and value of the training programs, (2) enhancing the quality of the programs and the organization of the training initiatives, (3) ensuring compliance of the programs with various expectations, norms, or standards and (4) developing or testing new knowledge (Dunberry & Péchard, 2007). Evaluation allows to determine whether an organization should continue a training program and if so, how it could be improved to obtain better outcomes (Saks & Haccoun, 2019).

Many frameworks exist today to evaluate training programs, such as the Kirkpatrick Training Effectiveness Model, the CIPP model, the CIRO model or Phillip's ROI model (Passmore & Velez, 2014). It is important to note that no one-size-fits-all exists for training program evaluation. Each framework possesses its own strengths and weaknesses, and the objectives of an organization will decide what is feasible and most beneficial.

For instance, Kirkpatrick's model emphasizes outcomes related to learning and behavior, while Phillips's ROI model is especially advantageous for business-oriented organizations due to its primary focus on return on investment. Contrastingly, Kaufman's model centers on societal and environmental outcomes (Choudhury & Sharma, 2019).

According to a 2019 review by Choudhury and Sharma, among many commonly used models, the Kirkpatrick Training Effectiveness Model continues to be the most valuable in structuring approaches to training and development evaluation in R&D organizations. The Kirkpatrick Training Effectiveness Model continues to be effective and versatile for evaluating training in various contexts. Research on the model is both active and growing, with its primary application being in medical training, although it is also used in fields like computer science, business, and social sciences (Alsalamah & Callinan, 2021).

Although the popularity of commonly used frameworks remain, the landscape for evaluation design of training programs is in a state of dynamic evolution, influenced by a myriad of factors ranging from technological advancements to a heightened focus on broader and longer-term outcomes. On one hand, organizations globally are earmarking a more significant portion of their Human Resource Development (HRD) budgets for evaluation, with best practices indicating an allocation of 3 to 5 percent (Phillips & Phillips, 2016). This underscores a growing recognition of the value of data-driven decision-making in program implementation and optimization.

One of the most pivotal changes is the incorporation of evaluation into the design, development, delivery, and implementation phases of training programs. This global approach is replacing the traditional reactive models, advocating for early-stage evaluation planning as a critical component of the program life cycle (Phillips & Phillips, 2016). In sectors like health and social services, recognition of the unique challenges and opportunities in specific settings such as remote or underserved regions have led the evaluation paradigm to expand to be more context-sensitive (Rog, 2012). This is part of a more holistic evaluation approach that takes into account the broader organizational and societal impacts of training programs (Njah et al., 2021). The role of training in facilitating KB—disseminating and implementing knowledge within organizations—is gaining increasing attention, notably in areas where evidence-based practices are crucial (Goodrich et al., 2020).

Technological advancements have also emerged as significant enablers in this evolution. The integration of technology into the evaluation process facilitates the systematic and methodical collection, processing, and analysis of large data sets (Phillips & Phillips, 2016). This not only streamlines the evaluation process but also enriches the quality of insights, leading to more nuanced and precise understandings of program effectiveness.

In summary, the current trends reveal a maturing field characterized by increased investment in the evaluation phase, moving towards more nuanced, multi-faceted evaluation frameworks that strive for a comprehensive understanding of training impact, both immediate and sustained.

#### **1.6.1 Beyond Training Program Evaluation: Assessing Implementation**

While evaluation is indispensable, there is a burgeoning consensus emphasizing the need to extend scrutiny to the realm of implementation. This nuanced perspective acknowledges that the efficacy of a training program is not merely a function of its intrinsic qualities, but also hinges on how faithfully and effectively it is put into practice (Bauer & Kirchner, 2020; Fixsen et al., 2019; King et al., 2020).

Implementation, in this context, signifies more than the mere delivery of a program's content. It encompasses a range of factors including participant engagement, the assimilation of learned concepts into daily routines, and the adaptability and scalability of the program itself, whereas implementation fidelity refers to the degree to which an intervention is carried out as planned, ensuring uniform application across all participants (Slaughter et al., 2015; Taylor et al., 2015). Understanding the fidelity of implementation allows for a nuanced interpretation of a program's effectiveness by distinguishing whether a program failed due to its inherent limitations or due to challenges in implementation (Pérez et al., 2015). Moreover, it aids in the efficient allocation of resources by emphasizing the most impactful

components of a program and offers insights into the adaptation and uptake of a program across different contexts (Bauer & Kirchner, 2020). Lastly, ongoing monitoring of implementation can act as an early alert system for quality assurance by promptly identifying and correcting deviations from program standards.

In recent years, the field of implementation science has seen remarkable growth. This advancement has been marked by the development of comprehensive frameworks and models specifically designed to scrutinize implementation processes. Among these, the previously mentioned CFIR and the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) frameworks are prominently utilized. These frameworks offer a multidimensional approach to assess the myriad factors affecting implementation, ranging from individual characteristics to broader systemic elements (King et al., 2020).

In this sense, the study of implementation is crucial for answering nuanced questions about what works, for whom, and under what conditions. It emerges as an indispensable dimension of contemporary program evaluation, enriching our understanding beyond the traditional confines of program effectiveness.

## CHAPTER 2:

### THEORETICAL FRAMEWORKS

Following a literature review on KTM and KB, certain elements have been selected to compose the theoretical framework. The proposed approach seeks first to evaluate the implementation of the training program using the Implementation Quality Model (Durlak & DuPré, 2008). The effects of the training program were measured using the Kirkpatrick Training Effectiveness Model (1959; 2015). The processes and factors influencing the KTM of the training program were measured through a combination of the TDF and the BCW into one integrated framework.

#### **2.1 Implementation Quality Model**

Durlak and DuPré (2008) sought to examine the significance of program implementation on the outcomes of various programs and identify the factors that influence the implementation process. They found six factors related to effective implementation: dosage, reach, quality of delivery, participant responsiveness, fidelity and adaptation. Dosage refers to how much of the program was delivered. Reach refers to the degree at which the target audience received the training. Quality of delivery refers to the method of delivery, meaning the implementer enthusiasm or clarity. The participant responsiveness refers to attendance and engagement of the participants. Fidelity means how closely the implementer adheres to the core content, and adaptations refers to the changes made to the content.

To evaluate the implementation, three elements were selected: dosage, fidelity and adaptation. The reason for this is given our definition of implementation, we believe those three factors pertain specifically to the program and how it was put into effect. Reach and participant responsiveness are both elements that refer to the participant side of implementation. In this sense, reach was reported in the results in terms of participation data to the training program. Participant responsiveness is reported in



the level 1 of the Kirkpatrick Training Effectiveness Model, reaction, since it refers to how participants responded to the training, more so in our opinion than the implementation itself of the training program. Finally, quality of delivery refers to the trainers and training content. Given that the training program is not objectively measured but rather, participants' thoughts are collected, this aspect is also measured in the level 1 of the Kirkpatrick Training Effectiveness Model in our framework.

The limited availability of the stakeholders involved in the project led to the selection of this simpler implementation model, as opposed to models such as the CFIR or RE-AIM, which would have brought significant complications to the data collection due to the evolving nature of the training program and the additional constraints brought on by the COVID-19 pandemic. The use of the other frameworks presented below act as a complement to ensure a comprehensive evaluation of the training program effectiveness and implementation.

## **2.2 Kirkpatrick Training Effectiveness Model**

The Kirkpatrick Training Effectiveness Model is a widely used framework to evaluate the effectiveness of training programs. The model uses four levels of evaluation: reaction, learning, behavior and results. Level 1 of the model, called reaction, focuses on getting feedback and gauging participants' immediate reactions. It evaluates the degree to which participants are satisfied, engaged, and feel that the training was relevant and helpful.

Level 2, learning, assesses how much participants have learned as a consequence of the training in terms of knowledge, skills, or attitudes. It evaluates the effectiveness of the teaching strategies and resources and measures the learning results.

Level 3, behaviour, looks at how information and skills are applied after training to the workplace or in other real-world situations. It evaluates how well participants are using what they have learned and how the training has affected their actions, performance at work, and output.

Level 4, results, refers to the extent to which the desired outcomes are achieved as a consequence of the training and any subsequent behaviour change. It evaluates the training's overall success by looking at how it affects important performance metrics, such as improved client satisfaction and outcomes or enhanced organizational efficiency.

The Kirkpatrick Training Effectiveness Model was selected for a variety of reasons. First, it is a simple and practical model. The Kirkpatrick Training Effectiveness Model offers a straightforward and practical framework for evaluating training programs. Its four levels offer a structured method that is simple for organisations to understand and put into practice without requiring extensive resources or expertise in evaluation. It is easy to use when the data comes from participants whereas other models may require an observer or data from the trainers or workplace.

Second, it is an established and recognized model. The model has gained significant recognition and acceptance in the field of training and evaluation. As mentioned earlier, the Kirkpatrick Training Effectiveness Model remains the most effective in structuring approaches to training and development evaluation in R&D organizations (Choudhury & Sharma, 2019). Its longevity and widespread adoption have created a common language and standard for discussing and assessing training effectiveness. Many organizations and professionals are familiar with the model, making it easier to communicate and compare evaluation results across different contexts.

Third, the different dimensions measured gives it a comprehensive approach. The Kirkpatrick Training Effectiveness Model emphasizes evaluating training programs across a variety of criteria,

including participants' reactions, learning outcomes, behavior change, and organizational impact. This holistic approach helps organizations gain an overall understanding of the effectiveness of their training initiatives and identify areas for improvement at various levels.

The Kirkpatrick Training Effectiveness Model, while widely used, has faced criticism from various scholars and researchers. One prominent concern is its sequential approach, which implies that success at each level is a prerequisite for progression to the subsequent level. Contrary to this linear perspective, the current study aims to adopt a more nuanced approach. Specifically, each level of the Kirkpatrick framework will be assessed independently, rather than viewing the levels as incremental steps in a cumulative process.

Another drawback highlighted by some researchers is the model's lack of explanatory power and its perceived incompleteness. In response to this concern, the study addresses a third research question, aimed at evaluating the underlying processes that account for the training program's effects measured by the Kirkpatrick Training Effectiveness Model. To accomplish this, the study employs the TDF and the BCW, both of which will be presented in the subsequent sections.

Furthermore, to ensure a comprehensive analysis, the research adopts a mixed method design. Quantitative data is initially utilized to gain a broad understanding of the effects on a larger scale. Subsequently, qualitative data is employed to delve deeper into the intricacies of the observed phenomenon. By combining multiple data collection methods and theoretical frameworks, the research design complements the Kirkpatrick Training Effectiveness Model and enables a thorough examination of the training program from various perspectives. This approach guarantees that the study is conducted through a multifaceted lens, enriching the overall evaluation process.

### **2.3 Theoretical Domains Framework**

The TDF is used to organize different variables which could impact the training effectiveness into an integrated model. It is a theory used in designing KTM interventions to improve implementation and results (Norton, Rodriguez & Willems, 2019). The TDF consolidates aspects of 33 theories into a single framework containing multiple domains, depending on authors' versions. These domains include internal and external concepts.

In this thesis, the 18 domains from Huijg et al. (2014) were used as the variables impacting training outcomes: (1) Knowledge, (2) Skills, (3) Social/professional role and identity, (4) Beliefs about capabilities, (5) Optimism, (6) Beliefs about consequences, (7) Intentions, (8) Goals, (9) Innovation, (10) Sociopolitical context, (11) Organization, (12) Patient, (13) Innovation strategy, (14) Social influences, (15) Positive emotions, (16) Negative emotions, (17) Behavioral regulation and (18) Nature of the behaviors.

These domains allow to assess potential determinants of KB implementation behavior with a good discriminant validity (Huijg et al., 2014).

### **2.4 Behavior Change Wheel**

The different domains of the TDF were grouped under three broad categories known as the sources of behavior on the BCW. The BCW is a systematic categorization of pertinent intervention methods and policy categories based on the sources of the user's behavior. The three broad components are known in the model as the COM-B since behaviors (B) occur as the result of the interaction between capabilities (C), opportunities (O) and motivation (M) (Michie et al., 2011). The utilization of this framework served as a method for classifying the diverse domains derived from the TDF into three

principal categories. The purpose behind this categorization was to streamline the analysis and enhance the clarity of data presentation within the article.

**Capability.** Capability is defined as the individual's psychological and physical capacity to engage in the activity concerned (Michie et al., 2011). It includes the TDF domains of knowledge, skills, behavioral regulation, innovation and nature of the behaviors.

**Motivation.** Motivation is defined as all those brain processes that energize and direct behaviour, not just goals and conscious decision-making (Michie et al., 2011). It includes the TDF domains of the social/professional role and identity, the beliefs about capabilities, the optimism, the beliefs about consequences, the intentions, the goals as well as the positive and negative emotions.

**Opportunity.** Opportunity refers to the factors lying outside the individual that prompt or make the behaviour possible (Michie et al., 2011). It includes the TDF domains of the sociopolitical context, the organization, the social influences, the innovation strategies and the patient.

## **2.5 Combining the TDF and the BCW**

The integration of both frameworks is inspired by Coulson et al.'s (2016) model. Both frameworks are recent developments of the behavior change field and provide a systematic and theoretical frame for understanding and modifying behavior (Richardson et al., 2019). This mix of both frameworks allows to have the many different variables of the TDF synthesized into one simpler framework of three categories: capability, opportunity and motivation. Combining them can provide both depth and simplicity in analyzing behavior. This allows to draw from a broad range of theories and constructs while also organizing them in a more manageable framework. This approach further

facilitates the identification of critical factors that shape behavior and the selection of the most appropriate strategies to address them.

The existing literature exhibits a notable gap concerning the influence of capability, motivation, and opportunity on the transferability of KB training among healthcare professionals. Additionally, the specific training modalities that effectively enhance the application of acquired knowledge in practical settings remain unidentified. Thus, the incorporation of this framework represents a valuable methodological contribution to the field of KB research, addressing these crucial aspects and shedding light on previously unexplored areas.

## **CHAPTER 3:**

### **THESIS METHODOLOGY**

#### **3.1 Research Design**

This thesis represents a two-part evaluation project conducted in parallel. These parts are presented in the form of two articles.

##### **3.1.1 Article 1: Implementation and Outcomes of Knowledge Brokering Training in Québec's Remote Health and Social Services Centers**

The first article centers around evaluating the implementation and the effects of the training program. It is primarily concerned with evaluating the training program itself. It adopts the Implementation Quality Model (Durlak & DuPré, 2008) to assess implementation factors like dosage, fidelity, and adaptation. The Kirkpatrick Training Effectiveness Model serves as the framework for measuring the program's effects across various dimensions, ranging from participants' reactions to the program's impact on their professional behavior.

Reaction was gauged both quantitatively and qualitatively, exploring participants' appreciation of the training. Learning was assessed by measuring perceptions of ability to carry out KB activities before and after the program. Behavior was analyzed through interviews to categorize participants' activities, behavioral changes, and future expectations.

In evaluating the fourth level of Kirkpatrick's model, results, the focus was placed on the participants' perspective regarding the impact of KB activities, rather than relying on objectively measured effects on professional practice or practical outcomes resulting from the training program. It is

crucial to recognize that these findings should be considered partial, as they provide insights primarily from the participants' subjective experiences and perceptions, rather than comprehensive and objectively measured outcomes.

Essentially, this article aims to answer questions regarding how well the training program was executed and what immediate impacts it had on the participants.

### **3.1.2 Article 2: Determinants of Effective Knowledge Brokering in Remote Québec Health and Social Services Sector**

The second article, in contrast, focuses on the broader ecosystem in which the training program operates. This part of the project involved evaluating the different internal and external factors influencing the adoption of KB practices in the context of health and social services institutions in Québec.

In this case, the TDF and the BCW guide the inquiry, providing a comprehensive lens to explore the various elements within motivation, capability, and opportunity that affect the adoption and sustainability of KB practices. It evaluated all the factors of the TDF before and after the training program, three months post-training and six months post-training, through a TDF questionnaire and interviews. The data was analysed to find any significant results or changes over time.

Thus, while Article 1 provides an in-depth evaluation of the training program itself, Article 2 situates the program within a broader context, examining how its benefits may be realized or constrained by external and internal factors. It is important to note that the participants are the same for both articles. They were asked to complete questionnaires relevant to both studies, and the interviews incorporated questions concerning both the training program and the broader context of adoption. In



this manner, both articles complement each other by providing a holistic view of the training program and its context, yet they remain distinct in their objectives, frameworks, and analytical lens. The Table 3.1 presents an overview of the distinctions of both articles:

**Table 3.1**

*Comparative Table of the Two Articles*

<b>Aspect</b>	<b>Article 1</b>	<b>Article 2</b>
Objective	Evaluate the training program's implementation and effectiveness	Identify factors affecting the adoption of KB
Participants	Health and social services professionals in Québec	Health and social services professionals in Québec
Frameworks	Implementation Quality Model, Kirkpatrick Training Effectiveness Model	Theoretical Domains Framework, Behavior Change Wheel
Instruments	Pre-training questionnaire, Post-training questionnaire, Interviews	TDF questionnaire, Interviews
Focus	Program-centric	Context-centric

### **3.2 Participants**

The participants took part in both studies conducted as part of this research. They consisted of employees from various health and social institutions of the CISSS and CIUSSS affiliated with the InterS4 Consortium. Each participating CISSS and CIUSSS was duly informed about the implementation of the training program and was entrusted with the responsibility of disseminating this information within their respective departments to encourage voluntary participation.

To facilitate the recruitment process, department managers within the participating institutions played an integral role in selecting potential candidates for the training program. They actively solicited specific members of their teams whom they deemed relevant and beneficial to have on the program or,

alternatively, they encouraged their teams at large to express interest in participating in the training, providing an opportunity for all interested individuals to partake in the program.

By leveraging a collaborative approach, this aimed to ensure a diverse and representative pool of participants, comprising individuals with varied backgrounds, expertise, and perspectives, to enrich the overall learning experience and outcomes of the training program. The participants did not receive any compensation for their participation in the research study.

### **3.3 Partnering Establishment (Consortium InterS4)**

The InterS4 Consortium is an association of different CISSS in remote regions carrying out the training program designed for HSS practitioners to learn and eventually implement KB practices. It is committed to develop a platform of KB to support the improvement of services in remote regions of Québec using KTM. Their service offer includes improving the competencies of identifying and using the best available evidence, putting into place KTM activities within the framework of different projects and consolidate access to the best knowledge through increased networking. The objective of the training program is to improve the abilities of practitioners to collect and use the best knowledge for problem solving in order to improve the services of CISSS in remote regions of Québec. Each CISSS involved is committed to training five or six knowledge brokers per year for three years. Given this limited number of participating knowledge brokers per establishment, the regions were not disclosed to protect the confidentiality and anonymity of participants.

### **3.4 Description of the Program**

The KB training program comprises multiple blocks that address various aspects of the knowledge brokerage process. At the outset, the program provides an overview of the conceptual framework of KB, encompassing its definition, design, limitations, and potential.

The training program is largely inspired by the work of Jacques Fortin, who developed the original program and carried out the training at the Health and Social Services Agency of Montérégie around 2008. It was revised and adapted by France Charles Fleury, KB specialist and coordinator at the Consortium InterS4. Emmanuelle Jean and Isabel Bastille, both members of the Consortium InterS4 at the time of this study, contributed to the adaptation and the animation of the training program.

The program covers topics such as identifying knowledge needs, identifying knowledge sources, conducting research, analyzing information, presenting results effectively, and building consensus around the best knowledge. Participants are also trained in optimizing research using online tools like Google. More details on the description of the program is available in the first article of the study.

## CHAPTER 4:

### ARTICLE I: IMPLEMENTATION AND OUTCOMES OF KNOWLEDGE BROKERING TRAINING IN QUÉBEC'S REMOTE HEALTH AND SOCIAL SERVICES CENTERS

#### 4.1 Abstract

**Introduction:** There is a growing need for education and training options for healthcare professionals resulting from an increasing interest in knowledge brokering (KB). However, scientific literature lacks in terms of descriptions or evaluations of KB training courses. The aim of this research was to assess the implementation and the effect of a training program given for integrated health and social services centers (CISSS) in remote regions of Québec.

**Methods:** Participants were asked to complete a questionnaire before and after the training to assess their opinion on KB, their abilities to carry such activities and their thoughts regarding the training program. Implementation of the training program was measured with data provided from the program trainers. Furthermore, participants were contacted for interviews 3 months and 6 months post-training to gather qualitative data on their experience with KB. Data was analysed and presented using the Kirkpatrick Training Effectiveness Model consisting of four levels: reaction, learning, behavior and results.

**Results:** Participants responded well to the training program, giving the course and its contents good marks for overall perception (reaction). Participants indicated their understanding of the KB was adequate (learning). The course material was used to a certain extent in professional practice (behavior) and led to some positive outcomes (results).

**Conclusions:** The evaluation of the KB training program provided to an ensemble of CISSS in remote regions of Québec showed favourable results. The implementation was solid despite multiple changes in content and trainers. However, many participants indicated limited avenues for implementing

the acquired training, despite expressing a positive evaluation of the program. This suggests the presence of additional obstacles that extend beyond mere knowledge and motivation in applying the training effectively.

**Keywords:** Knowledge brokering, Training, Program, Course, Evaluation, Kirkpatrick

## **4.2 Introduction**

### **4.2.1 Applying Research Into Use**

The gap between academics and practitioners in knowledge transfer and mobilization (KTM) has been a longstanding challenge documented in research (Brownson et al., 2018; Straus et al., 2009; Tabak et al., 2012). Despite the progress made in the creation and sharing of evidence, along with their acknowledged importance in shaping health care decision-making, there is prevailing evidence to suggest their limited use by health system managers and practitioners (Holmes et al., 2017; Tricco et al., 2015). Unfortunately, in recent years, this gap seems to have widened further, which could be attributed to a complex interplay of individual, organizational and systemic factors, hindering the timely and effective implementation of research findings into practice (Birken et al., 2017; Holmes et al., 2017; Serenko, 2021).

Rapid advancements and increased specialization have made it increasingly challenging for practitioners to stay informed and apply the latest research, exacerbated by the COVID-19 pandemic's demands (Klerings et al., 2015; Greenhalgh et al., 2017; Li & Khan, 2022; Vaucher et al., 2016). Such suboptimal engagement with rigorously conducted research leads to systemic inefficiencies, compromised life expectancy and quality, as well as diminished productivity (Tricco et al., 2015).

Moreover, academic publications are typically written in a language and style tailored to the scientific community, making them less accessible to practitioners who may lack the time, background or expertise to navigate dense academic literature (Bahadori et al., 2016; Harvey et al., 2015; Jabonete & Roxas, 2022). Scientific research often focuses on theoretical concepts and generalizability, which may not directly translate to the immediate needs and complexities of practitioners working in diverse and dynamic environments (Kalbarczyk et al., 2021). Furthermore, academic and research institutions tend to

prioritize the generation of research over the communication and dissemination phases of the knowledge translation process, further emphasizing the divergence between academic and practitioner priorities and the resultant impediments to KTM (Mitton et al., 2007; Murunga et al., 2020).

Furthermore, decision-makers and practitioners often face constraints in using research evidence, including time limitations, insufficient financial support, organizational readiness, difficulties in analyzing and understanding research evidence, relevance and quality of content and applicability, and lack of organizational and managerial support (Dearing, 2018; Dodson et al., 2010; Dreisinger et al., 2008; Hashemiparast et al., 2019; Mohajerzad et al., 2021). This means that dedicating time to engage deeply with academic publications may not be a practical option for many of them. The lack of tangible incentives or recognition for practitioners to engage with research findings also contributes to the gap, as the value of evidence-based practices may not be fully appreciated or integrated into performance evaluations and professional development (Harvey et al., 2015; Jacobs et al., 2010; Orton et al., 2011).

The detrimental repercussions of the gap between research and practice reverberate across various dimensions of healthcare delivery. This disconnect between research and practice impedes the realization of the full potential of evidence-informed decision-making (EIDM) and hinders the effective implementation of innovative solutions in real-world settings, leading to suboptimal outcomes, delays in adopting proven interventions and continued reliance on outdated practices (Grimshaw et al., 2012; Straus et al., 2009). Morris et al. (2011) underscored how this disconnect can contribute to compromised patient outcomes and diminished healthcare quality. As a result, finding effective strategies to bridge this gap and foster meaningful knowledge exchange between academia and practice has become a pressing concern.

This unfolding scenario accentuates the potential role of KB in synthesizing and translating the burgeoning and specialized knowledge into actionable insights in healthcare settings (Bornbaum et al., 2015).

#### **4.2.2 Knowledge Brokering**

KB is a dynamic process that involves intricate interactions wherein research is comprehended, challenged and modified to suit local contexts in order to address specific practical challenges effectively (Cooper et al. 2020). It is often seen as an intermediary role of bridging the gap between people, departments, processes or organizations.

A systematised review from 2015 (Elueze) suggests that KB seems to have a positive impact on various aspects of healthcare, from facilitating learning and collaboration to influencing policy and practice. However, the effectiveness can vary, and in some cases, no additional benefits or immediate policy changes were observed. More recently, Cross et al. (2023) conducted another systematic review of the roles and effectiveness of knowledge brokers in translating clinical practice guidelines in health-related settings, suggesting that the impact of KB can vary depending on multiple factors, including the role played by the knowledge broker, the setting and the type of guidelines being implemented.

As Gaid et al. (2021) confirms, favorable characteristics of knowledge brokers to maximize the achievement of specific outcomes includes being embedded within their organization as “insiders”. It might be unsurprising then that a limited number of contacts with an external KB and a virtual mode of delivery may have had limited outcomes in building relationships with the healthcare practitioners.

However, it is important to consider the possibility of KB tasks rather than a dedicated knowledge broker role serving as the intermediary. Most studies included in Elueze (2015) indicated that



the successful knowledge brokers predominantly originated from practitioners and knowledge users, rather than researchers or knowledge producers. Implementing changes in practices is inherently challenging, especially when compared to allocating resources towards increasing the number of healthcare professionals, where the outcomes or effects can be more immediately evident. In cases where a distinct knowledge broker role is not feasible due to resource constraints or other factors, incorporating KB tasks into existing roles or responsibilities could be an interesting avenue to explore.

#### **4.2.3 Training Knowledge Brokers**

When examining KB, previous efforts have predominantly assessed the functions, effectiveness or required skills of knowledge brokers, often overlooking the role that training plays in shaping these professionals (Bornbaum et al., 2015; Cross et al., 2023; Duncan et al., 2020; Scarlett et al., 2020). A survey of 182 knowledge brokers in Canada found that 61% of the respondents reported having received insufficient training to perform their KB roles (Gaid et al., 2022). Considering that KB involves a significant element of influencing and shaping the dissemination of knowledge to healthcare professionals, it becomes imperative to concentrate on the delivery of training and the outlook of knowledge brokers moving forward.

The training provided to knowledge brokers can play a pivotal role in equipping them with the necessary skills, strategies and communication techniques essential for effective knowledge exchange and implementation. Understanding the perspectives and experiences of these knowledge brokers in the context of their training can shed light on potential areas of improvement and innovation in KB practices. Moreover, delving into their insights can help identify barriers or challenges they encounter, paving the way for targeted support and professional development opportunities tailored to enhance their capacity as facilitators of evidence-informed decision-making.

#### **4.2.4 Training Implementation**

Implementation is commonly associated with implementation fidelity, which refers to the extent of adherence to the intended design of interventions. It is intrinsically tied to the concept of adaptation, involving modifications made to the original program during implementation (Bach-Mortensen, 2018)

Additional implementation aspects encompass adherence to the prescribed protocol, treatment dosage, participant responsiveness to the intervention, and implementation quality. However, past research has revealed a deficiency in reporting on these crucial implementation facets, such as fidelity and adaptation. This oversight creates a significant blind spot in comprehending the genuine effects of interventions and conducting meaningful replications (Bach-Mortensen, 2018)

Neglecting to address implementation-related issues poses the risk of encountering type III errors, meaning “implementation failure” or the failure to implement an intervention as intended (Dobson & Cook, 1980). In the context of KB training programs, adherence to implementation fidelity is paramount to ensure that the skills and strategies imparted are not only thoroughly understood but also applied effectively in practice. Discrepancies in the implementation of the acquired skills from such training programs can cloud evaluative efforts, potentially attributing failures in KB activities to the inadequacy of the strategies taught rather than discrepancies in their application (Pinnock et al., 2017). This omission can have far-reaching implications for policy and practice, as it may result in misleading conclusions about the effectiveness of interventions and programs. Consequently, it underscores the importance of scrutinizing implementation aspects to gain a more accurate understanding of intervention outcomes and to facilitate informed decision-making in both research and real-world settings (Bach-Mortensen, 2018). Hence, meticulous examination and adherence to implementation

fidelity within KB training can elucidate the veritable efficacy of the imparted skills and strategies, ensuring that observed outcomes are genuine reflections of the program's impact.

### **4.3 Research Objectives**

This study addresses a critical gap in the existing research on KB by focusing on the evaluation of training programs for knowledge brokers. Despite the increasing importance of knowledge brokers in bridging the gap between research and practice, little attention has been given to systematically assessing the effectiveness of their training programs. Therefore, the primary objective of this study is two-fold.

Firstly, it aims to rigorously evaluate the implementation of the KB training program. This evaluation assesses how well the program was delivered, the extent to which participants engaged with the training content, and the overall fidelity to the program's design.

Secondly, the study seeks to evaluate the training program's effects from the perspective of the participants. This aspect involved gathering feedback and insights from the knowledge brokers who underwent the training, exploring their experiences, perceived improvements in skills and competencies and the potential impact of the training on their KB practices.

By undertaking this comprehensive evaluation, the study seeks to shed light on the effectiveness and potential areas for improvement in KB training programs, ultimately contributing to the enhancement of KB practices and fostering more effective KTM between academia and practice.

## **4.4 Methodology**

### **4.4.1 Setting**

The training program was built and delivered by the InterS4 Consortium, an initiative aimed to develop and integrate best knowledge and practices in the health and social services institutions across five<sup>1</sup> remote administrative regions in Québec, a province in Canada. This is achieved through the facilitation of KB activities. The service structure within regional health and social services networks encounter numerous obstacles. These include the geographic spread of the populations in need, the significant distance to specialized service facilities, the modest and shrinking size of the local healthcare workforce, and a notable rate of staff turnover. Such factors collectively impede the provision and sustainability of healthcare services (Browne, 2010; Deloitte, 2022; Paré, 2022; UQAR, 2015). Healthcare and social service providers in regional clinical settings often lack the tools to address the unique needs of these communities. The effectiveness of primary care services in improving population health extends beyond mere resources. There is a need to acknowledge the contextual, cultural and organizational realities that shape service organization and frontline professional practices (UQAR, 2015).

### **4.4.2 Training Implementation Strategy**

The implementation of the KB training program in different health and social services institutions began in 2017 when a renewed and expanded version of the InterS4 Consortium was established. A partnership was formalized between different health and social services institutions and universities of remote administrative regions of the province of Québec, in support by the Ministry of Health and Social

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<sup>1</sup> Of which four participated in the research project

Services and the Ministry of Economy and Innovation. The training program was developed by the consortium to train health professionals into delivering KB activities in their work environment.

The information regarding the training program was trickled down to different departments of participating CISSS, where managers asked who in their team would be interested in receiving training on KB. Given that the dates of the training sessions had been scheduled for the following two years at the time when the research project started, managers were able to find the best timing for their employees and the cohorts were thus developed.

#### **4.4.3 Structure and Content of the Knowledge Brokering Training Program**

The objective of the training program was to improve the abilities of practitioners to collect and use the best knowledge for problem solving in order to improve the services of CISSS in remote regions of Québec.

The training program on KB consisted of eight blocks that cover various aspects of the knowledge brokerage process. In the first block, participants learned about the conceptual framework of KB, including the definition, design, limitations, and potential of the process.

The second block focused on identifying and analyzing knowledge brokerage needs and identifying the most useful knowledge sources to address them. The third block dealt with validating the understanding of the need and how to address it with the “knowledge brokerage mandate” from the requester. Participants were also trained in optimizing research using Google.

Block four was dedicated to preparing for the identification, organization, and analysis of written knowledge, while the fifth block focused on adopting strategies to identify the most relevant written

knowledge. In block six, participants learned how to conduct a review of practices or expert opinions, including why and how to do so.

Block seven presented the results of the knowledge brokerage process in a way that facilitates their adoption. Finally, in block eight, participants learned various animation techniques to help them build consensus around the best knowledge.

#### **4.4.4 Study Design**

This study used a longitudinal, mixed methods with explanatory sequential design (Ivankova, et al., 2006). This explanatory sequential design involves first collecting and analyzing quantitative data, then qualitative data later on to understand the previously collected quantitative data in more detail.

This design was selected to harness the strengths of both quantitative and qualitative data, ensuring a comprehensive exploration of the impact of the KB training program. Initially, quantitative data provided a broad overview, enabling the identification of general trends, patterns, and potential correlations within participants' responses regarding the program's impact on their skills and practices. This approach permitted an objective assessment of measurable outcomes, such as changes in self-reported abilities or satisfaction levels. Subsequently, the qualitative phase delved deeper, exploring the "why" and "how" behind the quantitatively identified patterns, offering insights into participants' experiences, perceptions, and contextual factors that could influence the implementation of the training. This sequential structure allowed for the qualitative data to explain and enhance the quantitative findings, ensuring that the resulting analysis was not only statistically valid but also contextually rich and informed by participants' lived experiences and perspectives.

Quantitative data was collected immediately before and after the training program to assess the general trends and quantify the changes resulting from the training program in terms of learning and opinions towards the training program and towards KB as a problem-solving method. Participants were contacted for interviews at 3 months and again at 6 months post-training to understand further the nuances and gain more insight into the participants' realities when it comes to applying KB activities into their professional practice.

The training program effects were measured using the Kirkpatrick Training Effectiveness Model (1959) due to its simplicity, practicality and ease of use, particularly when data comes from participants. Its longstanding recognition in the field of training and evaluation provides a standard framework that facilitates cross-contextual discussions and comparisons (Reio et al., 2017). Moreover, the model's multi-dimensional approach offers a comprehensive evaluation of the training program, spanning from participant reactions to organizational impact, thus aiding in the identification of areas for improvement.

The selection of the Kirkpatrick Training Effectiveness Model for evaluating the KB training program was largely influenced by the pragmatic considerations related to participant availability and the constraints in obtaining objective and consistent data regarding the contextual and input elements across diverse health centers. Given the focus on the experiences and progressive impacts on participants, the Kirkpatrick Training Effectiveness Model aptly facilitated an exploration of reactions, learning, behavior, and results linked to the training, without necessitating an exhaustive analysis of the contextual and input variables, which the CIPP or other similar models would require. Health centers, especially in remote regions, often grapple with variations in resources, practices and challenges, which could introduce significant variability and complexity into the evaluation process.

This study evaluates the training program's effect but also its implementation. Given that this is an iterative evaluation, it is necessary to report how the training program was given and how it evolved throughout the cohorts. Durlak and DuPré (2008) found six factors related to effective implementation: dosage, reach, quality of delivery, participant responsiveness, fidelity and adaptation. This article will discuss three of those factors: dosage, fidelity and adaptation. Dosage refers to the quantity of activities done. Fidelity is how closely the program planned was the one given. Adaptation refers to the elements changed in the program training. The other factors are discussed through the participants' lens in the evaluation of the participants reactions to the training program with the Kirkpatrick framework. The reporting of implementation drew inspiration from the StaRI checklist, serving as a guiding framework to enhance accuracy and specificity (Pinnock, 2017).

#### **4.4.5 Instruments of Data Acquisition**

The data collection instruments used include the pre-training questionnaire, the post-training questionnaire, and the semi-structured interview guide. Content validity of the instruments was assessed by members of the InterS4 Consortium and researchers affiliated with the RENARD Research Lab, who jointly ensured that the questions comprehensively cover the constructs under study. The implementation of the training program was measured through the use of the consortium's documents, observations of the program and discussions with the trainers. All data was collected in French and was translated for this publication.

***Pre-training questionnaire.*** This sociodemographic questionnaire was adapted from the previously developed questionnaire by the Consortium InterS4 and intended to trace the profile of the different practitioners following the KB training program (see APPENDIX I). It asks questions about the practitioner's occupation, region, years of experience in their field, experience with KTM and with KB.



This questionnaire was given to all participants. It allows to associate a trainee's profile with the training sessions followed and with their experience with KTM and KB. Some of the questions posed includes the following: How much time do you spend per week, on average, on knowledge transfer activities? Overall, how would you evaluate your ability to identify scientific knowledge? What is your level of comfort in applying these [KB] competencies?

The KB competencies were a list of 12 competencies previously used by the InterS4 Consortium to evaluate the training programs pre-pandemic. These competencies include finding information through a literature review, finding best practices, critically analyzing information, and selecting knowledge to use. The questions related to the level of comfort in applying these KB competencies was measured on a 5-point scale, ranging from not at all easy to extremely easy.

Minor modifications were made to the original questionnaire for the purpose of this study, such as reducing the 8-point scale on the question related to time spent per week on KB, to a 6-point scale. This was done to reduce excessive granularity that did not meaningfully differentiate levels of KB activities carried out by participants. This adjustment aimed to maintain sufficient nuance for capturing variations in activity.

These questions were also posed in the post-training questionnaire to assess the difference resulting from the training program. These questions aimed to measure the learning outcomes of participants (Level 2 Kirkpatrick).

To measure behaviors (Level 3 Kirkpatrick), participants were asked how much time they spend on KB per week.

**Post-training questionnaire.** This questionnaire (see APPENDIX II) was also adapted from the Consortium InterS4 and was sent to all participants. Its first objective was to measure the training dosage by assessing which training activities the trainees completed and when (Q2).

This questionnaire also assessed the participants' reactions (Level 1 Kirkpatrick) to the training sessions. This was done through both quantitative and qualitative questions.

The quantitative questions (Q6-8) sought to measure, through a 7-point Likert scale, the probability of participants to recommend this training to a colleague, their overall level of satisfaction regarding the training and their level of agreement with seven statements related to the content meeting expectations, being useful, the session objectives being clear, the training methods fostering the development of skills, the trainer considering the experience of trainees, the training answering questions satisfactorily and the trainer making sufficient connections between concepts and practical applications. The former two 7-point Likert scales ranged from Very Low to Very High, whereas the latter scale ranged from Strongly Disagree to Strongly Agree. These scales were fully labeled to reduce the presence of a ceiling effect (Chyung et al., 2020).

The qualitative questions (Q9-11) were open-ended questions on what participants liked about the training, what they liked least about the training and if they have any suggestions to improve the training.

Behaviors (Level 3 Kirkpatrick) were measured by asking participants how much time they planned to spend on KB per week. Specific KB activities were not measured given that this questionnaire was given immediately at the end of the training program and did not allow enough time for many learnings to be put into use. Instead, the semi-structured interviews were used to measure behaviors and their effects (respectively, Level 3 and 4 of Kirkpatrick).

***Semi-structured interview guide.*** The interview guide includes 18 questions and can be found in APPENDIX III. The different themes addressed in the interviews include the changes in the COM-B variables before and after the training program, the different training methods and the KB activities put into action after the training program was completed. These interviews are the main source of data for the second research question as they paint a better picture of the changes resulting from the training program.

***Training program documents, observations and discussions.*** In order to complement the previous data collection instruments, a multi-faceted approach was employed to garner a more thorough understanding of the training program's implementation and contextual factors. This involved the analysis of various documents provided by the InterS4 Consortium, including PowerPoint slides from the training, outlines of objectives for each training block and formal documents outlining the consortium's mission and organizational structure. These documents offered a foundational framework for interpreting both the intended objectives and structural elements of the training program.

Concluding each training cohort, debriefing discussions were held with the trainers to gather insights into any adaptations made in the current cohort compared to its predecessors and to identify any gaps between the planned and actualized training.

#### **4.4.6 Study Population**

The participants in this study were healthcare professionals working in one of the four regions included by the InterS4 Consortium in Québec, Canada. Individuals were eligible to participate if they were signed up to the KB training program between June 2021 and December 2022.

#### **4.4.7 Data Collection**

All participants were invited to participate in the study, including both the questionnaires and the interviews. They were informed of the study by email a week prior to the first training session and sent a consent form at the same time to sign and send back to the main researcher of this study. Participants were also presented the research project in more detail during the first training session by the project researcher. Participants were free to partake in the quantitative and/or the qualitative parts of the evaluation. The pre-training questionnaire was completed during the first training session and participants were sent the link by email also to complete in the following days if they were unable to complete it during the training session. The post-training questionnaire was completed during the final training session and were similarly sent the link by email to complete later if needed. Participants who had selected 'Yes' to being contacted for interviews in their consent form were contacted by email 3 and 6 months after the training program to partake in two separate interviews. An hour was scheduled and invitations were sent through Teams. Participants were informed of the purpose of the study and the interview, as was mentioned in the consent form, and were reminded that the interview was to be recorded for the transcription of the verbatim. Participants gave their oral consent as well before the recording was started on Teams.

#### **4.4.8 Data Analysis**

***Quantitative data.*** Data analysis started with an exploration of both pre- and post-training quantitative data, utilizing T-tests to discern any statistically significant disparities in participant'' self-reported skills and comfort levels with KB before and after the training. The quantitative findings were then analyzed and interpreted to comprehend the immediate impact of the training program.

**Qualitative data from interviews.** Subsequently, a theoretical thematic analysis method was chosen for the interview data (Braun & Clarke, 2006). This method consists of starting with a pre-existing framework in mind, as opposed to an inductive thematic analysis, where themes emerge from the data itself. Theoretical thematic analysis may provide a less rich portrayal of the data overall, but a more detailed analysis of some specific facets of the data. In this sense, a theoretical thematic approach was used based on the Kirkpatrick framework, meaning that the codes were organized within the 4 levels of the Kirkpatrick framework.

The interviews were transcribed and the data was uploaded to QDAMiner, a software designed for systematic management and analysis of qualitative data. Initial codes for the interviews were developed in alignment with the interview guide questions. For instance, responses related to what KB activities were carried out were coded as "Activities", which was categorized into the Level 3 (Behaviors) of Kirkpatrick. Utilizing QDAMiner, these codes were applied to relevant data segments within the transcripts. Following this, initial codes were divided into themes, such as transforming the "Activities" code into themes like "Activities Completed" and "Activities Planned". Each theme was then encapsulated into a narrative, offering a detailed and nuanced understanding of the participant's experiences and perspectives.

**Qualitative data from questionnaires.** The qualitative data collected from the questionnaires, which elicited participants' preferences and suggestions regarding the training, were subjected to inductive thematic analysis. Since all the questions in this section were designed to gauge participants' immediate reactions to the training, they inherently aligned with Level 1 of the Kirkpatrick framework. In other words, findings that emerged from this analysis were directly incorporated in the Level 1 results.

The question regarding what was liked about the training program was analyzed first. Each answer was looked at independently and separated into different statements if they contained multiple elements. For example, if an answer was “I really enjoyed the dynamic trainers and the content was really practical with many tools that we can use”, the answer was separated into two statements: 1) I really enjoyed the dynamic trainers, and 2) the content was really practical with many tools that we can use.

Emerging themes were then determined, such as “Trainers” and “Tools and concrete examples”. The next statement was then either categorized into an existing theme, or into a new theme, until all statements had been categorized.

The same process was done with the two other qualitative questions related to what was least liked about the training and suggestions. The analysis of these questions continued to build on the themes that emerged within the first question, thus allowing a quantitative comparison on the number of statements for each theme between the questions.

***Integration of findings.*** Finally, findings from both quantitative and qualitative data sets were synthesized and compared, using the qualitative findings to further detail and contextualize the quantitative results, thereby providing a thorough understanding of the training program's impacts from both numerical and experiential perspectives. For example, quantitative data measured the amount of time planned to spend on KB. Qualitative data from interviews allowed to dive deeper and understand what this number means and why. This systematic approach to data analysis ensures a holistic understanding of the impacts of the training program, combining the statistical with the experiential.

## **4.5 Results**

This section begins by describing the study's participants. Afterwards, the results are separated into two parts, corresponding to the two objectives of this paper: (1) evaluation of the implementation of the training program and (2) assessment of the training program through the four pillars of Kirkpatrick's framework.

### **4.5.1 Description of Participants**

The KB trainings were evaluated over a 2-year period (2021 – 2023). Over this time, 72 participants attended the training. Of those, 62 were women and 10 were men.

### **4.5.2 Questionnaires Participants**

Of those 72 total participants, 57 of them completed the pre-training evaluation questionnaire and 46 completed the post-training evaluation questionnaire. There were 17 responses from either the pre-training or post-training questionnaire with more than 50% of the questionnaire items unanswered, which were excluded. Table 4.1 shows the distribution of program participants who agreed to take part in the research and completed the pre and post-training evaluation questionnaire.

**Table 4.1**

*Distribution of program participants per cohort*

Cohort	Pre-training responses	Post-training responses
1	6	3
2	15	10
3	7	7
4	6	7
5	8	6
6	8	7
7	7	6
Total	57	46

Participation dropped from 57 pre-training to 46 post-training, representing a retention rate of 81%. The most significant drops were in the first two cohorts, when time was not attributed at the end of the training to complete the questionnaire. Following the completion of the second cohorts' training, the last block of the training program was adapted to offer time for participants to complete the post-training questionnaire at the end of the session. When accounting only for the cohort 3 and beyond, the retention rate jumps to 92%.

As shown in Table 4.2, participants were fairly evenly distributed among the four regions. Most participants were towards the middle of their careers; with 59% indicating they had been in their role for 10+ years. There was a variety of roles practiced, with 39 % being in an administrative or research professional role. This includes the Planning, Programming and Research Officer (APPR in Québec), who oversees programs aimed at providing professional assistance. They offer advice for implementing or improving programs and services, and they may also contribute to teaching and training activities. This role is often tied to KB activities, though not always the case.

**Table 4.2**

*Participant characteristics*



<b>Characteristic</b>	<b>Response</b>	<b>Number of respondents (%)</b>
<b><i>Region</i></b>		
Valid	R1	11 (20%)
	R2	19 (33%)
	R3	14 (25%)
	R4	12 (21%)
Missing		1 (2%)
Total		57 (100%)
<b><i>Length of employment in health and social services</i></b>		
Valid	0 – 4 years	12 (21%)
	5 – 9 years	11 (20%)
	10 – 14 years	12 (21%)
	15 – 19 years	10 (18%)
	20 + years	11 (20%)
Missing		1 (2%)
Total		57 (100%)
<b><i>Work title</i></b>		
Valid	Administrative or research professional	22 (39%)
	Clinical professional	18 (32%)
	Manager	14 (25%)
	Student	2 (4%)
Missing		1 (2%)
Total		57 (100%)

### **4.5.3 Interviews Participants**

Interviews were carried out in a semi-structured fashion, with the aim of understanding the post-training effects of the training program through the KB activities carried out. Interviews were scheduled to occur at two time points: three months and six months post-training. This design was intended to assess both the initial adoption and potential longer-term sustainability of KB behaviors among the trainees. In practice, the interviews took place between three to 14 months following the conclusion of the training program. This extended timeframe was necessitated by various logistical challenges, including summer breaks, work leaves, delayed responses and scheduling conflicts among participants. The majority of participants, however, were interviewed within the planned timeframe.

A total of 17 participants were interviewed, with three of these individuals participating in interviews at both the three-month and six-month post-training marks, yielding a total of 20 interviews. The remaining participants were interviewed only once, primarily towards the three-month post-training mark. Due to the limited number of participants interviewed twice or at the six months post-training mark, comparative analyses between the two measurement times could not be conducted.

Participants from the study occupy different positions over multiple health establishments and regions in Québec. In a context where multiple knowledge brokers are acquainted with one another, the participants' attributes are kept confidential to preserve their anonymity.

#### **4.5.4 Implementation**

The following section details three aspects of implementation: (1) Dosage, (2) Adaptation and (3) Fidelity. If an intervention lacks fidelity to its "active ingredients", meaning the core components of the training, its effectiveness will probably be weakened. On the other hand, inadequate adaptation to the local context may hinder successful implementation (Pinnock et al., 2017). For these reasons, we looked at the implementation in the context of the COVID-19 pandemic, the InterS4 Consortium and the Québec health system and services.

##### **4.5.4.1 Dosage (Quantity of Activities Produced)**

The training program provides a specific duration and frequency for the activities. Although the program was originally conducted in a face-to-face setting spanning 4 days prior to the pandemic, the current format observed in this study consisted of 8 blocks lasting 2 hours each spread out in the following ways: Blocks 1-3 were typically scheduled over a span of two days, while blocks 4-5 were usually scheduled on the same day or over two consecutive days, and blocks 6-8 were scheduled over a

duration of two days. The entire process was typically spread out over a period of 3 to 4 weeks, resulting in some blocks being closely scheduled while others may have been spaced out by over a week.

In the context of this study, a meticulous adherence to the intended dosage was observed, maintaining the integrity of the training program's implementation. The format, structured into eight blocks of two hours each, dispersed over a 3 to 4-week period, was followed in all seven cohorts that were planned and executed. The actual dosage, therefore, was in concordance with the predetermined structure, ensuring that the outcomes and findings derived from the study are reflective of the intended program design and content delivery. The attainment of the actual dosage was realized through early planning of the training dates and a deliberate selection of the cohort participants according to their availability to attend the entirety of the training program. It is noteworthy that while the overall dosage at the cohort level adhered to the plan, individual discrepancies were observed, with six participants missing one session and one participant missing three sessions.

#### **4.5.4.2 Adaptation (Modifications Brought to the Program)**

The KB program evaluated may be described as an evolutive training program. When the program was first offered in 2017, the training program was longer, the modules were presented in-person over a two-week-long training period by one animator, for a total of 28 hours. With the arrival of the COVID-19 pandemic, the program had to be redesigned to be offered through a virtual platform, starting from May 2021, with no intention to return to an in-person setting as of May 2023.

The first cohort evaluated began in June 2021. The program was animated by one trainer, who will be referred to as Trainer A. This cohort was offered to one region only whereas the subsequent cohorts evaluated were inter-regional.

The second cohort, which began in October 2021, included two regions. The heterogeneity of the participants led to richer discussions according to the trainer. A new element for this cohort was the addition of a second animator, Trainer B. With this addition, the trainers were able to share the roles and responsibilities during the sessions. For example, one would lead the presentation while another would look at the chat and raise the flag if anyone had a question. Both trainers would be able to answer questions, whether during the training or through emails between the sessions or following the training program.

The trainers mentioned having a complementary approach, the first being a university professor and the other having previously been a manager in the health field.

Regarding the changes brought for this cohort, the first change concerned the addition of a diagram in the PowerPoint to visually represent the current step being discussed of the KB process.

Another change concerned the addition of more interactive activities such as the learning platform Kahoot to keep the training program more dynamic and engaging.

Cohorts 3 and 4, respectively taking place in February 2022 and March 2022, started introducing the idea of a "memory aid" that the participants were invited to make, given the vast amount of knowledge being transmitted in those training sessions. Furthermore, whereas the first cohorts had a much more theoretical orientation, the subsequent cohorts were given more space to practice and application. This was enabled by the fact that the contents of the Powerpoint presentations were self-supporting and constructed like course notes and that coaching was offered to participants between training blocks.

Cohort 5, which began in May 2022, and subsequent cohorts had fewer changes and were fine-tuning at this point. For example, a table was added in the content regarding the difference and similarities between research and KB. Furthermore, in the block where tools were shown to produce KB content, participants were now being asked to animate by showing the content they've built, which the Trainers reported as being less daunting for the participants than seeing the content built by KB experts.

At cohort 6, taking place in September 2022, Trainer A left the animation given a job change, which led to the introduction of Trainer C. This trainer had been the one animating the program back in 2017 when it was given in person. Given that the trainer had previous experience and was knowledgeable on the topic, they made some changes regarding the training to make sure the content was distilled to its most essential and avoid redundancies. Those changes were made for cohorts 6 and 7, the latter taking place in November-December 2022. The core elements of the training were kept however.

The adaptations made to the KB program demonstrated a responsive approach to the dynamic external circumstances, notably the pandemic, but also showcased a commitment to continuous improvement in the pursuit of enhancing participant engagement and learning outcomes. The transition to a virtual platform enabled the continuation of the program amidst global disruptions, thereby ensuring sustained access to vital training amidst health crises. Furthermore, the inclusion of trainers with diverse backgrounds and expertise introduced a richer, multifaceted perspective into the sessions, potentially enhancing the applicability and relatability of the content across various professional contexts. The iterative adaptations, such as the incorporation of interactive activities, the focus shift from theoretical to more practical applications, and the introduction of tools like the "memory aid", were direct responses to the evolving needs and feedback of the participants. These modifications,

particularly aimed at improving participant engagement and knowledge retention, potentially facilitated a more immersive and participatory learning environment.

#### **4.5.4.3 Fidelity (Program Implemented = Program Planned)**

Although changes have been made to the training program, the content has maintained a consistent foundation. The same eight core blocks have been given to all cohorts and each cohort has had the same number of hours of training, manifesting a structural fidelity that has been preserved. The changes made were in-between cohorts and related to more effective ways to present or integrate the content, such as the addition of an exercise to reflect on what was learned, or cutting down on content that was seen as less useful for practitioners or that could be given to participants through references instead.

In other words, the core components of the intervention were unchanged and were implemented with high fidelity to the program planned at the start of each cohort. The adaptations were aligned with the intervention's goals to enable health professionals to use KB in the workplace.

The transition between trainers, particularly the departure of Trainer A and the introduction of Trainer C, introduces a variable that potentially influences both the fidelity and effectiveness of the program. Trainer-specific attributes, such as their unique delivery style, expertise, and interaction with participants, invariably infuse the training experience with distinctive qualities. These alterations in the training dynamic necessitate a closer examination to discern any palpable impact on the consistency of content delivery and participant engagement and learning. Participant feedback and comparative analysis of outcomes across different cohorts and trainers could yield insights into the tangible effects of this transition.

## 4.5.5 Intervention Effects (Kirkpatrick: Reaction, Learning, Behavior, Results)

### 4.5.5.1 Level 1: Reaction

#### 4.5.5.1.1 Questionnaire

The evaluation of participants' reactions was completed through the post-training questionnaire and through the interviews. The post-training questionnaire assessed participants' reactions through a 7-point Likert-scale. Participants were given the opportunity to answer these questions immediately after the final training session or in the days that followed, after receiving a reminder by email. The average scores for each question were calculated based on the responses from all seven cohorts. The following table presents the questionnaire results related to participants' reactions to the training:

**Table 4.3**

*Descriptive statistics from the post-training questionnaire related to Level 1 – Reactions*

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>
1- What is the probability that you would recommend this training to a colleague?	46	5	7	6.54	.657
2- What is your overall satisfaction level regarding the training?	46	5	7	6.59	.686
3- What is your degree of agreement with the following statements?					
a) The content met my expectations.	46	5	7	6.70	.553
b) The presented content will be useful for my work.	46	3	7	6.70	.695
c) The plan and objectives of each workshop were clear.	46	3	7	6.74	.773
d) The teaching methods fostered the development of my skills.	46	2	7	6.52	.888

e) The trainer took into account my knowledge and experiences.	46	5	7	6.72	.621
f) The trainer answered my questions satisfactorily.	46	6	7	6.93	.250
g) The trainer made sufficient connections between concepts and practical applications.	46	6	7	6.83	.383

The evaluation of the training program indicated that participants consistently reported feeling satisfied across various aspects of the training. Participants frequently mentioned they would recommend the training to colleagues, expressed satisfaction with the program’s format and content, and noted its relevance to their professional responsibilities. The structure, objectives, and teaching methods were found to be well-communicated and were said to have contributed to skill growth. The trainee's ability to tailor the training to individual needs and effectively address questions was also highly regarded. Furthermore, the trainee's success in linking theoretical concepts with real-world scenarios suggests an overall practical aspect of the program. These results underscore the program's success in meeting participant’' expectations and needs, reflecting a high degree of satisfaction and perceived utility.

Overall, feedback suggests that participants responded positively to the training program. They expressed a high likelihood of recommending the training to colleagues, reported a high level of satisfaction, and perceived the content as meeting their expectations and being useful for their work. Participants also found the program’s objectives and teaching methods to be clear and conducive to skill development. The trainers’ consideration of participants’ knowledge and experiences, along with their ability to answer questions and establish connections between concepts and practical applications, was



highly regarded. These findings suggest that the training program was well-received by the participants and successfully met their expectations.

#### 4.5.5.1.2 Questionnaire – qualitative

In the post-training questionnaire, participants were asked the following three questions: (1) What did you like about the training? (2) What did you like least about the training? (3) Do you have any suggestions for improving the training?

Regarding the responses, 44 participants answered the first question, 38 answered the second and 29 answered the third question. The blank responses were removed from the analysis.

In answering the first question, 84 separate comments were formulated, 41 for the second question and 29 for the third question.

**Table 4.4**

*Answers from the post-training qualitative questions regarding likes, dislikes and suggestions about the training*

<b>Theme</b>	<b>What did you like about the training?</b> Number of comments	<b>What did you dislike about the training?</b> Number of comments	<b>Suggestions for improvement</b> Number of comments
Tools and concrete examples	14 (17%)	1 (2%)	1 (3%)
Trainers	11 (13%)	-	-
Structure of the training / Animation	9 (11%)	3 (7%)	3 (10%)
Blocks / Session format	8 (10%)	10 (24%)	10 (34%)
Practical aspect of training / Exercises / Games	8 (10%)	7 (17%)	3 (10%)
Relevance of training for career	7 (8%)	5 (12%)	2 (7%)
Content / Learning / KB process	7 (8%)	4 (10%)	1 (3%)

Group interactions / Exchanges / Participation	6 (7%)	1 (2%)	-
Find a problem / Have a project before the training	4 (5%)	1 (2%)	-
Visual content / Powerpoints	4 (5%)	-	-
Support and availability	2 (2%)	-	-
Networking	2 (2%)	-	1 (3%)
Small group	2 (2%)	-	-
Virtual format	-	2 (5%)	2 (7%)
'Nothing'	-	7 (17%)	6 (21%)
<b>Total</b>	<b>84</b>	<b>41</b>	<b>29</b>

**Tools and concrete examples.** The most commonly received comment of appreciation was related to the tools and examples provided during the training. More precisely, the sharing of rigorous tools for each step of the KB process and the use of many concrete examples to demonstrate what it could look like. One comment detailed it as such: "We received a lot of tools to make our brokerage a success and a lot of tips to carry out specialized research."

**Trainers.** The second most common positive comment was related to the trainers. They were regarded as highly competent and knowledgeable, and they had a strong grasp of the content they presented. They were also praised for their availability, dedication, and ability to capture the participant's attention from the beginning to the end of the sessions. The trainers were described as interesting, relevant, competent, accessible, and genuinely eager to help and support the participants. The trainers were flexible in accommodating the participants' schedules and communicated the content clearly. Overall, they were praised for their dynamism, experience, and mastery of the subjects they taught.

**Structure of the training / Animation.** Participants appreciated the training program for its well-structured nature and clear presentation of information. They praised the program's balance between

content, concrete examples, practical exercises, and various methods and strategies to involve them actively. The program was considered useful, comprehensive, and easily accessible. The training's animation and structure were described as well done, and the learning transfer was enjoyable to receive.

Some participants expressed a feeling of being overwhelmed by the speed and density of the training program, wishing for more time to explore and choose among the tools and blocks presented, despite a wealth of information being provided in a short amount of time. Suggestions revolved around allocating more time to assimilate the content.

**Blocks / Session format.** Some participants mentioned an appreciation for the online training format structured in two-hour blocks. The division of the training into these shorter blocks, even though it was entirely conducted remotely, proved to be helpful in maintaining the attention and facilitating the integration of the learning content. Positive comments specifically highlighted that this approach prevented them from feeling overwhelmed or experiencing information overload, which can occur in other training formats. Overall, the idea of breaking the training into smaller blocks received excellent feedback, with some participants even suggesting the possibility of further dividing the blocks.

The session format was however the most commonly expressed dissatisfaction, with about a quarter of the comments related to it. These participants found the training blocks to be too condensed and closely scheduled, with several sessions and workshops occurring within the same week, leaving little time to implement learnings between them. Additionally, they expressed difficulty maintaining attention and engagement during the online sessions, especially on Friday afternoons and for two-hour blocks, while others noted that the time allocated for each block seemed short or that they would have preferred full-day sessions to better accommodate unforeseen schedule disruptions. Some participants

acknowledged the intention behind spreading sessions out to allow for practical application but found it challenging due to their managerial duties.

Participants suggested various adjustments to the training block/session format to enhance learning and engagement: more spacing between sessions and assignments to allow for completion and assimilation of exercises; adjusting the scheduling to perhaps one block per week to facilitate easier integration into participants' schedules; extending block lengths for a deeper dive into material; and including additional time or sessions focused on specific research tools like PubMed-MedLine. Additionally, incorporating post-training meetings to discuss outputs, and allowing more time for experimental and research work on projects between certain blocks were mentioned to better accommodate participants' research and project work.

**Practical aspect of training / Exercises / Games.** Participants highly appreciated the practical aspect of the training, which included various exercises and games to validate their learning along the way. The use of diverse tools, such as Kahoot, was particularly valued as it made the learning experience more engaging and dynamic. The incorporation of exercises and activities helped make the training more interactive and less monotonous, ensuring active participation and avoiding a dull learning environment.

The participants also praised the opportunity for hands-on practice and the inclusion of practical activities throughout the training. The use of multiple teaching techniques was commended as it catered to different learning styles and personalities, making the content accessible and enjoyable for all participants. Even individuals who might not usually participate much in such training sessions found themselves pleasantly surprised by how the questions and activities were tailored, as can be seen in the following comment: "I am not the person who participates the most in this type of training, but I

surprised myself; I have the impression that the questions and activities were reaching out to the maximum number of people according to our personalities and learning styles".

Some participants expressed concerns regarding the practical aspects and exercises during the training, particularly highlighting insufficient time to delve deeply into exercises and validate mastery of the content. Some felt that exercises and activities, like Kahoot, were not adequately adapted to the virtual and unfamiliar participant context, and others found it challenging to dedicate concentrated time to the 'homework' due to workloads, suggesting improving pre-training communication, such as providing schedules and time investment required further in advance, to enable participants to better manage their time and commitments.

**Relevance of training for career.** Some participants highly appreciated the training's relevance to their careers, expressing that they found it valuable and applicable to their roles. They wished they had received this training earlier in their professional practice, indicating that it addressed important aspects they encountered in their work as advisors or in similar positions.

They found the methods and content presented in the training to be highly applicable and easily integrated into their daily tasks. Participants felt that the knowledge gained from the training was directly relevant to their practices, allowing them to approach new assignments with greater confidence.

While participants found value in learning new tools and research methods, several expressed that aspects of the training were not entirely relevant to their day-to-day work or were impractical due to accessibility issues with certain tools within their respective organizations. Although this was highlighted as a limitation, some acknowledged that this was not within the trainers' control and still appreciated gaining insights into their utility.

**Content / Learning / KB process.** The participants highly appreciated the content presented during the training, finding it comprehensive and valuable. They expressed that the knowledge gained from the training was easily transferable and applicable in real-world situations, making it highly practical and beneficial for their work. Even if some participants were initially uncomfortable with the concept of "KB" they found the content accessible and well-explained, enabling them to grasp the concept effectively. Participants particularly valued the method used to create schematic summaries of various practice reviews, as it provided an efficient way to process and retain information. The training also equipped participants with an effective work method, emphasizing the importance of having a clear mandate, which they found allowed them to approach their work requests more confidently and efficiently.

Other participants offered mixed feedback on the content, with some viewing portions, like the Google research module, as potentially time-consuming or less beneficial, and others finding some concepts challenging to implement. While feeling somewhat overwhelmed by the breadth of material and possibilities, participants felt reassured by the acknowledgment of the theoretical nature of parts of the training and the ongoing support provided by the trainers.

**Group interactions / Exchanges / Participation.** Participants appreciated the group dynamics during the training, describing it as a beautiful interaction with all the participants. The group was engaged and interested, creating a positive and convivial atmosphere. The interactivity of the sessions allowed for active participation from all members, fostering a generous sharing of knowledge and experiences among the participants.

The interactive presentations and discussions were particularly valued as they provided a platform to benefit from the collective experiences and insights of their peers. This exchange of ideas

and perspectives enhanced the learning experience and allowed participants to gain valuable insights from one another.

**Find a problem / Have a project before the training.** Participants appreciated the requirement of finding a project related to KB before starting the training. They found it highly beneficial and engaging to be involved with a personal project, as it made the learning process more concrete and relevant to their work. Having a project belonging to each participant allowed them to understand and apply the KB concepts in a practical context, helping them in the realization of their professional mandates.

**Visual content / Powerpoints.** Participants highly appreciated the visual support provided during the training, particularly the PowerPoint presentations. They found the PowerPoint slides to be dynamic and attractive, making the learning experience engaging and visually stimulating.

The clarity of the PowerPoint presentations was commended, as it allowed participants to easily follow the content and understand the concepts being discussed. The visual aids, such as hyperlinks and other multimedia elements, made the content accessible and allowed participants to refer back to the material after the training, relieving them of the need to take extensive notes during the sessions.

Participants were pleased that all the necessary material was included in the PowerPoint presentations, and each topic was presented in a way that allowed them to internalize and grasp the content effectively.

**Support and availability / Networking / Small group.** Participants appreciated the level of support and availability provided throughout the training, which facilitated their learning and

progression. The trainer's accessibility and responsiveness to their needs were valued, as it allowed for a smoother learning experience.

Networking opportunities were seen as beneficial, enabling participants to connect with others in similar roles or fields. The chance to access and network with individuals facing similar tasks and challenges provided valuable insights and a sense of community. The small group format was appreciated, as it allowed for more personalized attention and interaction with both trainers and participants.

**Virtual format.** Feedback regarding the virtual format of the training highlighted challenges with maintaining concentration throughout the activity, partly due to simultaneous access to distracting elements like email. Participants encountered a few technical issues, such as non-functioning links and difficulties accessing platforms like SharePoint, despite the overall positive reception of the training.

Suggestions for improvement included a return to in-person formats when possible and considering alternative platforms and tools that are already familiar and widely used within the participant group, like Teams, to avoid confusion and enhance user experience. The recommendation leans towards utilizing accessible and less complex tools that may offer fewer capabilities but ensure ease of use and availability for all participants.

#### 4.5.5.1.3 Interviews

During the interviews, participants were asked to share their thoughts and experiences regarding the training program. Given the extended time gap between the training and the interviews, responses were not as precise as the qualitative questions from the post-training questionnaire.



Similar to the qualitative questions asked in the post-training questionnaire, several questions were posed revolving around what aspects of the training they appreciated, which aspects they appreciated less and suggestions for enhancing the training program, offering an opportunity to contribute constructive ideas and recommendations to further improve the overall experience. This approach allowed participants to reflect openly on their training experience and provide potentially more comprehensive responses compared to the post-training questionnaire. The following describes the main themes from the participants' comments.

**Structure.** Overall, people reported being very satisfied with the training program. The structured approach to KB was particularly appealing to many participants. The process, presented step-by-step, was found to be easy to follow. They found the practical examples provided in the training to be helpful in understanding the sequence of tasks and improving efficiency. Additionally, the participants praised the preparation, delivery, and content of the training, which included helpful formats for effective knowledge delivery. They felt that the balance between theoretical content and group discussions was well-dosed.

Similar to the questionnaire findings, some participants found the pacing of the training program to be too fast, which made it difficult for them to absorb the material, suggesting that more time be allotted for certain aspects of the training. Furthermore, a few participants mentioned that they struggled to complete the assignments in between the sessions. They suggested spacing out the sessions and allowing more time for review and application of the content. Participants also suggested providing clearer information about the time needed for exercises and assignments outside of the training sessions to better plan their schedules.

**Content.** Participants found the program to be relevant to their work, as it provided practical examples and tips that they could apply in their professional contexts. They found it very useful to learn how to make their research more efficient and less time-consuming. Participants appreciated the quality of the resources provided, specifically mentioning the usefulness of the website and the tools available. Participants found the access to resources and networking opportunities within the consortium helpful, as it allowed them to expand their horizons and learn from other professionals.

Some participants suggested having more focused cohorts for different sectors, such as social services or health, to provide more relevant examples and discussions. Furthermore, some expressed a desire for more in-depth training on certain topics, such as providing more information on final products like infographics and briefings.

**Trainers.** Participants valued the trainers' expertise and accessibility, stating that they contributed to a positive learning experience. They felt that the trainers were highly competent, approachable, and open to questions and discussions. They appreciated the trainers' openness to providing ongoing support after the training, fostering a sense of community and belonging.

**Interactive and practical format.** The one-on-one interviews revealed that participants enjoyed the interactive nature of the training, which facilitated discussions and encouraged a collaborative learning atmosphere. They valued the opportunity to learn from each other's experiences during the sessions. Participants liked the fact that they were doing KB while learning about it, which facilitated the generalization of their learning and understanding of the processes involved. The hands-on learning approach allowed participants to engage with the material and gain a deeper understanding. Interestingly, one participant mentioned that they sometimes felt less engaged in smaller breakout

groups than in larger group discussions, suggesting that greater emphasis be placed on fostering productive group interactions.

#### 4.5.5.2 Level 2: Learning

The evaluation of participants' learning was done through two questions, asked both in the pre-training questionnaire and post-training questionnaire and seen in the table below:

**Table 4.5**

*Questions from the pre and post-training questionnaire related to Level 2 – Learning*

Five – Point Likert Scale				
1 Novice (Theoretical knowledge, but no experience)	2 Beginner (Theoretical knowledge and some experience)	3 Competent (Some mastery, but without the speed or efficiency of a “performer”)	4 Proficient (Efficient and quick at finding the sought-after knowledge)	5 Expert (Great efficiency and speed in finding the sought-after knowledge)
<b>Question</b>				
1- Overall, how would you evaluate your ability to identify scientific knowledge?				
Five – Point Likert Scale				
1 Not at all easy	2 Slightly easy	3 Fairly easy	4 Very easy	5 Extremely easy
<b>Question</b>				
2- What is your level of comfort in applying these competencies?				
a) Define the information need or decision-making intention.				
b) Choose the most relevant information sources and brokerage products.				
c) Validate, clarify, and anticipate the need.				
d) Find information through a literature review.				
e) Find best practices.				
f) Find researchers or experts.				
g) Facilitate an exercise to obtain information from experts.				
h) Critically analyze information.				
i) Select knowledge to use.				
j) Organize and adapt information obtained to the needs of my organization or clientele.				
k) Connect stakeholders to relevant information.				
l) Evaluate the KTM strategy and its effects.				

To carry out the analyses, dependent T-Tests were done with participants who answered both the pre and post-training questionnaires. This analysis was chosen, as opposed to a repeated measures ANOVA, due to the attrition in participants being considered random. The most significant attrition happens in the first two cohorts, when data was not collected during the training program but rather sent by email to be completed when participants had the time. This leads us to believe that attrition was at random, due to participants forgetting or lacking time to complete the questionnaires, rather than attributed to their experience with the training program.

The data collected from the participants were analyzed and summarized in the form of tables, which are presented in APPENDIX IV.

An analysis of the 13 questions was conducted related to the learnings of participants following the training program. These analyses encompassed a range of the different activities related to KB. The ability to identify scientific knowledge is a competency particularly discussed during the training program. The results of the pre-test ( $M = 2.52, SD = 1.12$ ) and the post-test ( $M = 2.64, SD = .84$ ) indicate an improvement in participants' self-reported ability to identify knowledge  $t(24) = -.90, p < .001$ .

Similarly, the participants' level of comfort to find information through a literature review significantly improved from the beginning ( $M = 2.80, SD = 1.01$ ) to the last session ( $M = 2.85, SD = .93$ ), as indicated by a  $t(24) = -0.326, p < .001$ .

However, participants' comfort in finding researchers or experts decreased during the training program. Specifically, there was a significant decrease in comfort levels between the start ( $M = 2.70, SD = .73$ ) and the last session ( $M = 2.45, SD = .76$ ), with  $t(19) = 1.561, p = .014$ . In contrast, participants' comfort to critically analyze information showed a significant increase over the course of the training

program. The mean comfort level increased from 3.25 ( $SD = .73$ ) at the beginning to 3.45 ( $SD = .76$ ) in the final session, with  $t(19) = -1.165, p = .012$ .

Furthermore, participants' comfort in evaluating the KTM strategy and its effects also significantly increased. The initial comfort level at the start of the training was  $M = 2.79$  ( $SD = .71$ ), while it rose to  $M = 3.16$  ( $SD = .69$ ) in the last session. This increase was statistically significant, as indicated by  $t(18) = -2.348, p = .021$ .

Overall, the findings suggest that the training program had a positive impact on participants' comfort levels in information retrieval, critical analysis, and evaluation.

#### **4.5.5.3 Level 3: Behavior**

KB behaviors were mainly assessed through interviews by asking participants what KB activities they carried out since finishing the training program. The pre- and post-training questionnaire respectively assessed how much time each participant spends and plans to spend per week, on average, on knowledge transfer activities.

##### **4.5.5.3.1 Time spent and planned to spend on knowledge transfer activities**

The following table (Table 4.) details how much time participants estimated to spend on knowledge transfer activities per week before the training and how much time participants planned to spend on knowledge transfer activities per week after the training.

**Table 4.6**

*Time spent and planned to spend on knowledge transfer activities per week*

		Time spent per week	Time planned per week
<i>N</i>	Valid	54	44
	Missing	0	10
	Less than 60 minutes	13 (24.1%)	11 (25%)
	Between 1 and 2 hours	12 (22.2%)	20 (45.5%)
	Between 3 and 7 hours	16 (29.6%)	7 (15.9%)
	Between 8 and 14 hours	9 (16.7%)	2 (4.5%)
	Between 15 and 25 hours	2 (3.7%)	1 (2.3%)
	More than 25 hours	2 (3.7%)	3 (6.8%)

Overall, these results suggest that participants spend little time doing knowledge transfer activities on a day-to-day basis, with 46.3% claiming to spend less than 3 hours per week on KB and 70.5% planning to spend less than 3 hours after the training program.

#### 4.5.5.3.2 Knowledge brokering activities carried out

Several participants described the many activities they have carried out in the area of KB. One participant mentioned having completed a literature review, involving in-depth reading and consultation with colleagues and management partners. Another participant focused mainly on researching ministerial documents and the latest news, working in particular on the development of a protocol. One participant mentioned writing about how their organization works so government bodies can promote it elsewhere. They also mentioned writing short notes to managers to facilitate quick decision-making.

Another participant said he had received many projects, including requests for current practices reviews or recommendations based on data. These requests often required a review of the literature to

support decisions. Finally, one participant mentioned focusing mainly on the review of writings and texts, as well as on meetings with experts in the field.

Of the 17 participants interviewed, six (35%) expressed their inability to really put into application the learning acquired. Two of them indicated that their projects were put on hold, which prevented them from applying the knowledge in a practical way. The others mentioned that they did not have many opportunities to put new learnings into practice, at most on an ad hoc basis during specific assignments. In addition, one participant mentioned that they were unable to put into practice the knowledge acquired due to a sick leave.

Other participants admitted that they had not been able to fully apply the concept of KB. They carried out interviews, but could not carry out the projects until the handing-over of the final report. Despite this, they used strategies such as creating questionnaires, consulting experts, researching information, and submitting reports.

Although some participants were not given an official task related to KB, some of them took it upon themselves to put into practice what they had learned, bringing up a sense of personal responsibility. As said one participant:

I think it is me who can bring it (the implementation) because I am the one with the training, not my manager. The fact that I have the training, the information about the method to be done and what it entails, I believe it is up to me to stay alert to the types of projects, and when I hear things, it is up to me to bring it up again and propose it. I think that is where my responsibility lies. (p6)

One participant emphasized the importance of collaboration with physicians in the decision-making process. They explained that it is the physicians in their department who examine the decisions to be made, the priorities and the direction of the decisions. This collaborative role was recognized by the participant's manager, who found the results of the KB interesting. Accordingly, the manager proposed to discuss these results in co-management meetings.

Overall, participants reported that they did not necessarily carry out all of the KB process, but rather that they dealt with ad hoc requests. Some mentioned that the demands they faced were sporadic, such as searching the literature on best practices and participating in the development of a guide on best practices. These results highlight that participants mostly handled ad hoc requests and were not always able to complete all aspects of KB. The activities undertaken have been fragmented and adapted to the specific needs of information seekers.

#### 4.5.5.3.3 Changes in Approach or Behaviors

The interviews conducted highlight several behavioral changes in participants after completing the training. The most common change observed in their practices was the use of a more structured approach. For example, a participant said that their literature search was now more complete and less biased thanks to the specification of their question and the development of a solid conceptual plan. They are now able to better select relevant and reliable data sources, and can more effectively choose its data collection methods and sources. In summary, they believe their documentary research is more exhaustive, structured, of better quality and leads to a better selection of data.

Similarly, another participant was able to clarify the client's expectations and wishes, thus avoiding the need for a second validation meeting. They were able to communicate the results of the brokerage effectively and officially, which was seen as an added value.



Some participants confirmed that their current practices were already effective methods, serving instead as a confirmation that their current practices were good methods to use regarding KB activities. For example, one participant mentioned that searching for documents from the National Institute for Excellence in Health and Social Services (INESSS) and the ministry was a practice already confirmed during the training.

Otherwise, little tips and tricks were taught during the training that were able to be put into application. For example, the specification of the question to be answered and the appropriate use of Google search engines. Some participants also applied the structured method even for projects that were not directly related to KB.

Overall, participants reported changes in their approaches and practices following the training. They adopted a more structured approach, improved their ability to select and use data sources, and applied specific techniques in finding and presenting information. These changes have led to a better quality of work according to the participants and to results that are more relevant and adapted to the needs of clients.

#### 4.5.5.3.4 Anticipated Knowledge Brokering Activities

Participants expressed different anticipated KB activities. Some plan to establish exchanges with specific people to enrich their knowledge. Others plan to create brokerage products to help management make informed decisions, particularly in the area of telepractice. A participant wishes to use the mandate document to overhaul the library service. Finally, some participants plan to carry out in-depth literature reviews and technology assessments. These initiatives demonstrate their willingness to put into practice the skills acquired during the training and to provide relevant information to stakeholders.

#### **4.5.5.4 Level 4: Results**

The results of KB activities were assessed through interviews by asking participants what were the outcomes of the activities they carried out. Although impossible to attribute the cause of the results to the training program, this section gives an insight into the effects of KB interventions.

Regarding KB interventions, eight participants (47%) provided insights into the effects produced as a result of their involvement in KB activities. These participants shared their experiences and observations regarding the impacts of their KB interventions within their professional settings. The following sections summarize the key findings related to the effects reported by the participants.

First, some participants stressed the importance of monitoring and adjusting practices. Some had set up working committees bringing together members of senior management, department heads and field workers. These committees made it possible to set up new elements and to evaluate the results observed in the field. Thus, the documents and methods were readjusted according to needs and feedback.

Another observation concerns the development of communication tools. Some participants created online and paper-based tools to facilitate the transmission of relevant information to patients during their visit to the facility. These tools aimed to improve communication and provide useful information for patients.

Positive user feedback was also mentioned. Some participants received satisfactory feedback from the people to whom they provided brokerage interventions. These people used the information received to make decisions and implement projects. However, it is noted that the long-term effects are not yet known, as full results are not yet available.

It is interesting to note that the research carried out by certain participants was followed by ministerial directives consistent with their results. This testifies to the quality of their research work and their impact in guiding decisions taken at the ministerial level.

Acquiring external information was highlighted by one participant who sought the advice of experts from other institutions. Although this did not result in a formal report, these exchanges generated discussions with the manager and enabled the participant to orient their professional procedures in a more informed manner.

Finally, another participant presented a concise document to a steering committee, who then decided to implement the proposed method. This brokerage process helped prove the value of the approach and obtain the necessary approval.

## **4.6 Discussion**

The results of this evaluation study provide a first glimpse into the implementation and effects of a KB training program disseminated to diverse health professionals, specifically in the context of remote regions of Québec. The study employed a multi-level evaluation framework, incorporating quantitative and qualitative measures to assess the program's effectiveness. From participant satisfaction and learning gains to behavior changes and results, the data offer valuable insights into multiple dimensions of the training program's impact. The feedback given was overall positive at all levels, with some recommendations given by participants to further improve the training.

### **4.6.1 Implementation**

The implementation of the training program was examined through the lens of three key aspects: dosage, adaptation, and fidelity. Our findings indicate that the program exhibited a high degree

of structural fidelity, with all seven cohorts adhering closely to the planned dosage and core components of the training. Adaptations were undertaken responsively to cater to emerging needs and challenges, such as the transition to a virtual format due to the COVID-19 pandemic and the introduction of new trainers. Although the core elements remained consistent, these adaptations introduced nuanced variations that reflected the evolving pedagogical strategies and the diverse expertise of the trainers.

#### **4.6.1.1 Dosage**

Since the planned sessions of the program were delivered as intended, it can be determined that participants received the complete intervention dosage. The meticulous planning and execution of the dosage signify that any directly observed outcomes can reliably be attributed to the program design. This strengthens the internal validity of the study and ensures that the findings can contribute to the literature on training program effectiveness in health and social services (Clark & Middleton, 2010).

While the aggregate dosage across cohorts was consistent with the planned structure, variances at the individual participant level were noted. Specifically, six participants were absent for a single session, and one participant missed three sessions. Studies indicate that different levels of program dosage result in distinct effects within educational settings, with a greater dosage generally yielding more positive outcomes for students (Li et al., 2022). In this sense, the influence of these individual variations in dosage on the training outcomes would necessitate further exploration to determine whether, and to what extent, these absences may have impacted participants' learning and application of the KB skills.

#### **4.6.1.2 Adaptation**

The program's adaptability to external circumstances such as the COVID-19 pandemic underscores its resilience and relevance. This is particularly crucial for health and social service sectors in remote regions like Québec, which often grapple with dynamic challenges such as the dispersion of the

communities to serve, the remoteness of specialized service centers, the small size of the staff in place, and a high staff turnover rate (UQAR, 2015). The adaptive approach also aligns with the principle of continuous quality improvement, a cornerstone in healthcare training, which suggests that programs should be continually assessed and refined based on feedback and changing needs (Ogrinc et al., 2016).

Nevertheless, if the sample size within each cohort had been sufficient, it would have been crucial to assess if these modifications led to improved application of skills in practical contexts, thereby capturing the full scope of the program's intended advancements.

#### **4.6.1.3 Fidelity**

The biggest change that occurred in this program is the transition between different trainers from one cohort to another. This introduces a variable that could influence both fidelity and effectiveness. It would have been interesting to conduct a comparative analysis of outcomes across different trainers to discern any measurable impact on the program.

Beyond those transitions, the high fidelity to the program's core components implies that the training program is robust and can maintain its structural integrity even when modifications are made. This is a significant finding, especially when considering the program's scalability and potential application in different contexts (Power et al., 2019).

The global context of the pandemic, beyond necessitating a shift to a virtual platform, may however have pervaded other aspects of the training program and its outcomes. The pandemic, with its multifaceted impact on professional environments and individual workloads and stress levels, could influence participant engagement, their capacity to integrate learnings into practice, and the immediate applicability of the training. The disruptions and exigencies of a pandemic might reshape priorities and

available resources in healthcare settings, potentially affecting the implementation of KB activities. A nuanced exploration into how the pandemic might have altered participant experiences, engagement levels and the applicability of the training could provide a layered understanding of the training outcomes and future implications.

The importance of fidelity in training programs is well-established (Pinnock et al., 2017), and our findings corroborate this. High fidelity ensures that the "active ingredient" of a training program are consistently delivered, thus maintaining its effectiveness. Similarly, the study aligns with existing research emphasizing the necessity of context-specific adaptation in healthcare interventions (Valenta et al., 2023).

Interestingly, our findings enrich the discourse on the dynamic interplay between fidelity and adaptation. This aligns with the emerging viewpoint in implementation science which advocates for a balanced approach, allowing for minor adaptations to fit different contexts without compromising the core components (Moore et al., 2015).

#### **4.6.2 Intervention Effects**

In assessing the outcomes of the training intervention, the application of Kirkpatrick's four-level model unveils the diverse impacts of the InterS4 Consortium's educational program, which is tailored to strengthen KB in health and social services. This discussion aims to clarify these effects, address potential biases like the ceiling effect, and integrate qualitative insights to deepen our grasp of the program's influence. The following sections will focus on the ways in which participants' reactions, learning experiences, behaviors, and the resulting professional effects unfold, aiming to provide an objective evaluation of the program's role in developing skilled knowledge brokers.

#### 4.6.2.1 Reactions

The first level of the assessment analyzed the participants' reaction to the training (Level 1 Kirkpatrick).

The findings indicate that the training program was well-received by participants. In general, the participants found the experience to be valuable and relevant to their work. Specifically, they appreciated the practical nature of the training, the relevance of the content to their careers, and the interactive group dynamics. They appreciated the concrete tools, knowledgeable trainers, interactive format, and supportive environment. The utilization of various teaching techniques and the focus on hands-on practice contributed to an engaging learning experience, conducive to learning and skill development.

The observation that the digital format still yielded high satisfaction rates is particularly important in the context of remote regions of Québec. In these geographically isolated areas, logistical constraints such as travel time and associated costs can act as significant barriers to accessing quality training programs, leading to a shortage (Browne, 2010; Strasser & Neusy, 2010). The effectiveness of digital learning platforms could alleviate these challenges, enabling more equitable access to training resources (Reeve et al., 2020). This insight has the potential to inform policy directives aimed at enhancing healthcare capabilities in remote regions, suggesting that investment in robust, high-quality digital training programs and knowledge exchange portals could offer a viable and resource-efficient alternative to traditional face-to-face formats (Competition Bureau Canada, 2022; Quinn et al., 2014).

While the quantitative data from the assessment of participants' reactions portrayed a generally positive reception of the training, it is critical to acknowledge the potential for a ceiling effect. A ceiling effect can occur when the observed variable is near the upper limit of the scale used for measurement,

thereby restricting the range and potentially masking the true variability or intensity of participants' responses (Ho & Yu, 2015; Wang et al., 2008). This is particularly pertinent in the evaluation of educational interventions where participant feedback may hover around the high end of the satisfaction scale, potentially obscuring nuances and variances in participant experiences and outcomes (Voutilainen et al., 2016).

Qualitative data was collected to navigate this and to gain a deeper, more nuanced understanding of participant experiences and feedback. By doing so, the qualitative data operated as a mitigative strategy against the potential ceiling effect, offering a more granulated and comprehensive insight into participants' experiences and the program's impact, thereby enriching the evaluative depth and authenticity of the findings (Bahnon et al., 2023).

Some participants felt that the training program should be offered more frequently and accommodate more participants to ensure greater accessibility. Although the program was well-received, participants did offer suggestions for improvements, such as more tailored content, adjusted pacing, scheduling over a longer period of time and additional resources. Future iterations could benefit from implementing these recommendations to extend the program's reach and efficacy. For practitioners, these suggestions indicate a need for customization in training programs to cater to diverse learning needs and paces. For training program developers, this calls for flexible program designs and perhaps modular structures that allow for such customization without losing the integrity of the content.

The call for more tailored content resonates strongly with the healthcare challenges often faced in remote regions of Québec (Strasser & Neusy, 2010). These areas may grapple with issues such as limited healthcare infrastructure and a scarcity of specialized medical personnel (Desrochers, 2010).



Given these challenges, training programs should consider incorporating modules or content specifically designed to address these localized needs. This specificity would not only make the training more relevant but could also enhance its impact by equipping healthcare professionals with the skills and knowledge directly applicable to their unique work settings. Modular designs could allow for the seamless integration of such specialized content, enhancing both the program's adaptability and efficacy (Abril-Jiménez et al., 2022).

Interestingly, some participants experienced lower levels of engagement when placed in smaller breakout groups compared to engaging in the larger group discussions. Post-hoc hypotheses suggest two potential explanations for this: One possibility is the lack of a facilitator in those smaller groups, which might have hindered the initiation of meaningful conversations. Another hypothesis concerns the automatic allocation of participants into different breakout groups in the online setting, as opposed to the organic formation of groups in a face-to-face setting. This could make it more challenging for some participants to integrate within the group in such a rapid context and could lead to uncertainty regarding the role and space that each person should occupy within the group. Generally, smaller groups are best for problem-solving and complex case studies, while larger groups are ideal for real-time project planning, brainstorming, and presentations facilitated by mobile and synchronous tools (Boettcher & Conrad, 2016).

#### **4.6.2.2 Learning**

The second level focused on participants' learning following the training (Level 2 Kirkpatrick). In this paper, objective learning was not measured but rather the comfort levels in carrying out the different activities related to KB. The study revealed statistically significant improvements in participants'

self-reported abilities to identify scientific knowledge and their comfort levels in information retrieval, critical analysis and evaluation.

This increase in comfort and competency potentially manifests in the participants' day-to-day professional activities in multifaceted ways. Enhanced abilities in information retrieval, critical analysis, and evaluation can streamline the processes of assimilating and applying relevant research findings into practice, thereby fostering EIDM (Gaid et al., 2023; Yost et al., 2014). Furthermore, increased comfort in executing KB tasks may elevate the participants' confidence, efficiency, and efficacy in navigating through the myriad of informational sources and data, particularly in real-time, practice-based scenarios. This, in turn, could facilitate timely, data-driven decision-making and problem-solving, contributing to improved healthcare delivery and policy development (Moore et al., 2017).

Interestingly, participants' comfort in finding researchers or experts decreased during the training program, which diverged from the otherwise positive trends observed in other competency areas. One post-hoc hypothesis for this is the limited coverage of this topic during the training program. The bulk of the training revolved around the ability to locate credible scientific knowledge, oftentimes from databases. Emphasis was put on the integrity and reliability of data sources, whereas less focus was placed on the techniques for identifying and connecting with subject-matter experts. As a result, participants may have left the training with the realization that finding reliable experts is a more complex challenge than they initially anticipated. Given that participants felt most comfortable carrying out the activities they had seen the most during the training, this posits the importance of conducting needs analysis with the participants of a training whenever possible to ensure that the most important elements for the practitioners are emphasized during the training (Bell et al., 2017).

Within the specific context of HSS in remote regions of Québec, the decrease in participants' comfort in identifying researchers or experts takes on additional layers of complexity and relevance. Remote regions' challenges with limited local expertise in specialized areas, and logistical difficulties in establishing and maintaining professional networks as mentioned by some participants, could compound the difficulty of identifying and connecting with subject-matter experts (Desrochers, 2010). The scarcity of readily accessible experts in these areas may necessitate distinct strategies and approaches, such as leveraging digital communication tools or establishing collaborative, inter-regional professional networks, to facilitate connections with relevant experts (Camarinha-Matos et al., 2019).

Additionally, the particular socio-cultural contexts, healthcare and social services (HSS) needs of remote regions might require expertise that is finely tuned to these specificities, further complicating the quest for suitable experts (Browne, 2010; Gillespie, 2023). Thus, this nuanced challenge not only underscores the necessity of enhancing training content regarding expert identification and connection but also invites reflection on developing strategies tailored to navigate the unique challenges posed by the geographical and contextual specificities of remote Québec regions. These results warrant further attention, as they raise questions about potential barriers to effective network formation within the KB process. This aspect is notably under-researched in existing literature and could serve as a focal point for future investigations.

#### **4.6.2.3 Behaviors**

The next level reported on participants' behaviors (Level 3 Kirkpatrick). Participants demonstrated a variety of KB activities carried out such as researching, clarifying the needs and adapt the knowledge to the needs of the organization or clientele. These examples illustrate the diversity of

activities undertaken by participants in the context of their KB responsibilities and support the concept of KB including a wide array of tasks and activities.

Some participants reported being unable to fully apply the learnings acquired. It is important to take into account external factors related to the COVID-19 pandemic such as the suspension of projects, professional or personal circumstances, which can shift priorities and limit the application of knowledge training (Lewin, 2020). These results highlight the need to consider these potential obstacles when designing training programs and to assess the conditions necessary to promote effective use of participants' learning. However, participants mentioned that the tools they acquired during the training remain, and can be reviewed at any moment whenever a KB project comes up. In this sense, the knowledge is not lost even if not immediately applied.

**Time Spent on Knowledge Brokering.** When participants joined the program, they were asked before the session to think of one project or problem that they would like to bring to the table, which would be the project they would be working on as the training continues. This was an opportunity for participants to directly put into application their learning. Nevertheless, some participants mentioned that besides that project done during the training, outside circumstances led to them having to focus their time on tasks other than KB. In the context of these findings, trainees reporting a high usage of their learnings tend to perceive a higher alignment with their organization's strategic goals (Montesino, 2002). An immediate application would then require an alignment with the manager or the organization as a whole to ensure these new tools would be used promptly after the training program (Blanchard, 2018; Caverzagie et al., 2017). Thus, aligning KB activities with organizational priorities and managerial support becomes crucial to navigate these complexities and ensure that the newly-acquired skills are not only retained long-term but actively applied to enhance service delivery and decision-making. In these contexts, alignment might take the form of structured dialogues and collaborative planning between

knowledge brokers and organizational leadership to identify and prioritize areas where KB can yield tangible impacts. Furthermore, establishing mechanisms for ongoing support and integration of KB activities, such as dedicated time allocations, resource provisioning, and integration into organizational workflows and strategies, could fortify this alignment (Edmunds et al., 2013).

Some participants mentioned the interest from mandators to disseminate the data found from the KB initiative. This highlights the impact that KB can have in the decision-making process, especially in the medical and social services field. The proposal to discuss the results in co-management meetings shows the integration and recognition of KB in management and interprofessional collaboration. These observations underscore the importance of knowledge exchange between healthcare professionals and managers, thereby promoting more collaborative and EIDM (Dubois & Lévesque, 2020; El-Jardali et al., 2023; Quinn et al., 2014; Shahmoradi et al., 2017). KB plays a vital role in facilitating this collaboration and providing relevant information to improve decisions made in the medical and social services field (Bornbaum et al., 2015; Glegg & Hoens, 2016).

When designing and implementing KB processes, it is vital to consider that the implementors may not be liberated full-time or at all within their professional role to carry out these activities (Seymour & Rowley, 2014). It should be recognized that the reality of KB practice may involve sporadic activities rather than full application (Kislov et al., 2016). This understanding will better respond to user needs and optimize the impact of KB in specific contexts. In the case of this study, participants reported spending and planning to spend on average approximately 2,5 hours per week on KB, this number decreasing between the start and end of the training program. This could be explained in multiple ways, either participants might feel equipped with more effective techniques or strategies to perform the activity, allowing them to complete it more efficiently. It is also possible that participants or their managers changed priorities following the training program.

**Personal Responsibility and Role Clarification.** In this sense, the role of personal responsibility comes into effect when it comes to applying the teachings in a professional context. Future training may benefit on bringing forward this idea of personal responsibility in applying the learnings and discussing ways and opportunities to do so in their line of work. In a context where many participants are not knowledge brokers but rather, health professionals who can carry out KB tasks, an important aspect of training is to ensure participants can see the opportunities to apply these learnings, or how it can translate into their current role. This aligns with the results found in the Reactions section, where some participants expressed a desire for more relevant examples. This may be difficult to do in a context where participants from different backgrounds get together for a common training. Offering a space for participants to reflect on how it can be applied into their work environment may be a way to ensure that learnings can be applied and that the application can be sustained further than the immediate project they are working on at the moment (Cooper & Wieckowski, 2017). Future training iterations may profit from incorporating structured, role-specific application workshops or simulation activities. These sessions can facilitate participants to critically explore, with facilitator guidance, how KB can be woven into their day-to-day activities, addressing specific challenges and opportunities pertinent to their roles and contexts. Additionally, developing a repository of varied case studies, which illustrate the application of KB across diverse roles and contexts, can serve as a valuable resource for participants to gain insights and draw parallels to their work settings.

**Ad Hoc Nature of Tasks.** This is especially pertinent given that a significant number of participants indicated that they had not performed a comprehensive KB process, but rather engaged in specific aspects of it through ad hoc requests. This observation highlights the infrequency with which a complete KB process is undertaken (Gaid et al., 2022). In such cases, it is possible that future KB training programs should focus on developing proficiency in the key components that constitute KB, rather than an elaborate, multi-step process. This approach may appear paradoxical considering the notable increase

in participants reporting having a more structured approach. Structure, in this context, denotes a series of logically sequenced steps constituting a process. However, in a context where health and social services professionals would be called to carry out KB tasks ad hoc, it may be more beneficial to concentrate on the essential and situationally appropriate tasks, rather than the process as a whole.

Some participants mentioned not having engaged in KB even though certain tasks evoked it, such as presenting information in a synthesized and audience-specific manner. These participants may consider KB to be an exhaustive process and use the given tools in perhaps more limited situations. It can then be more challenging to assess the effectiveness of KB if one focuses solely on the entirety of the process rather than the tasks or steps that are most necessary and suitable for the situation. For these reasons, it could be interesting to consider KB as a set of skills rather than a process.

Considering KB as a set of skills rather than a stringent process opens avenues for enhancing the utility and applicability of training programs. This approach necessitates a pivot in training design towards modular offerings, focusing on discrete, standalone skills that can be directly applied in varied contexts. By isolating and intensifying the focus on fundamental skills such as synthesizing information, critical appraisal, and tailored communication, training can be more adaptive to the sporadic and diverse nature of KB tasks that professionals encounter. Furthermore, this facilitates the integration of these skills into a wider range of professional activities, enhancing the broader applicability and impact of KB in healthcare settings, particularly in the diverse and dynamic contexts found in remote regions (Guthrie, 2009).

#### **4.6.2.4 Effects**

The final level reported on participants' perspectives of the results from carrying out KB activities (Level 4 Kirkpatrick). Here, the participants' findings highlight the positive effects of KB in various aspects

of their professional practice. This includes monitoring and adjusting practices, development of communication tools, positive user feedback, alignment with ministerial directives, acquisition of external information and validation. These findings bear witness to the importance and effectiveness of KB in improving professional practices and making informed decisions (Bornbaum et al., 2015; Cross et al., 2023; Elueze, 2015)

This level begs the question: what are the key indicators that should be looked at when it comes to evaluating KB? Few studies evaluate the effectiveness or impact of KB interventions (Powell et al, 2018 in MacKillop et al., 2020). A recent review carried out by MacKillop and colleagues (2020) shows that KB is measured in many different ways in the literature, from impact on policy, to use by stakeholders, potential long-term impacts of KB efforts, self-reported perceptions of knowledge brokers, perception of KB initiatives, etc. This variety of evaluation angles demonstrate the lack of understanding on how KB works and how to measure its effectiveness in a valid and consistent manner.

Given the vast scope of KB, its dependency on context, its contingent nature, and the intricate social processes it involves, it is improbable that consistent evidence on the effectiveness of these interventions will be found (Chew et al., 2013). The challenges in evaluating the effectiveness of such interventions stem from the typically distributed and unpredictable nature of these roles. This complexity makes it difficult to define and attribute the direct outcomes of KB work (Chew et al., 2013).

Even if the KB process is executed well, a new practice may yield unsatisfactory results. The opposite could be true as well. The quality of the KB process could be evaluated independently of the results. This assessment would necessitate accepting, as an underlying assumption, that the process of KB itself is considered beneficial and that it can lead to favorable outcomes.



Overall, participants had limited amounts of time to conduct KB. However, KB is a complex set of activities often involving multiple steps. It could be hypothesized that the effectiveness of KB is positively correlated with the intensity of effort, which includes time commitment. In other words, a minimal investment of time may lead to limited outcomes. Future research should look into the time required to effectively carry out KB processes. Furthermore, this highlights the need for organizational policies to allocate more time for such activities and to promote KB as a fundamentally collective process that occurs within teams and is backed by the organization at large (Kislov et al., 2017).

#### **4.6.3 Contributions of this Study**

**Contributions to Research.** This study enriches the limited body of literature on the evaluation of KB training programs, particularly in the healthcare sector and remote regions of Québec. By employing a comprehensive multi-level evaluation framework, the study introduces methodological depth to the evaluation of KB training, addressing the call by MacKillop et al. (2020) and others for more nuanced and context-specific evaluations. The study's focus on both quantitative and qualitative measures offers a holistic view of the KB training's impact, a feature often lacking in existing studies.

Moreover, this study sheds light on the "time factor" in KB activities, echoing the common challenge of limited time availability, and sparking further discussions regarding the necessary time investment to effectively carry out such activities.

**Contributions to Knowledge Brokering.** The findings of this study provide concrete recommendations for enhancing the effectiveness of KB training programs. The identification of specific competencies where participants felt less comfortable, such as finding experts, provides actionable insights for training program improvements. It also emphasizes the importance of conducting a needs

analysis with participants to tailor training content, thereby advancing best practices in KB training design.

**Contributions to Healthcare and Social Services.** This study holds implications for HSS in remote regions of Québec. By demonstrating the positive impact of the KB training program, the study provides evidence that could be used to advocate for the broader implementation of such programs, potentially informing policy decisions. The findings point toward the pertinence for organizational policies to allocate more time for KB activities. The creation of dedicated roles focused exclusively on KB activities could provide a more structured and effective approach to knowledge translation and mobilization.

**Contributions to Policy and Practice.** The study has broader implications for policy, especially in the context of digital learning platforms. The finding that the modality of the training (online vs. face-to-face) did not significantly affect participant' learning or satisfaction could influence future decisions about investment in digital training platforms, particularly in remote areas with limited access to in-person training.

#### **4.6.4 Strengths and Limits to the Study**

One of the most significant strengths of this study lies in its use of a comprehensive multi-level evaluation framework, based on Kirkpatrick's Training Effectiveness model. This nuanced approach allows for an in-depth understanding of the training program's impact, from capturing participant reactions to assessing learning outcomes, behavioral changes, and perceived effects. Complementing this, the study employs a mixed methods approach, incorporating both quantitative and qualitative data. This methodological rigor not only enhances the robustness of the study's findings but also provides a more holistic understanding of the complex phenomena under investigation (Scott, 2016).

Another strength of this study is its focus on the specific context of HSS in remote regions of Québec. This focus fills a critical gap in the literature, making the study highly relevant to practitioners and policymakers in similar settings. Additionally, the study takes into account participant feedback for future program improvements, thereby aligning with best practices in training design. This user-centered approach significantly adds to the study's practical utility. Moreover, the study is unique in its exploration of the impact of time commitment on the effectiveness of KB, a topic that remains under-researched.

However, the study is not without limitations. One such limit is the reliance on self-reported measures for assessing the levels beyond reactions. While this method offers valuable insights, it can also introduce a level of bias, and its limitations become more pronounced when evaluating long-term organizational impact, corresponding to Level 4 of the Kirkpatrick Training Effectiveness Model. Specifically, self-reported measures may lack the overall view needed to capture systemic changes or improvements in organizational performance metrics. Moreover, such subjective assessments are often influenced by individual perceptions and may not accurately reflect broader organizational outcomes. Incorporating more objective measures could provide a more accurate assessment of the program's effectiveness. The study design's absence of a control group further complicates the attribution of observed changes directly to the training program, thus posing a limitation to the study's internal validity.

The study also offers a somewhat limited description of the training program. An often-cited limit to research studies involving a training program is the lack of detailed description of the training program. Observation of all the program cohorts was not possible and would have been difficult to describe accurately and precisely the content and activities carried out during the training given the evolution of the program throughout the different cohorts.

Similarly, the study does not offer a description of the participants partaking in the interviews. While it would have been interesting to conduct an attrition analysis to see if there are differences between the characteristics of participants who completed the interviews and those who did not, sociodemographic data was not collected for the interviewees.

Also, given that KB activities are time-consuming, the study's timeframe might not have been sufficient to capture significant behavioral changes related to KB and its effects. Some participants mentioned not having received KB projects yet, still undergoing their projects or being too early in the process for evaluation of the effects. It would have been interesting to conduct an evaluation 1-year post-training to see the changes in behaviors and the effects of the interventions on the organization or on health-outcomes.

Due to logistical challenges, some participants were interviewed several months passed the 6-month mark initially planned. This represents an important limit since the study was designed with a longitudinal design, yet the variability in data collection moments made it impossible to conduct analyses based on the variable of time. Although it could have been possible to remove those participants from the data set, it was deemed that the richness in experiences was more valuable data than the time factor, given the previous point that KB activities can take significant amounts of time and measures at 3 and 6 months may have been insufficient to measure changes over time.

A final limit to this study is the measure of the implementation of the training program. Although the data was analyzed using a theoretical framework, the data would have been more precise and exact had a framework been used for the data collection as well. Stirman developed and updated a framework to report adaptations and modifications to evidence-based interventions (Stirman et al., 2019) called FRAME. This model details in depth the types of adaptations, their reasoning, how they were done, etc.

Future research on measuring implementation could be done using FRAME to ensure that adaptations are reported in the most accurate way possible.

#### **4.7 Conclusion**

The present study embarked on a journey to assess the impacts of a KB training program tailored for healthcare professionals in remote regions of Québec. Utilizing a multi-level evaluation framework grounded in Kirkpatrick's Training Effectiveness Model, the study provides insights into the program's effectiveness across various dimensions: participant satisfaction, learning outcomes, behavioral changes, and perceived effects on professional practice.

The findings demonstrate that the training program was generally well-received, leading to statistically significant improvements in participants' self-reported abilities to identify scientific knowledge and their comfort levels in executing KB activities. This aligns with the broader literature, as evidenced by the meta-analysis by Ebner and Gegenfurtner (2019), affirming the efficacy of digital learning platforms. Moreover, this study contributes to the ongoing discourse on the importance of targeted training programs, particularly in enhancing KB competencies in specialized contexts like healthcare and social services in remote regions.

While the study has its limitations, including the reliance on self-reported measures and lack of a control group, it introduces pioneering research into the understudied area of KB in remote HSS settings. The study's findings are particularly timely given the increasing recognition of the role of KB in HSS decision-making processes. These results underscore the need for a nuanced understanding of the complexities involved in KB.

This study also raises important questions for future research. The decrease in comfort levels for finding researchers or experts, and the limited time commitment to KB activities, invite further investigation. These elements highlight the multifaceted challenges involved in effective KB, suggesting the need for a multi-disciplinary approach to training and implementation. By placing a greater emphasis on the training aspect, future research can contribute to advancing the field of KB and optimizing its impact on the integration of research findings into healthcare policies and practices. Ultimately, empowering knowledge brokers through well-designed and comprehensive training programs can foster a culture of evidence-informed decision-making, leading to improved healthcare outcomes and strengthened organizational learning. Finally, the study calls for an examination into the organizational policies and practices that can better facilitate the integration and effectiveness of KB, especially in specialized and remote settings.

In conclusion, this study stands as a step in understanding the impact and complexities of KB training in HSS settings. It not only adds empirical depth to existing literature but also offers practical recommendations for training program design and implementation. As healthcare and social systems continue to evolve, studies like this provide the empirical grounding needed to guide effective and evidence-informed practices in the realm of KB.

## CHAPTER 5:

### ARTICLE II: DETERMINANTS OF KNOWLEDGE BROKERING IMPLEMENTATION IN REMOTE QUÉBEC HEALTH AND SOCIAL SERVICES SECTOR

#### 5.1 Abstract

**Introduction:** The mixed evidence on the impact of Knowledge Brokering (KB) in health care and social services is reflective of the limited understanding of the essential elements for its successful implementation. This study sought to evaluate the determinants influencing the deployment of KB initiatives within the health care and social service sectors in remote areas of Québec following a training program.

**Methods:** A mixed methods design was used to evaluate the factors related to successful implementation of KB activities. An adapted version of a questionnaire based on the Theoretical Domains Framework (TDF) was used to assess the motivation, capacity and opportunity of participants to carry out these activities before and after the training program. Interviews were carried out after minimum 3 months post-training as well to discuss in depth the work realities of the professionals involved.

**Results:** A limited number of participants played a substantial role in executing KB activities, resulting in minimal opportunities for the broader group to apply what they had learned. These results can be attributed in part to given professional roles and work contexts. Despite this, the training yielded meaningful learnings and insights for participants, who expressed enthusiasm about applying these lessons. Suggestions are offered to establish the necessary conditions for the successful execution of KB initiatives in similar contexts.

**Conclusions:** While a training program can help equip participants with the necessary skills, knowledge, and drive to conduct KB activities, appropriate systems must also be established to create an environment that is favorable for these initiatives.

**Keywords:** Knowledge brokering, Factors, Implementation, Training, Program, Course, Evaluation



## 5.2 Introduction

### 5.2.1 Problematic Gap Between Research and Practice

In various domains, including healthcare, social services, and international development, there exists a persistent gap between research and practice (Bornbaum et al., 2015; Boutcher et al., 2022; Maag et al., 2018). This disconnect hampers the effective translation of evidence into actionable strategies and policies (Chew et al., 2013). Such a disparity results in a cascade of consequences, impacting both healthcare delivery and outcomes. The delayed or absent integration of new, evidence-informed<sup>2</sup> interventions into practice can compromise patient safety and the overall quality of care by sustaining outdated or suboptimal practices (Glasziou & Haynes, 2005).

Additionally, the challenges to transfer solutions from abroad can result in policy failure locally. Therefore, from a practical standpoint, it is crucial to understand the original context from which these solutions arise and determine how they can be tailored to fit the receiving environment (Dabrowski et al., 2019). These challenges can stifle the evolution of healthcare practices, potentially resulting in the persistence of health disparities and impeding advancements in patient care and outcomes.

Despite a recognition of the importance of evidence-informed decision-making, barriers such as market and societal pressures, individual and professional values, or constraints in financial and human resources, to name a few, frequently play a more significant role in the decision-making process than research knowledge (Maag et al., 2018). The gap poses challenges to the quality and efficiency of services, making it an urgent issue to address. One potential solution to improve evidence-informed decision-making (EIDM) is KB (MacKillop et al., 2020).

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<sup>2</sup> The term "evidence-informed" is used throughout this article to be more inclusive of other forms of information.

### 5.3 What is Knowledge Brokering

KB is an innovative approach to bridging the gap between research and practice. It involves the active facilitation of knowledge exchange between researchers, practitioners, policymakers, and other stakeholders (Glegg et al., 2016). It serves as a cognitive bridge between different types of knowledge (e.g. empirical, expert, descriptive), fostering mutual learning and collaboration, with the intent of creating enhanced knowledge, which is both more rigorous and relevant to its specific local application (Cummings et al., 2018; Glegg et al., 2016).

The application of KB in healthcare is particularly pertinent due to the challenges faced by organizations in integrating new knowledge to enhance the quality of care, including investing sufficient resources to adoption or implementation of evidence-informed practices. KB in this context can promote the use of research findings in clinical decisions, policy-making and service delivery (Boutcher et al., 2022).

Research evidence supports the positive impact of KB in increasing knowledge and evidence-based practices among clinicians, implementing guidelines and advocating for organizational change (Boutcher et al., 2022; Cross et al., 2023). However, the effectiveness of KB activities is not universally consistent; it varies depending on the contextual factors, target audiences, and the specific conditions under which it is implemented. These variables may include, but are not limited to, the healthcare system's complexities, the nuanced characteristics of the information being brokered, the intended outcomes of its mobilization, and the disparate needs and perspectives of various stakeholders involved (Bornbaum et al., 2015; Dobbins et al., 2009). It is the interplay of multifaceted enablers that often determines the success of KB initiatives (Elueze, 2015).

Understanding these conditional factors related to the implementation of KB is precisely the aim of the current study and could help serve as a reference for optimizing the effective application of these initiatives in a similar context.

### **5.3.1 Factors that Influence Knowledge Brokering Implementation and Effectiveness**

The complex task of implementing KB is governed by a diverse and intricate set of factors, which are subject to contextual variations and necessitate thorough investigation and understanding (Elueze, 2015).

A 2022 critical interpretive synthesis conducted by Boutcher et al. reviewed the role of middle managers as knowledge brokers in healthcare organizations. The most salient enablers that influenced KB roles, activities and impacts included senior management support (32%), availability of resources such as budget and staff (21%), training and mentorship (21%). Alternatively, the most common barriers were lack of resources (32%), lack of time (32%), staff resistance (21%), lack of training (21%) and dissatisfaction with work-life balance (21%). The results of this study corroborate earlier research, emphasizing that factors such as integration within the organization, possessing the requisite skills and training, and the ability to deploy diverse interventions contribute to maximizing the success of knowledge brokers in achieving desired outcomes (Gaid et al., 2021).

The implementation of KB in healthcare is also marked by a series of complex challenges. Previous studies, including research by Chew et al. (2013), underscore the difficulties in maintaining knowledge broker roles over the long term. There is an inherent uncertainty in the effectiveness of intermediary activities, as knowledge brokers often grapple with ambiguity regarding which actions will succeed, leading to confusion and doubt about where to direct efforts (Newman et al., 2020).

Furthermore, the question of how best to structure the management of these intermediary roles continues to be unclear, reflecting the broader complexity of integrating KB into traditional organizational frameworks. In essence, the field of KB in healthcare remains fraught with challenges related to sustainability, effectiveness, role definition and structural integration (Chew et al., 2013).

#### **5.4 Translating Theory into Action: Approaches to Behavior Change**

Boutcher et al. (2022) highlighted the lack of training as a significant obstacle in the application of KB activities. However, Grossman & Salas (2011) noted that mere training presence does not guarantee its practical application. The transition from training to practice has been a consistent challenge recognized by organizations and researchers. This has led to extensive research and analysis, shedding light on the nuances of training transfer.

Barwick (2020) emphasizes the need for a detailed exploration of change mechanisms, influencing factors, and implementation outcomes, advocating for a research-based, strategic approach to behavioral modifications in these settings. To this effect, two widely recognized frameworks have emerged to address this complexity: the TDF and the Behavior Change Wheel (BCW).

The TDF represents a synthesis of 33 psychological theories and 128 theoretical constructs that were initially identified to understand behavior change in healthcare settings (Michie et al., 2005). This framework has subsequently been refined into 14 domains that encompass key determinants of behavior, such as knowledge, skills, beliefs about capabilities, and social influences. The TDF provides a comprehensive lens through which to examine and categorize the multitude of factors influencing behavior change, making it an invaluable tool for researchers and practitioners alike.

Alternatively, the BCW offers a systematic framework for understanding and designing interventions for behavior change. Central to the BCW is the COM-B model, which posits that behavior (B) is a result of an interaction between Capability (C), Opportunity (O), and Motivation (M) (Michie et al., 2011). The BCW allows for a structured approach to intervention development, linking identified barriers and facilitators to specific behavior change techniques and policies.

Recognizing the complementary nature of these frameworks, some researchers have combined the TDF and BCW to provide a more comprehensive and nuanced approach to behavior change (Atkins et al., 2017; Coulson et al., 2016). The integration leverages the strengths of both frameworks, those being the TDF's in-depth insight into the factors that influence behavior, and the BCW's structured approach to designing interventions. By integrating these elements, the merged framework simplifies the process of translating theoretical knowledge into actionable strategies, thereby improving the success rate of interventions aimed at changing behavior.

Building on the foundation of the TDF, Huijg et al. (2014) developed the Determinants of Implementation Behavior Questionnaire (DIBQ), which expanded the number of domains from 14 to 18. This expansion reflects a tailored approach to meet the specific needs and complexities of the implementation process across various professional settings. The DIBQ serves as a robust tool for assessing the determinants of implementation behavior, contributing to the growing body of knowledge and methodology in the field of implementation science.

## **5.5 Overview of the Health Care and Social Services System in Québec**

In 2015, the health care and social services system in Québec, a Canadian province, underwent a transformational governance reform that resulted in significant centralization, fundamentally reshaping the entire infrastructure (Alami et al., 2021; Gabet et al., 2023). Aimed at enhancing the quality of care

through the integration of services, this reform marked a paradigm shift in the organizational structure of health care in Québec. It manifested in a sweeping consolidation of health and social services organizations, reducing the number from 182 to 34, each encompassing a comprehensive variety of facilities and services for their specific geographic location (Alami et al., 2021; Gabet et al., 2023). This led to the formation of large, intricate organizations known as Integrated Health and Social Services Centers (CISSS, or CIUSSS when affiliated with a university), each employing between 12,000 and 15,000 individuals (Alami et al., 2021; Gabet et al., 2023).

The health and social services must adapt to growing demand and the complexity of population needs, as well as advancements in knowledge and technology. This pushes providers to continuously improve their care, services, and skills to adopt new approaches (Massuard, 2023b). Improving the quality of care and services is a fundamental aspect of Québec's Health and Social Services Network. Within various institutions, dedicated support directions have been established to evaluate care and service quality, foster the growth of professional skills, and put into action promising clinical and organizational practices. However, in many organizations, including health care systems, only a small proportion of these initiatives (between 30% and 40%) are truly integrated long-term (Massuard, 2023a).

The implementation of promising practices in the health and social services system is a complex process that often signifies substantial change. It requires support and coordination, rather than simply distributing research findings or best practice guidelines (Massuard, 2023a; Massuard, 2023b). The initiatives must be responsive to intricate environments and ever-evolving challenges, and the success of improvements is amplified when guided by well-orchestrated strategies (Massuard, 2023a; Massuard, 2023b).

## 5.6 Knowledge Brokering in Québec Health Care and Social Services

In the Québec context, the function of KB is still in the process of being appropriated and understood within member institutions (Lane et al., 2022). Some high-level managers are observed to lack the listening skills required for meaningful discussions, often prioritizing action over collaboration. Training is suggested to bridge this gap, enabling managers to engage more effectively with knowledge brokers (Lane et al., 2022). While participation in training workshops and practice communities occurs with managerial approval, KB activities are not sufficiently recognized as part of the professional tasks within many establishments. There is a call to develop an organizational culture that values knowledge use and fosters a learning and innovative environment (Lane et al., 2022).

Some health professionals emphasize the importance of enhancing the integration of the knowledge broker function to support its appropriation within institutions. They advocate for increased communications about this function with managers, recognizing the need to clarify and promote the role (Lane et al., 2022).

Challenges related to resource allocation hinder the realization of KB activities. Health professionals point to a lack of human resources and time, compounded by competing priorities during the COVID-19 pandemic, as factors that constrained KB within member institutions. Others note a lack of robust internal monitoring concerning the use and effects of KB within member establishments (Lane et al., 2022).

Overall, the current state of KB in Québec's health care and social services system reveals a landscape marked by growing recognition, integration challenges, resource constraints, and opportunities for strategic alignment. Building a supportive organizational culture, enhancing training,

and fostering collaboration are key pathways to realizing the potential of KB in improving the quality and effectiveness of care and services.

### **5.7 What Factors Influence the Implementation of Knowledge Brokering into Practice?**

The understanding of applying promising practices has gained much ground in the past years, with implementation science offering numerous models, frameworks, and tools to guide the process.

However, the context of implementing promising practices through KB within healthcare and social services (HSS) in remote regions of Québec remains to be explored. The specificity of remote regions, characterized by factors such as limited access to resources, geographical isolation and potentially diverse populations, adds layers of complexity to implementation efforts.

Previous sections have illuminated several barriers and facilitators in the broader context of KB, such as organizational support, resource allocation, and the nuances of professional roles and identities within the realm of HSS. In the specific case of Québec, these general challenges and localized ones, for instance the logistical and structural upheavals prompted by healthcare reforms, necessitate a detailed exploration to comprehend and navigate the distinct hurdles and opportunities present.

The following article, therefore, seeks to assess the factors that have shaped the utilization of KB in this distinct context, following a training program delivered to health and social services professionals. The evaluation aims to provide insights that can inform tailored strategies and interventions to facilitate the successful translation of training program learnings into practice in similar remote settings.



## **5.8 Methodology**

### **5.8.1 Setting**

The research setting for this study encompasses four remote administrative regions of Québec. These specific regions were not arbitrarily selected; rather, they are part of the five administrative regions partnered with the Consortium InterS4, an organization dedicated to the development and utilization of best practices for continuous improvement of health and social services offered to regional populations. Consequently, the CISSS and CIUSSS within these regions were the recipients of a training program on KB, facilitated by the Consortium InterS4. The objective of measuring factors influencing KB implementation in these regions is intrinsically linked to this partnership and the associated training program.

### **5.8.2 Description of the Program**

The KB training program, facilitated by the Consortium InterS4, comprises a series of eight modular courses of two hours designed to address the multifaceted nature of KB. At the beginning of the program, participants are introduced to the fundamental concept of KB. This includes an in-depth explanation of what KB entails, how it is structured, the limitations it may encounter, and the opportunities it presents.

The curriculum delves into areas such as pinpointing knowledge requirements, locating sources of information, carrying out research reviews, processing the gathered data, articulating findings in an impactful manner, and forging agreement on the most suitable knowledge. A specific focus is also given on refining research methodologies through the application of digital platforms, including search engines like Google.

The training spans over a period of four weeks and was carried out virtually through Zoom. Each module comprised a combination of theoretical presentations from the trainers, live quizzes to gauge immediate understanding, group discussions to foster collaborative learning, end-of-session summaries for content reinforcement, and an ongoing KB project that participants worked on in-between the training sessions. Details of the program's description can be found in Arnautu & Dagenais (In preparation).

### **5.8.3 Study Design**

This study employed a mixed methods longitudinal design, which was chosen for its capacity to holistically capture both the quantitative and qualitative dimensions of KB practices and factors leading to implementation. Quantitative data were collected at multiple points: before and after the training program, as well as 3- and 6-months post-training. This data aimed to assess the general trends and quantify changes resulting from the training program in terms of capacity, opportunity and motivation. The longitudinal approach was chosen as it allows for tracking the evolution of these factors over time, offering a more in-depth and evolving insight than a cross-sectional study would provide.

To delve deeper into the experiential and practical aspects of KB, qualitative data were collected through semi-structured interviews starting at 3 months post-training. These interviews, lasting between 40 to 60 minutes, were aimed at exploring the intricacies of how participants integrate KB into their professional practice. Conducting two rounds of interviews served to monitor the temporal progression in the implementation of KB practices. By adopting a mixed methods longitudinal design, this study aims to provide a robust understanding of how training in KB affects various facets of professional practice over time. All participants were contacted at each measurement point to complete questionnaires or participate in interviews, regardless of their participation in previous measurement sessions.

#### 5.8.4 Data Collection Tools

The tools for gathering data encompassed the TDF survey and a semi-structural interview guide. All data was originally collected in French and has been translated for this article.

**Theoretical Domains Framework Survey.** The survey is based on the Determinants of Implementation Behavior Questionnaire (DIBQ) built by Huijg et al. (2014), a questionnaire developed to measure the potential behavior determinants of the TDF. An adapted version was tailored to better align with the specific context of KB.

The original DIBQ contains 93 items assessing 18 domains, explaining 63.3% of the variance in item scores and has an internal consistency reliability values ranging from .68 to .93. The survey includes items such as “I am confident that I can deliver [intervention] following the guidelines” and “I have the skills to deliver [intervention] following the guidelines”.

Items that were non-relevant to the current context were removed, such as receiving a financial incentive to carrying out the activities, or giving attention to the participant’s maintenance of the intervention. In this case, employees trained on KB were on a fixed salary and had no financial incentive from carrying out KB activities. Furthermore, the activities measured were to be carried out by the brokers themselves, rather than a third party such as in Huijg et al.’s questionnaire. Nevertheless the 9 items removed, the domains were kept identical except for *Patient* which was changed to *Mandator*. This change is explained due to the end user of a KB process often being the mandator who asked for the project, whereas the patient was the end-user for the intervention being evaluated in the original questionnaire by Huijg and colleagues.

The adapted version includes 84 items with 18 domains as well. The domains were related to the variables of capability, opportunity and motivation of the trainees to implement behaviors related to KB into practice. High scores for capability-related domains signifies that the trainee feels competent, knowledgeable and skilled in KB. High scores for motivation signifies that the trainee feels optimistic about KB and intends to put into action what they have learned. High scores in opportunity means the trainee feels they have the support and the right organizational context to put into action the behaviors they have learned in the training program. All items employed a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree), with 3 indicating neutrality. The full survey can be found in APPENDIX V. This survey was given to all participants and was used as the quantitative assessment of the factors explaining the implementation or lack thereof of KB activities done by practitioners.

**Semi-structured Interview Guide.** The semi-structured interview guide, which comprises 18 questions detailed in APPENDIX III, was meticulously designed to capture in-depth insights from participants. The interview guide aimed to holistically understand the integration of KB post-training through the BCW framework. It centers around pivotal themes, such as participants' ability to conduct KB activities, their perceptions of KB, the opportunities they had to put the learnings into application and the impact of their work environment on those opportunities.

The interview guide was built using best practices in qualitative studies design (Maxwell, 2008). In this sense, questions were open-ended, encouraging participants to share narratives, experiences and reflections. The flow of the guide was structured to transition smoothly from factual elements related to the decision of following such a training program, to general opinions on KB and delving to specific instances, promoting a natural and comprehensive conversation. Interviews were conducted via Teams video conferencing to accommodate the geographical dispersion of participants and to maintain consistency. The guide was reviewed by multiple researchers within the research laboratory of the

authors to ensure its clarity, relevance, and effectiveness. While interviews were anticipated to last 60 minutes, discretion was exercised to further probe areas of interest, ensuring a rich and exhaustive data collection.

#### **5.8.5 Participant Selection**

Eligibility for participation in this study was granted to the 72 healthcare practitioners who had enrolled in the KB training program offered by the allied consortium between June 2021 and December 2022. Approximately one week prior to the start of the initial training session, an invitation detailing the research project was sent to all registrants via email. Accompanying the invitation was a consent form, which attendees were required to complete and return by email, underscoring their willingness to participate in the study. To further acquaint potential participants with the research's scope and objectives, the first author presented the project to each cohort during their inaugural training session. Participants were granted full autonomy in their decision to partake in either, both, or none of the quantitative and qualitative components of the evaluation.

#### **5.8.6 Data Collection**

Data was collected over a 2-year period, starting in June 2021 and ending in August 2023. Participants were asked to complete the first TDF questionnaire at the end of the initial training session. The survey was sent by email to the participants to ensure those who did not complete it after the training session were able to do so in the following week. Given the significance of completing this questionnaire either prior to or at the onset of the training, no subsequent reminder emails were dispatched for this initial phase.

For the final training session, the second TDF questionnaire was sent, with participants having the opportunity to complete it during the session. Participants were sent the questionnaire via email at the end of the day to complete if they had been unable to do so during the session. To ensure comprehensive responses, reminder emails were sent 1-2 weeks post the initial emailing.

A similar emailing strategy was employed three months post-training, as participants were prompted to fill out another TDF questionnaire. Alongside this, an invitation for a qualitative interview was extended. This pattern was mirrored six months post-training, with the final TDF questionnaire being shared and an additional opportunity to partake in an interview being offered.

All TDF questionnaires were circulated using LimeSurvey. In terms of the qualitative component, interviews, which varied in length from 29 to 59 minutes, averaging 42 minutes, were facilitated by the principal researcher via Microsoft Teams.

## **5.8.7 Data Analysis**

### **5.8.7.1 Quantitative Data**

The data derived from the questionnaires was initially exported to an Excel spreadsheet. Data was cleaned by removing entries deemed unsuitable for analysis, such as incomplete or duplicate responses.

Data was then formatted for ANOVA analysis by systematically pairing each participant's responses with their respective participant ID, while entries not directly linked to an existing ID received a distinct participant number. Utilizing IBM SPSS, a repeated measure ANOVA was conducted for each question within the TDF questionnaire. For the purpose of this analysis, the primary within-subject factor was the time of data collection, capturing the evolution of responses over the study's duration. To

provide a structured interpretation, data was systematically organized according to the distinct domains outlined in the TDF questionnaire. Significant differences were accounted at the  $p < .001$  level.

#### **5.8.7.2 Qualitative Data**

The interviews were recorded and initial transcription of the recordings was undertaken either by the author, a research assistant or through the Office Dictation software. To ensure credibility, the author reviewed each transcription against its original recording, rectifying any discrepancies to ensure an accurate representation of the interview content.

The interviews were systematically analyzed using a Deductive Thematic Analysis approach with QDA Miner software. This approach, following the principles outlined in Pearse (2019), allows for the structured exploration of predefined themes. In this study, the analysis was anchored around the 18 domains inherent to the TDF questionnaire, which formed the foundational themes for qualitative exploration and analysis. Based on these 18 domains, a code book was developed to provide a structured framework for data analysis. This codebook, integrated directly into QDA Miner, delineated each code, aligning it with the corresponding domain (or theme), and providing a definition along with a description of qualifiers and exclusions, thus illustrating the conditions under which it is applicable or not.

The code book was then applied to the data, ensuring that codes were present and revising where necessary. Within these overarching themes, the analysis then focused on identifying emergent sub-themes or recurring patterns reflective of participants' experiences and perceptions. Contradictory data or outliers were not discarded but instead were highlighted and discussed in the analysis, providing a more comprehensive understanding of participants' diverse experiences. To prevent potential bias, the author remained reflexive throughout the process, documenting personal reflections and potential

influences on the analysis. The insights from each theme and sub-theme were condensed into descriptive observations, predominantly using the participants' own phrasing to maintain the accuracy of the results. In the final stage, these descriptive observations were combined with the quantitative findings from the TDF questionnaire, fostering a comprehensive, integrated narrative of the results while also acknowledging any contradictions or surprising results that arise.

## 5.9 Results

### 5.9.1 Participants

For the TDF questionnaire, a total of 176 responses were collected. Entries with fewer than 50 items completed were removed. After this data cleaning process, there were 151 viable responses remaining.

**Table 5.1**

*Distribution of responses per cohort and time for the quantitative data*

Cohort	TDF1 (pre- training)	TDF 2 (post- training)	TDF 3 (3-5 months post-training)	TDF 4 (6+ months post training)
1	6	1	2	2
2	15	9	11	3
3	8	6	4	1
4	8	7	5	3
5	7	6	5	0
6	7	6	6	3
7	7	6	4	3
Total	58	41	37	15

A sharp decrease in responses post-training manifested for cohort 1 and 2. This can be explained by the absence of allocated time for survey completion at the training's conclusion. Instead, participants



were sent the survey link via email and had to complete it in their own time within the following week. Learning from the initial cohorts, the subsequent ones were given time during the training, specifically at the end of the last session, to facilitate immediate survey completion. Nonetheless, those unable to complete the questionnaire during the session had the latitude to do so in the subsequent week, courtesy of a follow-up email.

A notable reduction in response rates was also discernible at the 6-month post-training mark, as reflected in Table 5.1.

Regarding the qualitative data, 17 participants were interviewed. Out of those 17 participants, three were interviewed twice—at both the three-month and six-month intervals—resulting in a total of 20 interviews. The other participants were primarily interviewed at the three-month mark. Participants represented various roles across multiple healthcare establishments in Québec. To maintain anonymity in a small community where many knowledge brokers are known to each other, specific participant attributes were withheld.

### **5.9.2 Quantitative Analysis**

The analysis of the internal consistency of responses to the adapted questionnaire revealed Cronbach's Alpha coefficients ranging from .480 to .946, with only 4 of the 18 domains exhibiting an alpha lower than .70.

Repeated measured ANOVAs were carried out to compare the different time measurements of the TDF questionnaires. A pivotal step in this analysis involved pairing data across the different time points for each participant. To facilitate this, existing participant IDs were systematically mapped to a numerical sequence, starting at 1. However, upon completion of this mapping process, the assigned

participant numbers culminated at 92, a figure surpassing the total of 72 participants known to have attended the training.

This discrepancy underscored a potential challenge: multiple participants might have input incorrect IDs when completing the questionnaire, thereby obfuscating the ability to consistently pair responses across different times of completion. Such inconsistencies pose concerns about the reliability of the paired analysis. Nonetheless, amidst these challenges, a pairing was achieved for 38 participants, each with data spanning at least two distinct measurement points.

### **5.9.3 Qualitative Analysis**

The study employed semi-structured interviews to explore the implementation of KB activities over time. Initially planned for two time points—three- and six-months post-training—the interviews aimed to evaluate both early adoption and sustained practice of these activities. Due to logistical challenges like work leaves and scheduling conflicts, the interviews occurred between three- and 14-months post-training. Given this variation and the large majority of interviews at the three-month mark, comparative analyses were not conducted between the two initially planned time points.

### **5.9.4 Factors Influencing Behavior Change: Organization of Findings**

The following sections delineate the findings related to the factors shaping the implementation of KB activities. To ensure a coherent and thematic presentation, the results have been organized based on the three core components of the BCW: Capacity, Motivation, Opportunity. Within each of these overarching categories, finer granularity is achieved by further segmenting the results according to the 18 TDF domains. Furthermore, the analysis integrates both qualitative and quantitative results, encompassing insights from all interviews conducted, regardless of their timing. Results from the survey

are commonly presented using time indicators: T1 corresponds to data collected before training, T2 to data gathered immediately after training, T3 to data taken three to five months post-training, and T4 to measurements made six months and over after the training. The interview data does not involve a comparative analysis based on different time measurements.

## **5.9.5 Capacity**

### **5.9.5.1 D1 Knowledge (Q1-4)**

Knowledge here refers to being aware of the existence of something (Huijg et al., 2014). The TDF questions measured participants' understanding and awareness of their role and responsibilities regarding KB. All four questions had a significant increase in mean score between the initial measurement and the subsequent measurements. These findings suggest a noteworthy shift in participant's understanding of KB and their role in this domain.

These findings are consistent with the data from the interviews. Many participants mentioned that they did not know what KB was before the training, and then had a good understanding of what it was. Similarly, some participants mentioned having done KB already but with the training, having a clearer understanding of how to do it, as mentioned by the following participant: "What is also particular, I find, is that I did the work for 2 years without having the training, relying on a foundation with my colleagues. But now, the training I received has really clarified everything" (p14).

Four participants mentioned that if they were to carry out KB activities in the future, they would have to reacquaint themselves with the material again, as said here: "But as of today, I feel that next time I have to do KB, I will need to actually retrieve my training documents, take the time to reacquaint myself with them. Because I do not do this every week or every month as part of my job" (p5).

This points to the concept of using the material content after a training, otherwise the learnings get lost. Although participants had a good understanding of KB, the ability to put it into application is another aspect, and will be discussed further in the next section of skills.

#### **5.9.5.2 D2 Skills (Q5-7)**

Skills refers to an ability or proficiency acquired through practice (Huijg et al., 2014). The TDF questions here measured whether people had been sufficiently trained and had the competencies necessary to carry out KB activities. Similarly to the previous section on knowledge, a significant increase was observed between T1 and the other measurements for questions 5 and 6. For question 7, the difference was significant only at a .05 level for T2 and T3. This indicates that participants felt they had been sufficiently trained in KB to carry out these activities.

These results are consistent with the interviews. Participants mentioned having had sufficient training to deliver KB. In terms of next skills to acquire, many participants said simply to have the opportunity to put their learnings into practice. This aligns with results from Q7 "I am practiced to deliver KB", where the average scores were respectively T1 = 2.620, T2 = 3.015, T3 = 3.036 and T4 = 2.641, out of a maximum of 5. This points to a fairly low application of KB into their work context. This will be further explored into the professional role section and the organization section.

#### **5.9.5.3 D17 Behavioral Regulation (Q73-78)**

Behavioral regulation refers to any effort aimed at managing or changing objectively observed or measured action (Huijg et al., 2014). Participants are asked to rate themselves on their clarity and foresight in conducting KB, determining circumstances for conducting such activities, handling situations when mandators lack motivation, managing situations with limited time, and scheduling KB activities.

Participants significantly increased scores on the statement “I have a clear plan for how I will conduct KB activities” after the initial measurement. This may indicate that the training had a positive impact on participants’ ability to formulate a well-defined plan to carry out KB activities.

Regarding the circumstances to carry out KB, the situation when mandators lack motivation and limited time, a significant increase was observed at T2 and T3 compared to T1. Regarding having a clear plan when to carry out KB, a significant increase was only observed at T2. These findings may indicate that although participants understand how to carry out KB, there may be challenges regarding how to fit these activities into their schedule.

During the interviews, some participants discussed how they applied KB techniques to structure their work and address challenges. One participant described a situation where they used the KB methods learned in training to address a challenge. The participant organized information, summarized key points, and structured a presentation following tips presented in the KB training. This approach helped them effectively communicate the necessary information to their team and implement the procedure they were presenting.

Overall, participants acknowledged the benefits of structuring their work using the KB process. They mentioned being more patient in waiting for clear directions, valuing validation and collaboration with colleagues, and understanding that the time required for each mandate can vary. They also emphasized the significance of using tools such as Google Scholar and the support of the training to enhance their research and problem-solving skills, resulting in efficient and effective outcomes for their tasks. Participants who mentioned having done KB tasks before the training without knowing what it was reported having a better understanding of the steps needed to carry out their project.

#### 5.9.5.4 D18 Nature of the Behaviors (Q79-84)

The nature of the behaviours refers to the nature of all responses displayed by an individual in any situation (Huijg et al., 2014). These questions measure the extent to which an individual's engagement in KB is characterized by automaticity, awareness and memory recall. No significant changes were observed over time for these questions. However, as seen in table 5.2, low scores can be observed for a few questions. For example, the question about often forgetting to do KB, which shows it is not something people tend to forget to do. However, people also rated low to doing KB without having to remember to do it consciously. This may indicate that it is a very conscious decision to carry out KB.

**Table 5.2**

*Average Scores of Items Related to the Nature of the Behaviors*

<b>Item</b>	<b>Time 1</b>	<b>Time 2</b>	<b>Time 3</b>	<b>Time 4</b>
79. Performing knowledge brokerage activities is something I do automatically.	2.733	2.879	3.017	3.012
80. Performing knowledge brokerage activities is something I do without having to consciously remember doing it.	2.777	2.868	2.984	2.678
81. Performing knowledge brokerage activities is something I do without thinking.	2.814	2.670	2.737	2.444
82. Performing knowledge brokerage activities is something I start doing before realizing that I am doing it.	3.211	3.125	3.313	3.004
83. Performing knowledge brokerage activities is something I rarely forget.	3.126	3.104	3.257	2.867
84. Performing knowledge brokerage activities is something I often forget.	2.574	2.496	2.474	2.554

During the interviews, participants discussed varying degrees of familiarity and engagement with KB. One participant mentioned that they had previously undergone KB training, but over time, they had forgotten the concepts and structure. They admitted not applying the knowledge in their tasks and even

struggled to remember the process. The participant acknowledged that they may have underestimated the value of KB before undergoing the longer training.

Another participant highlighted how they aim to integrate KB into their workflow and make it a natural part of their work methods. They recognized the need to align this approach with their time and mandates and expressed a desire to further develop their skills in KB.

While participants recognized the value of KB, they also acknowledged that its implementation might depend on the demand for such activities. They noted that without a specific request or need, they might not naturally engage in KB.

#### **5.9.6 Motivation**

Motivation refers to the basic drives and automatic processes like habits or impulses, along with reflective processes such as intention and choice, all of which contribute to behaviour change (Coulson et al., 2016).

##### **5.9.6.1 D3 Social/Professional and Role and Identity (Q8-10)**

This domain refers to a coherent set of behaviors and demonstrated personal attributes of an individual within a social or work setting (Huijg et al., 2014). The related questions measured the extent to which participants recognize KB as an integral aspect of their professional responsibilities. Although no significant change was found over time, further descriptive statistics of these items (see Table 5.3) show a median of 4 for all questions, meaning most people agree that KB is an integral part of their professional responsibilities.

**Table 5.3***Descriptive statistics of items related to Social/professional and role and identity in the DIBQ-kb*

<b>Question</b>	<b>M</b>	<b>Median</b>	<b>SD</b>	<b>Skewness</b>	<b>Standard Error of Skewness</b>	<b>Kurtosis</b>	<b>Standard Error of Kurtosis</b>
Q8. Engaging in knowledge brokerage activities is part of my job.	3.8146	4.00	.85949	-.717	.197	.385	.392
Q9. As a healthcare professional, it is my job to carry out knowledge brokerage activities.	3.8543	4.00	.78653	-.819	.197	1.540	.392
Q10. It is my responsibility as a healthcare professional to perform knowledge brokerage activities.	3.9338	4.00	.73638	-1.012	.197	2.131	.392

However, a moderate skewness can be observed, indicating that some people disagreed or felt neutral towards these statements (27% for Q8, 26% for Q9 and 18% for Q10).

Regarding the interviews, some participants had experiences related to KB before formal training. Some participants found that they had unknowingly practiced KB. Participants often engaged in benchmarking and research to develop their services and projects.

Some participants saw KB as a significant aspect of their job, while others considered it part of their responsibilities but not the primary focus. KB was described as being intermittently present in their roles. They mentioned engaging in KB when working on specific projects or interventions that required research and information gathering.



The nature of their roles significantly influenced their engagement in KB. For instance, participants in roles specifically titled as “knowledge broker” or those who had the time and flexibility in their job prioritized KB. As one participant said:

It is the fact that I am a full-time knowledge broker. By training, I am a [clinician] (redacted for anonymity). If I were working solely as a [clinician], I probably would not be able to do it; not due to capability; I would not be able to due to time constraints because of clinical demands. The fact that I hold a position called ‘knowledge broker’ allows me to prioritize it. It is as simple as that. (p7)

#### **5.9.6.2 D4 Beliefs About Capabilities (Q11-19)**

Beliefs about capabilities involve acknowledging the truth, reality, or validity regarding one’s ability, skill, or competence that can be effectively utilized (Huijg et al., 2014). The related statements measured the perceived ease of carrying out various aspects of KB, such as demand analysis, assessing needs and reporting activities to a manager. All questions significantly increased between T1 and the two following measurements. Assessing the needs was seen as significantly easier at T4 also compared to T1. The increase indicates that participants have become more comfortable and capable of performing KB tasks, suggesting a potential enhancement in their skill.

Regarding the interviews, beliefs about capabilities varied a lot between participants, often due to the nature of their work and how much opportunity they had to put the learnings into practice. The study's findings on beliefs about capabilities in KB are exemplified through the detailed narratives of four interviewees: Sarah, Jennifer, Linda, and Michelle (false names and gender). Each case offers a unique perspective, illustrating the evolution of skills and confidence following the training program. These detailed accounts, ranging from structured approaches and strategic task management to the challenges

of a novice, provide a rich understanding of the diverse impacts of training. For more comprehensive insights into these individual journeys and their broader implications, the APPENDIX VI contains extensive elaborations on each case.

A strong factor related to beliefs about capabilities is related to the opportunity to put the concepts into application and the need for timely engagement to prevent forgetting too much about the process and having it becoming unclear. As one participant said:

It seems that the more time goes by, the more you realize that KB is truly complex. Just compiling databases from various sources, if you think it is complex, tools can help clarify things, but if you do not engage with them right away and do not use them immediately, it becomes a bit unclear. The more we learn, the more we realize that we do not know much in the end. (p16)

All in all, the individuals' beliefs about their ability to engage in KB are diverse, with some highlighting the complexity of KB and how their confidence can fluctuate based on their familiarity with different stages. A common theme is that experience, practice and ongoing learning are crucial for enhancing their proficiency in KB.

### **5.9.6.3 D5 Optimism (Q20-22)**

Optimism refers to the confidence that things will happen for the best or that desired objectives will be achieved (Huijg et al., 2014). The related statements measured the extent to which participants maintained a hopeful and positive outlook over time. No significant results were found.

Similarly, no significant results were found from the interviews regarding a particular optimistic or pessimistic expectation. One participant was convinced they would find data on a specific topic before getting confirmation that there were none. They mentioned understanding that sometimes work is done in vain because no results are found or no outcomes result from the process. This observation was also noted by other participants. However, nobody mentioned this as a deterrent to carrying out KB activities.

#### **5.9.6.4 D6 Beliefs About Consequences (Q23-33)**

This domain concerns acknowledging the truth, reality, or validity regarding the results of a behavior in a specific situation (Huijg et al., 2014). These statements collectively measure participants' perceptions, attitudes, and expectations regarding various aspects of knowledge brokerage activities and their outcomes. They assess participants' beliefs about the usefulness, value, enjoyment, and interest in carrying out KB. The statements also explore participants' predictions about the effectiveness, appreciation, collaboration enhancement, satisfaction, problem-solving potential, and recognition associated with adhering to guidelines for KB. Additionally, the statements gauge the extent to which participants perceive recognition for their work from both general recognition and recognition specifically from colleagues in the field of KB.

Although no significant change was found over time, further descriptive statistics of these items (see Table 5.4) show the lowest scores related to KB being enjoyable, being recognized for their KB work and recognized by their colleagues. Nevertheless, participants highly recognized KB as being useful, worth the efforts, interesting and effective.

**Table 5.4***Descriptive statistics of items related to Social/professional and role and identity in the TDF*

	<b>Mean</b>	<b>Median</b>	<b>Mode</b>	<b>Standard Deviation</b>	<b>Variance</b>	<b>Skewness</b>	<b>Standard Error of Skewness</b>	<b>Kurtosis</b>	<b>Min.</b>	<b>Max.</b>
Useful	4.34	4.00	4.00	.56	.319	-.120	.199	-.680	3.00	5.00
Worth the efforts	4.30	4.00	4.00	.60	.361	-.237	.199	-.599	3.00	5.00
Enjoyable	3.84	4.00	4.00	.77	.596	-.340	.199	-.135	2.00	5.00
Interesting	4.17	4.00	4.00	.66	.441	-.343	.199	-.157	2.00	5.00
Effective	4.45	4.00	5.00	.59	.345	-.530	.199	-.639	3.00	5.00
Appreciation	4.17	4.00	4.00	.68	.468	-.228	.199	-.853	3.00	5.00
Collaboration	4.24	4.00	4.00	.65	.417	-.277	.199	-.683	3.00	5.00
Satisfied	4.34	4.00	4.00	.60	.361	-.303	.199	-.642	3.00	5.00
Solve problems	4.21	4.00	4.00	.58	.334	-.048	.199	-.325	3.00	5.00
Work recognized	3.56	4.00	3.00	.70	.495	.270	.200	-.306	2.00	5.00
Colleague recognition	3.63	4.00	4.00	.70	.496	.079	.200	-.300	2.00	5.00

Regarding the interviews, participants held overwhelmingly positive beliefs regarding the usefulness of KB.

The participants share common beliefs about the profound impact of KB on their work. Its structured approach is deemed essential for problem-solving, allowing professionals to systematically address issues with rigor and timeliness, effectively contextualizing information to fit specific organizational needs while considering both scientific evidence and local realities.

Furthermore, KB fosters collaboration and communication across different departments and teams, promoting a culture of knowledge sharing.. Participants emphasize its capacity to drive innovation by exploring novel solutions and learning from best practices adopted by others. They acknowledge that this approach keeps them up to date with evolving trends and enables the adaptation of successful strategies from diverse contexts to their own work.

#### **5.9.6.5 D7 Intentions (Q34-35)**

Intentions refers to a deliberate choice to perform a behavior or a commitment to act in a certain way (Huijg et al., 2014). This section had two statements: (1) I intend to carry out KB activities in the next three months, and (2) I will definitely engage in KB activities in the next three months. Although changes are not statistically significant at  $< .001$ , a significant drop at  $< .01$  was observed between T2 and T3 for both questions. The results further drop between T3 and T4, although not significantly. This suggests a potential decline in participants' intention and commitment to actively participate in KB compared to their initial intentions immediately post-training.

From the interviews, more than half of the participants held clear intentions to carry out KB activities, such as literature reviews, interviewing experts, or creating visual reports, in the following months.

#### **5.9.6.6 D8 Goals (Q36-37)**

Goals refer to mental representations of outcomes or final conditions that an individual aims to achieve (Huijg et al., 2014). This section had two statements: (1) For me, carrying out knowledge brokerage activities is a priority that comes before anything else, and (2) For me, carrying out knowledge brokerage activities is more urgent than working on something else. For the first statement, a sharp decrease was observed between T1 and T4, as well as between T2 and T4. For the second statement, a decrease was observed between T2 and T4. These two findings point to how much KB was a priority to participants. Whereas they thought it would be more important when they followed the training program, there was a sharp decline over time.

This follows the findings of the interviews as well, where several participants stated they were unable to put into application the learnings of the training over time. The allocation of time and balancing competing priorities emerged as key factors influencing the extent of their KB engagement. Challenges such as competing demands, unexpected developments, and the dynamic nature of their roles affected the extent to which participants could engage in KB activities. Several participants noted that their KB activities were currently on hold, with plans and actions paused due to competing priorities, roles changing or managers being away for an extended period of time. While planning and preparation were sometimes still undertaken, concrete actions were limited.

### 5.9.6.7 D15 Positive Emotions (Q61-66)

This domain refers to complex positive reaction patterns that encompass experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event (Huijg et al., 2014). The different statements measure the emotion experiences that participants associate with their engagement in KB activities. These include : feeling optimistic, comfortable, calm, relaxed, joyful and delighted. A significant increase was found between T1 and T3 regarding feeling comfortable carrying out KB activities. This demonstrates that participants felt more at ease carrying out KB after three months, arguably when they've had the chance to put the learnings into practice.

In the interviews, participants overall reported positive emotions in regard to KB. As one participant said:

When I start working on producing the deliverable, that is when I feel content because it seems to lead to something concrete, and I really enjoy that. And then there is also the part where I have gathered all this information, and now I am at [...] figuring out how to condense it to share with decision-makers, leaders, or stakeholders – that is something I love. It is also a creative aspect for me; in KB, we have templates, and we have gathered ideas. I would like to add some flair, some aesthetically pleasing elements, while conveying how I summarize that idea – not just a comparative table. I really enjoy creating the deliverable and sharing it, making sure it is clear and enlightening for the people I collaborate with. (p14)

Similarly, other participants reported feeling motivated and interested after the training, or enjoying the ability to take a step back and research, rather than being in action-mode all the time.

#### **5.9.6.8 D16 Negative Emotions (Q67-72)**

This domain refers to complex negative reaction patterns that encompass experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event (Huijg et al., 2014), including: feeling nervous, pessimistic, depressed, restless, sad, uncomfortable. A significant decrease was found between T1 and T2 regarding feeling uncomfortable engaging in KB activities, suggesting that participants felt most comfortable to carry out KB immediately after the training program. This did not carry over the time 3 and 4, probably because participants did not have the opportunity to put it sufficiently into practice.

Overall, four participants mentioned negative emotions in the interviews associated with KB. One participant mentioned having felt uneasy initially due to KB not being part of their professional practice for many years. Another mentioned a sense of uncertainty and discomfort when starting the research process from not knowing where to start. A third participant wondered openly if the term KB may intimidate or evoke fear among both themselves and their stakeholders. The fourth participant highlighted the extensive and intricate nature of KB and acknowledged the process as potentially demotivating.

#### **5.9.7 Opportunity**

Opportunity refers to the physical and social environment having the right conditions, creating an atmosphere where participants feel capable of engaging in the behaviour (Coulson et al., 2016)

No question had a statistically significant change over time. This is unsurprising given that a significant change in results would mean a significant change in the work context in the healthcare sector. Another pertinent analysis to look at is the average score of these items. None of the items had



any significant results. This may be explained by the domains related to opportunity being potentially the least well conceptualized domains of the TDF (Huijg et al., 2014).

However, factors related to opportunity were widely discussed in the interviews. As is mentioned in the following sections, many themes related to the role of the organization, management and the characteristics of KB, were brought up to explain the challenges of putting these concepts into practice at times.

#### **5.9.7.1 D9 Innovation (Q38-41)**

Innovation refers in this study to any characteristics of KB that hinders or fosters the development of skills and abilities, independence, social competence, and adaptive behavior (Huijg et al., 2014). These statements sought to assess the feasibility, convenience, and ease of integrating KB into one's professional practice. No significant changes were observed but the average scores were generally low for question 39 and 41, indicating that generally, people do not believe that KB takes little time or that it is simple.

This was confirmed by the interviews. Participants agreed that KB is a time-consuming process and that it is not simple. Some participants acknowledged the challenges of time constraints, which sometimes hindered them from fully implementing the formal KB process. As mentioned a participant: *" Well you do not have the time but you have no choice"* (p2), meaning that it is a lengthy process but a necessary one to obtain the outcome they would want. This is confirmed by many participants who acknowledged that each step is important, such as p13: *"sometimes we have the feeling that it is a bit tedious as an approach for the product that we will have in the end (laughs). I do not question its relevance for mandates but sometimes it can be a bit tedious."*

Some participants found value in using selected aspects of KB, such as structuring information and utilizing relevant models. They also expressed a need for flexibility in the approach, particularly in fast-paced contexts.

The structured nature of KB emerged as a common theme, with many participants appreciating the methodical approach it offers. They highlighted how this structured process aids in organizing ideas, clarifying mandates, and presenting information effectively. It was noted that the InterS4 model, in particular, provides a practical framework for defining mandates, understanding needs, and aligning projects.

The participants recognized the value of KB in addressing real-world challenges. They mentioned that while their previous practices often included aspects of KB, the formal method brought clarity to their approach. The participants appreciated the rigorous and systematic nature of KB, as it helps maintain focus, ensures thoroughness, and guides projects from inception to completion.

#### **5.9.7.2 D10 Socio-Political Context (Q42-43)**

This domain refers to any characteristics of the socio-political context that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior (Huijg et al., 2014).

No significant changes happened but a continuous increase from 2.615 in T1 to 2.966 in T4 has been seen in terms of support from government and local authorities regarding KB interventions (Q42).

This aligns with the ministry developing KB initiatives, which has been supported by participants in interviews. For example, one participant (p20) reported different tools recently developed allowing health establishments to know which other establishments have an expertise in a given subject.

Although no other significant results were found through the questionnaires, participants mentioned many aspects of the socio-political context during the interviews.

The underlying theme of those factors is the impact of the covid-19 pandemic. The pandemic disrupted normal operations and roles within the organization. Positions were put on hold or affected by staff shortages and changes. Many facilities faced challenges due to outbreaks and staff shortages, leading to difficult decision-making during the crisis such as prioritizing certain services over others. The pandemic increased the focus on patient care and response to immediate needs for many of the health professionals interviewed. Reduced resources and increased workloads then impacted prioritization and project timelines. Those were significant factors in explaining why some participants were unable to put into practice their learning from the KB training. Despite those challenges, participants aimed to ensure the quality and dissemination of best practices in HSS.

### **5.9.7.3 D11 Organization (Q44-47)**

This domain refers to any characteristics of the organization that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior (Huijg et al., 2014). The related statements measure the availability of resources for KB, the extent of support from organizational management during challenges, the willingness of management to address challenges in KB, and the overall support provided by management to facilitate successful completion of KB activities within the organization. One item (Q44) related to all the necessary resources being available in their

work environment to carry out KB activities. The scores were somewhat low, with 2.862 at T1 and 2.818 at T4 out of five, indicating that participants tended to disagree with the statements.

One challenge oftentimes mentioned was the ability to compare oneself to other regions or centers. This stemmed either from the lack of information available, the challenges in contacting other regions for information or the difficulty in accessing scientific databases. Participants were able to contact the consortium or their professorial departments in the case of a CIUSSS to obtain the articles needed. However, such a detour being needed was seen as time-consuming and demotivating.

Support from the immediate superior was seen very positively. For many participants, their manager was the one who suggested they follow the KB training. Managers would also many times offer sources of information to look into, experts to contact and answer questions.

Participants generally agreed that their organization is open to the idea of KB, especially in contexts where new knowledge is needed. They also mentioned that their tasks sometimes do not naturally lend themselves to KB. They believe that a more systemic approach and clearer demand, possibly coming from higher-level decision-makers, would be beneficial. This could help define needs more precisely, provide clearer references, and focus on targeted areas.

One participant provided insights that echoed these general sentiments while also revealing additional layers of complexity in the integration and practice of KB within their role. Notably, they emphasized the absence of 'KB' in official job descriptions and identified variability in its application among different professionals. They highlighted a divergence in approaches to KB between those who had undergone the training offered by the consortium and those who had not, indicating that the training illuminated the methodology of how to conduct KB effectively. Furthermore, the participant expressed a desire for more structured guidance from leadership on time allocation for given projects

and strategic applications of KB, as well as a need for consistent opportunities to apply these skills in practice to ensure their refinement and integration into regular workflows.

#### **5.9.7.4 D12 Mandator (Q48-49)**

This domain refers to any characteristics of the mandator that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior (inspired by Huijg et al., 2014). The original version of the Determinants of Implementation Behavior Questionnaire by Huijg et al. (2014) had the domain of “patient” because their interventions were related to physical activity given to patients. In this case, KB services are requested by and given to the mandators, hence the adaptation of the domain in this case. No significant outcomes were observed for the statements related to the mandator.

During the interviews, many characteristics of mandators were found. First, mandators had varying levels of awareness about KB, from limited understanding to enthusiastic engagement. Some may not fully grasp the time and effort required for comprehensive KB. Those with a limited understanding may have struggled to articulate their needs clearly and expect quick results, requiring the participants to ask probing questions to understand the scope accurately and to moderate expectations in terms of time and outcome.

#### **5.9.7.5 D13 Innovation Strategy (Q50-53)**

This domain refers to any characteristics of the innovation strategy that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior (Huijg et al., 2014). These statements measure the level of support and resources provided by the organization to facilitate effective KB activities. This includes the availability of necessary materials,

the extent of assistance given to professionals in their KB efforts, and the organization's practice of scheduling meetings to aid professionals in their roles. No significant outcomes were observed for these statements.

Insights into effective strategies for KB were richly shared by participants during the interviews, touching upon several pivotal aspects. The necessity for adequate time and support was acknowledged, emphasizing the importance of being relieved from regular tasks and the valuable role of guidance from supervisors and peers. Limited access to essential resources, such as online databases with scientific literature, posed challenges, underscoring the need for better accessibility to facilitate a robust and expedient KB process. Participants heralded the structured training program, appreciating its dynamic learning experiences, which included group interactions and the sharing of challenges and diverse perspectives. Additionally, coaching and expert assistance were seen as significant enablers, providing valuable insights and problem-solving techniques that simplified intricate tasks like comprehensive research. The effectiveness of collaborative approaches, manifested through working groups, regular meetings, and experience sharing, was highlighted, with such efforts fostering integrative learning and insights generation. The capacity to tailor KB techniques to individual needs and contexts was deemed crucial, with individualized solutions facilitating the navigation of specific challenges and strategy development. Furthermore, participants noted the prevalent lack of awareness within their work environments regarding KB and its potential outcomes, leading some to undertake promotional activities, such as presenting tools and promoting KB as a service to enhance awareness and stimulate increased requests. For a succinct overview of the articulated strategies for effective KB, refer to Table 5.5, which distills the key points from the participants' insights into a synthesized format.

**Table 5.5**

*Participant-Identified Strategies for KB*

<b>Strategy</b>	<b>Description</b>
Time and Support	Need for dedicated time and support from supervisors and colleagues for effective KB.
Access to Information	Importance of access to scientific literature and online databases for comprehensive KB.
Structured Training	Value of dynamic and structured training programs for gaining essential skills and understanding of principles.
Coaching and Assistance	Significance of coaching and expert assistance in providing insights and problem-solving techniques.
Collaboration and Peer Learning	Effectiveness of collaborative approaches, such as working groups and regular meetings, for integrative learning.
Tailored Approaches	Importance of adapting KB techniques to individual needs and contexts.
Promotion	Undertaking activities to promote KB methods and tools among colleagues and stimulate requests.

#### **5.9.7.6 D14 Social Influences (Q54-60)**

Social influences encompass interpersonal dynamics that can lead individuals to change their thoughts, feelings, or behaviors (Huijg et al., 2014). The related statements collectively explore the participants' network of support, endorsement, adherence to guidelines, and willingness to help or listen within the context of KB activities. No significant outcomes were observed for these statements.

Data from the interviews suggests that most social influences were positive. Most colleagues were open, appreciative, and eager to collaborate in KB projects. Colleagues were often receptive to research-based information. Collaboration and sharing among colleagues for feedback and improvement were prevalent. Others found it less relevant or difficult to promote. Some participants felt that KB is not widely known, mainly recognized by those who received training. Overall, coworker support and an environment that values expertise positively influenced the perception of KB.

## **5.10 Discussion**

The present study investigated various factors influencing KB implementation within the HSS of remote regions in Québec. These factors were grouped into the categories of capability, motivation and opportunity. This discussion seeks to interpret the findings in the context of existing research and theoretical frameworks on behavior change and KB.

### **5.10.1 Participants**

A significant diminution in response rates was perceptible at the six-month post-training mark. One plausible explanation for this decline is the increasing temporal distance from the training event. As the gap since the training widened, participants might have felt a diminished sense of immediacy or perceived relevance, thereby impacting their engagement levels with the follow-up survey. The attrition in participation across the different data collection times could have been attributed to a lack of interest in KB by the participants. However, the results related to the sharp decrease in prioritizing KB after 6 months (D8 Goals) point that even participants who answered at T4 recognized that KB was not much of a priority for them at that moment. These results highlight the importance of maintaining engagement over time, using strategies such as alternative methods of data collection or incentives (Teague et al., 2018).

### **5.10.2 Enhanced Knowledge and Skills Initiate a Call for Application**

As Boutcher et al. (2022) had found, skilled knowledge brokers exhibited strong training, expertise and a more profound comprehension of the practical setting compared to those new to KB. However, the absence of formal training in project implementation was an impediment for both. This highlights the critical need to offer avenues for professional development and training, ensuring that both novice and seasoned knowledge brokers are equipped to effectively implement practice change.



Similarly, results here show that the training had a significantly positive effect on participants' understanding of how to deliver KB activities, having the skills to do so and a clear plan with regard to delivering. Although lack of training was a major barrier found by Boutcher et al. (2022), no participant mentioned lack of training as a barrier during the interviews. On the opposite, participants found the training program useful and helpful in understanding what is KB and how to do it. Furthermore, lack of knowledge or skill was presented as an outcome from lack of practice, more so than a barrier to carrying out KB activities. This shows the importance of correctly training knowledge brokers and posits that the training format offered may have been sufficient to overcome this barrier. While the training led to a clearer understanding of the concept, the need for continuous engagement with the material was highlighted, indicating a potential gap between theoretical knowledge and practical application. These insights echo the notion that training alone is insufficient for maintaining skills over time and underscore the importance of continuous practice and application.

It is important to note that failure to apply learnings might result in forgetting what was taught, which is referred to as knowledge or skill decay, or more commonly as the “use it or lose it” principle. Rather than indicating a process, decay illustrates a noticeable decline in the performance of acquired skills or knowledge following a period of non-use (Arthur et al., 1998). A meta-analysis of factors influencing knowledge and skill decay after training found that decay tended to be greater for cognitive criteria compared to skill-based ones and in instances of a less structured learning environment (Wang et al., 2013). Given that KB requires a balance between cognitive abilities and skill, as well as had a very structured method in the training, it makes sense that a certain decay could be observed with time, in concurrence with some participants during the interview mentioning the need to look again into the training content should they need to carry out KB activities in the future. However, the overall knowledge or skills decay was not strong enough to be observed in the quantitative data.

A regression analysis by Wang et al. (2013) revealed that extended periods of non-use, higher cognitive demands and closed-looped tasks are associated with greater decay. Consequently, ensuring the retention of skills and their immediate application in the professional setting becomes paramount. Saks and Belcourt (2006) note that training activities that precede and follow the training session have a more potent relationship with transfer compared to those conducted during the training itself. Moreover, interventions, such as practice, feedback, goal-setting, and fostering a supportive organizational environment, are pivotal for the successful retention and transfer of training (Burke & Hutchins, 2007). A positive transfer climate is characterized by cues that encourage trainees to apply new skills, consequences and remedial actions associated with the accurate or inaccurate usage of skills, and the presence of incentives and feedback as forms of social support from peers and supervisors (Rouiller & Goldstein, 1993). Discussions before, during or after the training on how the KB processes can be applied in their work beyond the case of a KB project may then translate into different forms for different professionals. It is important for professionals following a training program to ask themselves what they will apply in their work context and how they will do so.

### **5.10.3 Navigating Between Conscious Engagement and Automaticity in Knowledge Brokering**

Behavioral regulation findings reflect a positive impact of training on participants' ability to plan and conduct KB activities. Despite acknowledging the utility of KB, participants exhibited a dichotomy between recognizing its importance and seamlessly incorporating it into their routine practices. The data reveals a tendency towards conscious decision-making in KB, not leaning significantly towards automaticity in its application.

In the realm of behavior change, habits are formed through a process of repeated, context-dependent behaviors, eventually becoming automatic responses to contextual cues (Lally et al., 2010;

Wood & Runger, 2016). Automaticity, or the ability to perform a behavior with little or no thought, usually results from consistent repetition in a stable context, which may not be readily available in KB due to its cognitive and project-dependent nature.

Some participants mentioned wanting to integrate KB into their practice and highlighted the challenge in doing so without a specific project requiring KB. These findings emphasize the importance of intentional engagement with the process and suggest that integrating KB into regular workflows may require deliberate effort and support.

Although a conscious engagement may be arguably necessary given the nature of KB, it also opens a dialogue about the degree to which it can become a more integrated, perhaps semi-automated, component of practice. It is pertinent to consider whether KB, with its inherent complexity, can fully transition into a habit, especially in a context where it is practiced part-time, or whether it will always require a level of conscious decision-making. Participants' endeavors to integrate KB into their workflows and the highlighted challenges in doing so without specific projects requiring its application underscore the need for strategies that facilitate its more consistent implementation. The upcoming recommendations section will delve further into potential strategies, grounded in the findings of the present study, to navigate this complex, yet essential, endeavor.

#### **5.10.4 Dwindling Intentions and Goal-Setting Post-Training**

A decline was observed in participants' intention and commitment to actively engage in KB, compared to their initial intentions immediately following the training. The decline in intentions and goals over time, despite initially positive emotions and intentions, is an important result. Research has shown that initial enthusiasm and intent post-training can wane as individuals re-integrate into their regular work environments and face competing priorities (Gegenfurtner et al., 2009).

The decline in intentions and goals over time, despite initially positive emotions and intentions, underscores the challenges in translating training outcomes into sustainable practices. The Theory of Planned Behavior (Ajzen, 1991) suggests that intentions are significant predictors of behaviors but may not always translate into behavior due to various barriers.

One such barrier is the prevailing organizational culture. If an organization's culture does not prioritize or value KB, even the most enthusiastic individuals might find it challenging to integrate KB practices into their daily routines (Ahmad et al., 2023). This is further compounded by external pressures, such as demands from stakeholders or competing organizational priorities, which can divert attention and resources away from KB activities (Burke & Hutchins, 2007).

Alternatively, Rafferty et al. (2013) suggests viewing behavioral intentions as a consequence rather than a component of change readiness. Despite initial enthusiasm, participants later recognized that KB was not a priority in their current work context. Furthermore, participants did not perceive KB as simple or time-efficient, which may have implications for how KB is positioned and supported.

Possible explanations for the observed decline in intentions could include changing priorities, shifts in job responsibilities, perceived challenges, or decreased belief in efficacy. From the interviews, more than half of the participants held clear intentions to carry out KB activities in the following months. This, combined with the positive beliefs about consequences, points that a decrease in activities over time would not be associated with a decreased belief in the efficacy of KB activities. Participants who did not have clear intentions about carrying out KB activities in the coming months also did not perform them much in the past months. Reasons for this were more related to their professional role and their organizational context.

Despite the overall high motivation of participants, no significant results were found regarding optimism. The absence of significant findings regarding optimism may reflect a realistic understanding of the challenges and potential outcomes of KB. This could indicate that optimism alone may not be a determining factor in engaging with these activities, and more tangible supports and incentives may be required.

#### **5.10.5 The Knowledge Broker: A Full-Time or Ancillary Role?**

One determining factor in whether participants had the opportunity to apply KB into their activities pertains to their given role. The professionals implementing KB activities must be actors of establishments and infrastructures that support the implementation of promising practices and provide KTM services within the HSS network. In this study, a clear dichotomy emerged: participants either held full-time, part-time, or no responsibilities related to KB. Consequently, those without dedicated KB roles often sidelined KB projects, treating them as supplementary activities to be pursued if time allowed.

As was already known in the literature, the opportunity for practical application, meaning having the opportunity to implement what they have recently learned in order to transfer it, and the time frame, meaning the time elapsed between the end of training and the application of acquired skills in a work situation, are two big factors that have an influence on transfer of learnings (Burke & Hutchins, 2007; Dunberry et al., 2007; Grossman & Salas, 2011). The results of this study confirm these findings, whereas many participants claimed that they found KB very interesting but did not have the opportunity through given mandates to put it into application.

This leads to questioning who should be carrying out KB activities: health and social services professionals with an already established role yet also trained in KB, or a knowledge broker whose full-time function is to carry out such activities? The results of this article show that the integration of KB

practices requires much more than a good training. Rather, it requires opportunities to put these skills to use and resources to effectively carry out the activities. Based on the results, we posit that, if resources are available, health and social services establishments may consider prioritizing the hiring of full-time knowledge brokers, thus ensuring a focused and specialized approach towards identifying and implementing best practices.

In the case where resources are more limited and the hiring of dedicated knowledge brokers would be difficult, it is then essential for the organization to prompt and support the use of the new skills through opportunities to practice, goals, incentives and performance feedback (Grossman & Salas, 2011). This ensures that KB project can come to light and that time can be given to the employees carrying out these activities. Here, the balance between ensuring that KB is not relegated to the sidelines amid other professional responsibilities, while also recognizing and capitalizing on the embedded expertise and contextual knowledge of existing professionals, becomes crucial. The potential for knowledge brokers who are embedded within teams, understanding their nuances and challenges, versus dedicated knowledge brokers, who bring a specialized and focused approach, opens a dialogue about the flexibility and adaptability of KB practices within varied organizational contexts (Gaid et al., 2021).

Crafting a pathway that aligns with the unique contexts, needs, and resources of each establishment, whether that entails hiring knowledge brokers or ensuring that KB skills are embedded and enacted within existing roles, becomes pivotal. This not only ensures that KB projects are nurtured and brought to fruition but also that employees are accorded the requisite time, resources, and organizational support to effectively navigate these activities (Kislov et al., 2016).

### 5.10.6 Beliefs About Capabilities and Emerging Emotions

The findings of this research confirms a varied landscape of beliefs about capabilities among participants, echoing the self-efficacy theory, which posits that beliefs in one's abilities are pivotal in determining how one approaches goals, tasks, and challenges (Bandura, 1977; Blume et al., 2010; Burke & Hutchins, 2007). Some participants demonstrated high confidence and felt adequately equipped to undertake KB activities, while others navigated through nuances of self-doubt and sought additional support. This disparity in confidence and belief might be attributed to their unique professional experiences, roles, and the degree to which they had opportunities to apply and engage with KB post-training.

The complexity inherent in KB activities, as participants indicated, is a resonant theme in the literature (Elueze, 2015; Ward et al., 2009). Participants highlighted how the multifaceted nature of KB, such as synthesizing information, navigating research platforms, and translating findings, influenced their beliefs about their capabilities. This echoes previous research emphasizing that practitioners' confidence, flexibility and curiosity are key to successful KB activities (Ward et al., 2009).

In alignment with the literature on knowledge and skill decay, participants emphasized the criticality of timely and continuous application of KB skills to maintain and enhance their capabilities. This aligns with Bandura's (1977) concept of mastery experiences, where the ability to gain experience has an impact on our self-efficacy. The decline in confidence and clarity, particularly among those who did not immediately apply KB concepts post-training, underscores the pivotal role of practical application in solidifying and enhancing learned skills.

The significant increase in comfort levels regarding the execution of KB activities, as evidenced by the quantitative data, could be perceptively linked to the enhanced beliefs about capabilities. Positive

emotions, such as feeling comfortable and optimistic, might be seen as a reflection or outcome of strengthened beliefs in one's own capabilities, particularly in conducting KB activities.

On the contrary, the manifestation of negative emotions like discomfort and nervousness might hint at possible barriers or challenges in translating learned capabilities into practical application. The stagnation in comfort levels from T2 to T3 and T4 possibly indicates that while the training may have initially mitigated discomfort or nervousness regarding KB activities, sustaining this comfort might be contingent on practical application and continuous engagement with the KB process. Supportive mechanisms, such as mentorship, coaching, continuous professional development, or peer support networks, could bridge the gap between positive emotions and enhanced capabilities, thereby fostering a conducive environment for the sustained adoption of KB practices.

#### **5.10.7 Beliefs About Consequences and Innovation**

The quantitative data, despite showing no significant change over time, underscores a prevailing sentiment that KB is considered useful, worthwhile, interesting, and effective. However, it is vital to address the lower scores related to enjoyment and recognition in KB work. Does the lack of recognition or perceived enjoyment impact the sustainability of KB practices among participants? The Self-Determination Theory (Ryan & Deci, 2000) posits that activities are more likely to be sustained and internalized when they satisfy three basic psychological needs: autonomy, competence, and relatedness. In this context, recognition, a form of relatedness, and enjoyment, which could potentially influence intrinsic motivation, become paramount for the sustained engagement in KB activities.

The absence of perceived recognition, both general and from colleagues, juxtaposes with the qualitative insights where KB is lauded for its multifaceted benefits, from enhancing decision-making processes to fostering collaboration. The Theory of Planned Behavior (Ajzen, 1991) suggests that beliefs



about the consequences (behavioral beliefs) influence attitudes towards the behavior, which, along with subjective norms and perceived behavioral control, predict behavioral intentions and behaviors. Therefore, while participants might recognize the utility of KB, their actual engagement in KB activities might be influenced by their attitudes (potentially shaped by emotional experiences) and perceived behavioral control (akin to beliefs about capabilities).

A salient paradox emerges from the findings: KB, while being acknowledged for its structured, systematic approach to information synthesis and decision-making, is simultaneously perceived as a complex, time-intensive process. This duality, where the recognized utility of KB is potentially shadowed by its intricate, demanding nature, echoes the sentiments articulated in existing literature (Kislov et al., 2017). The participants, while appreciating the methodical nature and problem-solving prowess of KB, concurrently highlight its depth and time demands, indicating an alignment with broader academic perspectives that underscore the meticulous, detailed nature of KB. This raises a pivotal question: how can the acknowledged utility of KB be harmonized with its perceived intricacies and demands? Some participants navigated the practical realities and constraints of their professional context by adopting a flexible, adaptive approach to KB. They integrated facets of KB into their practices, even when unable to adhere rigidly to the full, structured process. This pragmatic, adaptive approach to KB aligns with perspectives in the literature that emphasize the importance of flexibility and adaptability in KB across varied contexts and constraints (Bornbaum et al., 2015). Despite recognizing KB's utility in addressing real-world challenges and valuing its structured approach, participants navigated the tensions between ideals and practicalities by selectively and strategically incorporating KB into their practices.

In terms of training design, employing overlearning—practicing beyond the point of initial mastery—enhances the transfer, particularly for skills that might not be utilized frequently. By fostering

automatic reactions, overlearning conserves cognitive energy, allowing the trainee to allocate more cognitive focus to addressing new or intricate challenges (Burke & Hutchins, 2007).

#### **5.10.8 Navigating Organizational Challenges: Resources, Managerial Support, and Recognition**

The findings regarding the organizational context in which KB is embedded present a panorama of supportive yet challenging scenarios. The evident gap between the organizational openness to KB and the tangible resources and systemic support available to execute it is notable. The relatively low scores related to the availability of necessary resources to carry out KB activities underscore a critical disconnect between intention and action within organizational structures, echoing challenges documented in extant literature regarding the feasibility of KB within constrained resource environments (Ward et al., 2009).

These findings align with the meta-analytic review of factors on training transfer by Blume and colleague (2010). Transfer climate, meaning managerial objectives, availability of resources and opportunities to put into practice, had the strongest correlation with transfer. Similarly, although our results cannot quantify the importance of the different factors found, it is undeniable that factors related to the opportunity to put the learnings into practice were of the most commonly mentioned by interviewees.

Job resources, such as constructive feedback and autonomy, are essential for managing work demands, fostering personal growth, and promoting learning at the workplace (Salamon et al., 2022). In terms of training transfer, critical job resources include social support, quality relationships, transformational leadership, autonomy, feedback, learning opportunities, and career advancement. Notably, social support has been consistently linked to better training transfer outcomes (Salamon et al., 2022).

The positive role of immediate superiors and managers, who were often the catalysts for participants engaging in the KB training and ongoing activities, shines a light on the pivotal role of leadership support in KB implementation and sustainability. This reflects the sentiments in wider literature that emphasize the criticality of leadership and managerial support and commitment in facilitating and sustaining KB activities within organizations (Birken et al., 2013). However, the nuanced challenge here lies in the divergences in KB approaches and the expressed desire for more structured, strategic guidance from leadership. This highlights a potential gap in consistent, strategic support and direction from leadership in navigating the KB process, an aspect that is crucial for ensuring that KB can be systematically and effectively embedded within organizational practices (Burke & Hutchins, 2007).

While organizations appear to harbor a general openness towards KB, especially in contexts necessitating new knowledge, the participants' experiences suggest a disconnect when translating this openness into structured, systemic practices. The absence of KB in official job descriptions and the variability in its application hint at a lack of formal, systemic integration of KB into organizational structures and roles. This points towards a potential area for strategic enhancement, where the formal recognition and systematic integration of KB into roles and workflows could amplify its impact and sustainability within organizational contexts.

#### **5.10.9 Unraveling the Complexities of Knowledge Brokering Amidst Pandemic Challenges**

The socio-political context within which KB unfolds reveals a narrative of progression, albeit fraught with challenges and interruptions, especially given the pervasive impact of the COVID-19 pandemic. The gradual increase in support from government and local authorities, evident from the rise from a score of 2.615 at T1 to 2.966 at T4, suggests a growing, albeit modest, acknowledgment and endorsement of KB interventions at a broader socio-political level. This aligns with a burgeoning body of

literature that emphasizes the crucial role of socio-political support in enabling and sustaining evidence uptake activities within healthcare contexts (Oliver et al., 2014).

In parallel, the COVID-19 pandemic, as highlighted in the interviews, emerged as a substantial disruptor, realigning priorities, reshaping roles, and redirecting resources. The focus on immediate patient care and crisis response, coupled with reduced resources and increased workloads, inevitably impacted the implementation and practice of KB. These observations concur with the insights presented by Lane et al. (2022), wherein health professionals identified a scarcity of human resources and time, further exacerbated by conflicting priorities amidst the COVID-19 pandemic, as elements that restricted the implementation of KB across member institutions. This reflects global narratives where the pandemic has forced healthcare professionals to pivot sharply, which may have placed planned initiatives and developments, such as KB, in a precarious position.

Despite these challenges, the perseverance of participants to ensure quality and dissemination of best practices provides a testament to the resilience and adaptive capacity of healthcare professionals amidst crisis. It also underscores the intrinsic value they place on KB as a mechanism for enhancing healthcare delivery, even in tumultuous times. This aligns with literature that underscores the pivotal role of KB in ensuring the translation of best practices into healthcare delivery, particularly in contexts of crisis where EIDM is paramount (Martini et al., 2022; Pentzold et al., 2021).

### **5.11 Contributions of the Article**

**Contributions to Research.** This study enriches the current literature on factors affecting the implementation of KB activities in HSS. By employing the TDF in conjunction with the BCW, the study adds a layer of complexity to our understanding of the dynamics that influence KB activities. This builds

on Huijg et al.'s (2014) work by applying the TDF to a specific context—remote regions in Québec—thus answering calls for more context-specific evaluations.

This study also breaks new ground by examining the role of “mandators” in the KB process, adapting the TDF to a new context. Additionally, the study explores the impact of external crises (such as the COVID-19 pandemic) on KB activities, an area under-researched in existing literature. This opens avenues for future research focusing on crisis management and resilience in KB activities.

**Contributions to Knowledge Brokering.** These findings offer actionable insights for refining KB training programs. For instance, the decline in participants’ “Intentions” and “Goals” for carrying out KB activities post-training suggests the necessity for ongoing support mechanisms. This can be in the form of more tangible resources and time allocations. These insights can significantly advance the design and delivery of future KB training programs.

**Contributions to Healthcare and Social Services.** The nuanced understanding of how various factors influence the implementation of KB activities has direct implications for HSS, especially in remote regions. The study highlights the importance of organizational and socio-political context in the effective implementation of KB activities. This is particularly pertinent for policy-making in remote areas where resources are scarce and healthcare needs are unique.

**Contributions to Policy and Practice.** The study’s findings could be instrumental in shaping organizational policies and guidelines, particularly in advocating for dedicated time and resources for KB activities. Moreover, the impact of broader socio-political contexts, especially in light of emergent crises like the COVID-19 pandemic, highlights the criticality of developing policies that ensure the robustness, adaptability, and resilience of KB practices amidst varied external landscapes. This might involve crafting

guidelines that facilitate agile responses to external disruptions and ensure a consistent focus on knowledge-sharing and decision-making that is firmly rooted in the current contextual reality.

### **5.12 Strengths and Limits to the Study**

This study possesses several strengths that contribute to its robustness and the depth of its findings. Firstly, the utilization of the TDF with the BCW provided a comprehensive lens for understanding the complexities inherent in implementing KB activities. This nuanced approach allowed for a detailed exploration of both personal and structural determinants.

Secondly, the mixed methods design, incorporating both quantitative and qualitative data, offered a holistic understanding of the factors influencing KB activities. This multipronged approach enabled the capture of rich, in-depth data that could not have been obtained through quantitative methods alone. The longitudinal nature of the study, featuring quantitative data collection at multiple time points added another layer of depth, allowing for a dynamic understanding of how attitudes and practices related to KB evolve over time.

Related to the design is the use of an adapted TDF Questionnaire, whose validity and reliability had not been measured before the data collection. While the adapted survey preserved the essential structure and intent of the original questionnaire, it is crucial to recognize that any modification to a validated instrument can potentially impact its reliability and validity. Although the domains remained largely consistent, the removal and alteration of specific items mean that the adapted survey's psychometric properties might differ from the original. It would have been optimal to conduct a preliminary validation study on the adapted version, assessing its reliability and validity within the KB context specifically. Such a step would have provided empirical evidence regarding the survey's consistency, sensitivity, and specificity in capturing the desired constructs. However, the use of a base

survey with well-established psychometric properties does provide a foundational level of confidence in the adapted tool's utility. Moving forward, it would be beneficial for future research to delve deeper into the psychometric testing of this adapted survey, thereby ensuring its continued reliability and validity for KB studies.

Thirdly, the focus on HSS in remote regions of Québec not only fills a significant gap in the literature but also offers contextualized insights that could be invaluable for policymakers and practitioners operating in similar settings. Moreover, the study ventured into relatively unexplored territories, such as the role of “mandators” and the impact of external crises like COVID-19 on KB activities, thereby opening new avenues for future research.

While the study offers some methodological and contextual strengths, it presents some limitations that should be considered. The study's geographical focus on remote regions of Québec may constrain the generalizability of its findings to other contexts. Furthermore, the reliance on self-reported data for both the questionnaire and interviews introduces the possibility of social desirability or recall bias, which could affect the validity of the results.

The absence of a control group limits the study's ability to make causal inferences about the effects of the training program. Setting up a control group in naturalistic settings, distinct from controlled laboratory environments, presents a myriad of challenges. For instance, the logistical constraints of identifying and maintaining a comparable control group in specialized fields or remote regions can be daunting due to the limited pool of eligible participants and varying work contexts. Moreover, in such real-world settings, a plethora of external factors could influence outcomes, making it harder to attribute any observed changes solely to the intervention. Some researchers argue that little scientific or applied knowledge is gained from no-treatment controls (Street & Luoma, 2002). Given

these intricacies, the practical implementation of a control group, while academically ideal, becomes considerably complex in such contexts.

Attrition across the various data collection points could introduce challenges in interpreting the robustness and generalizability of the findings. Participants, for the most part, were selected for their interest in participating in the training program. Hence, the findings might reflect the perspective of a group already inclined towards the pertinence of implementing KB practices in their work environment. The participants who remained in the evaluation over time could be seen as even more motivated, potentially amplifying positive outcomes. For other participants, as they reintegrated into their professional roles post-training, the immediate demands and evolving commitments of their work might have overshadowed the initial enthusiasm or perceived obligation related to the training, leaving them with limited bandwidth to engage in ancillary activities like the survey.

This phenomenon could be further compounded by what is often termed 'survey fatigue' (Field, 2020). Having been exposed to similar survey instruments multiple times over the course, participants might have experienced a waning inclination to respond, feeling the repetitiveness of the exercise. Moreover, some participants might have deemed their feedback from earlier surveys as adequately representative of their perspectives, thereby perceiving little value in reiterating their views in subsequent surveys. Lastly, unforeseen external or personal events might have impinged on the availability or willingness of some participants to complete the survey. This decline in response rates underscores the challenges inherent in maintaining consistent participant engagement in longitudinal studies (Seals, 2016).

Due to occurrences of work leaves and challenges encountered in scheduling interviews with select participants, the data collection timeline exhibited variability, ranging between 3 and 14 months,



despite the methodology's initial projection of a 3 to 6-month timeframe. This substantial variation precluded the ability to effectively investigate the factor of time within the interviews. The inability to control for the temporal factor might potentially impact the consistency and comparability of the data across participants, as variations in the time elapsed since training could influence recall accuracy, the salience of training experiences, and the application of learned concepts in practice. Consequently, this temporal variability may introduce an additional layer of complexity when interpreting findings, as differential impacts based on the post-training interval cannot be systematically examined or accounted for in the analyses.

The study also predominantly used self-assessed measures for skills and behavior changes, lacking objective metrics that could have corroborated the self-reported data. Although the TDF includes the domain of "Opportunity," the study found no significant changes although was found to be very pertinent in the interviews. This is possibly due to its less well-conceptualized nature in the TDF as highlighted by Huijg et al. (2014).

Another limit concerns the difficulty in pairing the participant IDs to carry out the repeated measure ANOVAs, which results in a loss of statistical power and a limited ability to analyze within-subject effects. Although the free assignment of participant codes was selected to preserve their confidentiality, the introduction of a unique identifier would have facilitated a more comprehensive longitudinal analysis but also enabled a detailed attrition analysis, providing insights into the reasons behind participant dropout. This insight highlights a significant area for improvement in future research, particularly the balance between protecting participant confidentiality and the need for rigorous methodological tracking.

In summary, while this study makes several significant contributions to the field, caution should be exercised when interpreting its results and implications due to these limitations. Future research could address these gaps to provide a more comprehensive understanding of the factors affecting the implementation of KB activities in healthcare settings.

### **5.13 Conclusion**

This study set out to investigate the factors influencing the implementation of KB activities following a training program in the HSS sectors of remote regions in Québec. Utilizing a mixed methods approach, the study scrutinized multiple determinants framed within the TDF and the BCW.

This research delves into KB within Québec's remote HSS, categorizing influencing factors as capability, motivation, and opportunity. A significant observation was the declining participant engagement post-training, shedding light on the challenges of maintaining long-term interest. Although the training positively impacted participants, a gap persisted between theoretical knowledge and its real-world application, emphasizing the necessity of continuous engagement. Participants recognized KB's importance but grappled with its routine integration, leading to questions about its seamless adoption in practice. Over time, there was an observed decline in KB intentions, influenced by organizational culture and external pressures, such as the COVID-19 pandemic, which realigned professional priorities. This study provides insights into the complexities of implementing KB in Québec's remote regions, bridging academic gaps and offering actionable recommendations for policy and practice in resource-constrained settings.

Despite its contributions, the study is not without limitations, including the potential for generalizability and self-reporting biases. Therefore, while the findings offer a nuanced understanding of the complexities involved in KB activities, they should be interpreted with caution.

Future research should aim to address these limitations, possibly incorporating objective measures and a more diverse geographical focus. Investigations could also focus on the long-term impacts of KB training programs and how they translate into actionable changes in healthcare practices and policies. The study opens new avenues for research particularly around the role of ‘mandators’ in KB activities and the impact of external crises. It would be interesting for future research to explore strategies to enhance the visibility, recognition, and enactment of KB in practice, examining how its structured, systematic approaches can be harmoniously integrated into varied professional contexts and practices within the health and social services domain. Given the evolving nature of healthcare challenges, especially in the wake of global crises, understanding how to effectively broker knowledge is not just beneficial—it is imperative for the advancement of healthcare services and the well-being of communities.

## **CHAPTER 6:**

### **GENERAL DISCUSSION**

#### **6.1 Comparative Overview: Objectives and Methodological Design of the Two Articles**

The two articles of this thesis both aim to evaluate the effectiveness and implementation of KB activities in the HSS sectors following the InterS4 training program. However, they approach the issue from different angles and employ varying methodologies.

The first article assesses the immediate impact of the program, offering a snapshot of its potential to bridge the theory-practice gap, particularly focusing on whether the training led to noticeable changes in attitudes, knowledge and engagements of KB activities among HSS professionals in remote regions. This article serves as a preliminary gauge, presenting an early-stage panorama of the training's influence.

To do so, the first article used a multi-level evaluation framework and focused on the overall impact of the training program. It reveals that the training had a positive impact on participants' beliefs regarding KB and provided them with valuable skills, though it also highlights the need for ongoing support, both from an application perspective and a continuous development perspective. Notably, the article brings attention to the "time factor," showing that effective KB requires a substantial time investment.

The second article goes a step further by delving into the sustained impact of the training, providing insights into the complexities and multi-faceted challenges involved in implementing KB. More than just an evaluation of initial implementation, this article examines the challenges and realities HSS professionals encounter when looking to integrate and maintain KB activities over extended periods.

An often-cited criticism of the Kirkpatrick Training Effectiveness Model is the focus on results without considering the processes or the many factors and contexts that influence training effectiveness in organizations (Alsalamah & Callinan, 2021). Therefore, the second article takes a more granular approach by employing the TDF and the BCW to evaluate the program's effectiveness. It delves into specific personal and environmental factors that influence the implementation of KB activities, such as beliefs, intentions and organizational context.

This design provided a rigorous methodological approach for understanding the various factors that influence the implementation of KB activities post-training.

The TDF was deemed suitable because it offers a comprehensive lens to examine the myriad of motivational, capability and organizational factors that can influence the behavior and practices of HSS professionals. In essence, it digs deeper into the 'why' behind behaviors, ensuring that the evaluation is not just surface-level but probes into the underlying motivations, barriers and facilitators.

The TDF encapsulates a range of domains, from knowledge, skills, and beliefs about capabilities to environmental context, emotions, and social influences. Each of these domains provides insights into different facets of behavior, making the framework a holistic tool for understanding the intricacies of knowledge application in real-world settings. Given that the InterS4 program aimed at effective KB, it was vital to measure not just the acquisition of knowledge but also the multitude of factors that could influence its application. The TDF, with its multifaceted and complementary approach to Kirkpatrick, was aptly suited for this. The BCW was then used as a way to condense all of this information into a more comprehensive ensemble, facilitating afterwards the analysis and extraction of key insights.

However, employing the TDF to evaluate the InterS4 program was not without its challenges. Given the complexity of the framework and its expansive scope, ensuring that each domain was

adequately addressed in the interviews required meticulous planning and execution. Moreover, synthesizing the findings across the various domains to draw cohesive conclusions demanded rigorous analytical procedures. Yet, despite these challenges, the depth and breadth of insights offered by the TDF made it an invaluable tool in understanding the real-world impact of the InterS4 training program.

The article highlights that while optimism and intentions may wane over time, beliefs about the utility and effectiveness of KB remain strong. The findings also indicate that the health or social worker's role, the organizational and the socio-political contexts play a pivotal role in the implementation of KB activities.

By using complementary approaches, the articles attempt to offer a comprehensive view of how training in KB could be a viable step forward to the pressing challenges faced by HSS professionals, particularly in remote regions.

### **6.1.1 Comparative Analysis of Findings**

In the realm of KB, training initiatives and their subsequent implementation present a spectrum of challenges and opportunities, as evident from the findings of the two articles. An analysis of these articles reveals both converging insights and diverging nuances that help provide a comprehensive understanding of the KB landscape in this given context.

Both articles consistently underscore the importance of training in enhancing knowledge and skills in KB. Article 1 emphasizes the improved understanding of KB principles post-training, accentuating the criticality of hands-on application to retain and fortify this knowledge. On the other hand, Article 2 resonates with these findings, accentuating the significant increase in participants' knowledge post-training. However, Article 2 provides a nuanced perspective, highlighting that while training helped

bridge the knowledge gap, the practical application of this knowledge remains a challenge, suggesting potential discrepancies between theoretical understanding and its tangible execution. The results underscore the necessity for organizations to provide the essential resources and allocate adequate time for professionals to carry out KB mandates effectively.

This notion of application, or rather the lack of it, inevitably leads to the decay of knowledge, a theme resonant in both articles. Article 1 alludes to the inherent challenges in applying KB, pointing to the constraints of time and the intricate demands of the task, which may result in knowledge attrition. Article 2 delves deeper into this arena, underscoring the accelerated decay in cognitive abilities as opposed to skill-based aspects, particularly if not regularly applied (Wang et al., 2013). Furthermore, it highlights the importance of continuous engagement, suggesting that training sessions, devoid of regular reinforcement through practice, might not sustain the skills over time.

The table 6.1 below presents a consolidated overview of the key findings, their implications and potential future directions from both articles.

**Table 6.1**

*Overview of Key Findings and Recommendations from Articles 1 and 2*

<b>Article Section</b>	<b>Key Findings</b>	<b>Implications/Theoretical Contributions</b>	<b>Recommendations/Future Directions</b>
<b>First Article</b>			
4.6.1 Implementation	High structural fidelity in training, with adaptations for changing needs, like the pandemic.	Highlights the importance of fidelity and adaptability in training programs.	Maintain core elements while adapting to local needs and challenges.
4.6.1.1 Dosage	Consistent delivery of planned sessions, but individual variances in attendance.	Stresses complete participation for optimal training outcomes.	Explore impact of varying attendance on learning outcomes.
4.6.1.2 Adaptation	Program adapted to virtual format due to COVID-19.	Demonstrates need for flexibility in training programs, especially in remote areas.	Implement continuous quality improvement in training design.
4.6.1.3 Fidelity	High fidelity with variations in trainers.	Emphasizes role of implementation fidelity in intervention success.	Comparative analysis of outcomes with different trainers.
4.6.2 Intervention Effects	Diverse impacts of training program revealed by Kirkpatrick's model.	Validates comprehensive approach in evaluating training programs.	Explore nuances of each level of impact, considering ceiling effect.
4.6.2.1 Reactions	Training well-received; high participant satisfaction with practical, relevant content and interactive format.	Highlights the effectiveness of digital formats in remote settings.	Enhance training accessibility and tailor content to specific regional needs. Consider facilitation strategies in small groups for better engagement.
4.6.2.2 Learning	Statistically significant improvements in KB competencies; decrease in comfort finding researchers/experts.	Suggests the need for comprehensive coverage of all KB aspects in training.	Expand training to cover expert identification and connection, especially in remote areas.
4.6.2.3 Behaviors	Varied application of KB activities; external factors like COVID-19 affected usage.	Demonstrates external influences on the application of learned skills.	Design training with external contexts in mind; support implementation post-training.
4.6.2.4 Effects	Positive impacts of KB on professional practice; challenges in evaluating effectiveness.	Underlines the complexity in measuring the impact of KB interventions.	Develop nuanced indicators for evaluating KB effectiveness.
<b>Second Article</b>			



5.10.1 Participants	Decline in response rates post-training likely due to increased temporal distance.	Highlights engagement challenges in longitudinal studies.	Strategies to maintain engagement over time, like alternative data collection methods or incentives.
5.10.2 Enhanced Knowledge and Skills	Training improved skills and understanding of KB; gap between knowledge and practice.	Importance of practical application in training.	Continuous practice and real-world application post-training.
5.10.3 Conscious Engagement vs. Automaticity	Tendency towards conscious decision-making in KB.	Challenges in translating training into automatic professional behavior.	Support strategies for integration of KB into regular workflows.
5.10.4 Dwindling Intentions and Goal-Setting	Decline in participants' intentions to engage in KB post-training.	Intentions may not always translate into actions.	Investigate factors influencing sustained motivation.
5.10.5 The KB Role : Full-time or Ancillary?	Varied roles practice KB, with some as full-time, others as ancillary.	Challenges traditional understanding of KB roles.	Consideration of full-time KB roles or embedding KB skills within existing roles.
5.10.6 Beliefs About Capabilities and Emotions	Varied confidence in KB abilities; emotions played a role in capability perception.	Role of belief in one's abilities in task approach.	Support mechanisms like mentorship and peer networks.
5.10.7 Beliefs About Consequences and Innovation	Participants viewed KB as useful but faced challenges in enjoyment and recognition.	Importance of recognition and enjoyment in sustaining KB practices.	Adopting a flexible, adaptive approach to KB and overlearning the more complex elements of KB
5.10.8 Organizational Challenges	Gap between organizational openness to KB and availability of resources.	Discrepancy between intention and action in organizations regarding KB.	Enhance organizational support through formal recognition and systemic integration of KB.
5.10.9 Pandemic Challenges	COVID-19 pandemic disrupted KB practices, reshaping priorities.	Impact of external crises on implementation of new initiatives.	Develop adaptive strategies to maintain KB practices in crises.

One of the pivotal challenges in the application of KB, as discussed in both articles, revolves around its role and integration within organizations. Article 1 touches upon the need for dedicated time allocations for KB activities, especially in contexts where time is a scarce resource. Article 2, however,

delves into this challenge more profoundly, dissecting the integration of KB into existing professional roles. It raises a pertinent question: Is it more effective to have dedicated knowledge brokers or to embed KB responsibilities within existing roles? The article leans towards the former, positing that a dedicated role might ensure a specialized focus on identifying and implementing best practices. However, in scenarios where resources are limited, the article emphasizes the necessity for organizations to provide opportunities, incentives and feedback to those integrating KB into their existing roles.

Embedded within these dilemmas is the omnipresent challenge of organizational and environmental constraints. While Article 1 sheds light on the practical challenges, emphasizing limited time and resources, especially in remote regions, Article 2 offers a panoramic view of the broader challenges. It draws attention to the disruptive impact of the COVID-19 pandemic, reshaping priorities and redirecting resources. Moreover, it underscores the potential disconnect within organizations, where there might be a general openness towards KB, but a lack of tangible resources and systemic support to translate this openness into action.

Perhaps one of the most distinctive insights from Article 2 revolves around the emotional and psychological dimensions of KB implementation. While Article 1 offers a more pragmatic viewpoint, focusing on the tangible challenges, Article 2 delves into the intricate array of beliefs about capabilities, intertwined with emerging emotions. It underscores the complex interplay between beliefs, emotions and the practical application of KB. The article suggests that positive emotions might reinforce beliefs about capabilities, potentially creating a virtuous cycle driving both emotional well-being and enhanced knowledge application.

Overall, both articles collectively underscore the complexity of implementing KB in HSS settings, given the rich panorama of individual, organizational and contextual factors. They also complement each other in terms of breadth and depth: while the first offers a more holistic, overarching view, the second provides detailed insights into the psychological and behavioral elements involved.

Most importantly, both studies emphasize the need for a multi-faceted approach to training and support. While the training program succeeds in equipping participants with the necessary skills and competencies, the findings suggest that additional elements such as ongoing support, time allocation and organizational commitment are crucial for the sustained implementation of KB activities. These findings serve to enhance our understanding of how training programs can be designed and improved, while also shedding light on the challenges and barriers that professionals may encounter in the field.

## **6.2 Contribution of the Thesis**

From a broader societal perspective, successfully bridging the gap between theory and practice can catalyze significant improvements in HSS outcomes. When HSS professionals are empowered with the latest knowledge and skills, and when they're equipped to apply these in their daily practices, the population stands to benefit. Enhanced population experiences, improved HSS outcomes, and more efficient HSS delivery can be direct ramifications of this bridged gap.

In this sense, the combined findings of these two articles attempt to extend the academic and practical discourse on KB in several ways. Together, they enrich our understanding of how KB training programs can be effectively designed and implemented in HSS, particularly in remote regions.

### **6.3 Advancement of Methodological Approaches**

The integration of the Kirkpatrick Training Effectiveness Model in tandem with the TDF/BCW in this research signifies a methodological stride and offers a robust approach for future studies. As far as we know, the two have been employed separately, largely due to their distinct focal points; the Kirkpatrick Training Effectiveness Model emphasizes evaluation of training programs across varied levels, from participant reactions to long-term effects, while the TDF/BCW is rooted in identifying and addressing barriers and facilitators to behavioral change. The challenge of merging these methodologies arises from their differing scopes and objectives, as well as potential complexities in capturing data that satisfies both frameworks simultaneously. However, the synergy between these approaches allows for a nuanced understanding that none could achieve in isolation. By harnessing the evaluative depth of the Kirkpatrick Training Effectiveness Model with the behavioral insights of the TDF/BCW, a multi-dimensional, context-rich analysis was achieved, providing a more holistic view of training efficacy and its impact on behavioral change.

The integration of these methodologies in this research holds implications for future studies, even beyond the HSS sectors. Industries and sectors that grapple with the dual challenges of training efficacy and behavioral change, such as education, organizational development and public policy, could benefit from adopting this combined approach. It offers a blueprint that allows researchers to evaluate training programs' immediate impacts while also gauging their long-term effects on behavior, bridging the gap between knowledge acquisition and its practical application.

#### **6.4 Expansive Understanding of Knowledge Brokering Implementation**

Moreover, individually, each article provides valuable insights into specific aspects of KB—be it the time factor to carry out these activities, self-efficacy or psychological domains like beliefs and intentions.

The exploration of the "time factor" does not merely emphasize the duration required to execute KB activities, but also underscores the need for professionals to proactively allocate and prioritize sufficient time weekly. Understanding the time commitment necessary for effective KB can significantly influence both the design of training programs and the organizational strategies that facilitate it. Professionals and organizations can then be better positioned to strategize and allocate resources, ensuring that KB activities are not sidelined due to time constraints but are seamlessly integrated into routine workflows.

Similarly, delving into self-efficacy sheds light on the profound role that participants' confidence plays in their engagement with KB. Recognizing the significance of self-efficacy, training programs can be structured to bolster participants' confidence through experiential learning, mentorship and constructive feedback. This refined approach would not only amplify the impact of training but would also foster sustained and enthusiastic engagement with KB post-training.

These articles challenge and expand the current discourse on KB. Collectively, they offer a comprehensive portrait that covers both the macro and micro aspects of the subject. By highlighting often-underestimated aspects, the research underscores the multifaceted nature of the challenges and opportunities involved in implementing KB in HSS settings.

## **6.5 Training Program Format**

The combined findings of these articles not only contribute to the academic realm but also hold potential for real-world applications, especially in the nuanced context of remote regions. In areas where access to resources and expertise is often limited, and where HSS professionals grapple with unique challenges, the tailored insights from this research can provide a roadmap to address these constraints.

The emphasis on the design and refinement of training programs, such as InterS4's, highlights the importance of contextually tailored approaches that account for the realities of remote settings. For instance, the inclusion of digital or blended learning modules could cater to professionals in isolated areas, providing them with flexible and accessible learning opportunities.

The diverse composition of cohorts, encompassing HSS professionals from different regions, did not hinder the creation of collaborative groups and actually facilitated the exchange of varied perspectives. Nonetheless, some participants suggested that trainers provide context-specific examples, especially if the training program expands in scale and allows for more tailored content.

The presence of two trainers was well-received and the structure of the content was also appreciated. While views were divided regarding the 2-hour blocks, nonetheless, the overall consensus appears to be that a 2-hour block is appropriate for an online format. However, there should be a slightly extended interval between sessions to allow integration of the content and the completion of the assigned exercises.

## **6.6 Ecosystem of Support**

Beyond the training program format, the articles underscore the necessity of an ecosystem of support. In contexts where professionals might often feel 'on their own', the emphasis on ongoing

mentorship, time allocation and organizational commitment becomes even more pronounced. Such a supportive framework can mitigate feelings of professional isolation, foster community building among HSS providers and facilitate the continuous application of learned skills in real-world contexts.

Indeed, the studies hint at the need for a multi-stakeholder approach to truly leverage the benefits of KB. Such an approach is paramount because of the diverse perspectives and resources that each stakeholder group brings to the table. HSS professionals, being on the frontline, offer firsthand insights into client services or patient care nuances and the on-ground challenges of implementing new knowledge. Managerial staff, with a broader organizational view, can provide the requisite infrastructure, allocate resources and prioritize initiatives. Policymakers, on the other hand, hold the power to shape the broader regulatory and policy framework that can either inhibit or foster the effective implementation of KB.

However, while the involvement of multiple stakeholders can be a potent force for enhancing the impact of KB, it also presents its set of challenges. Aligning diverse groups around common objectives, managing potential conflicts of interest and ensuring streamlined communication can be complex. On the flip side, the benefits are manifold: a common understanding of challenges, pooled resources and the creation of a unified front that can champion the cause of KB more effectively.

Leadership plays a pivotal role in orchestrating this multi-stakeholder collaboration. For KB to flourish, especially in remote regions, leaders must foster an environment that prioritizes learning, collaboration and innovation. Moreover, leaders should be equipped to navigate the complexities of multi-stakeholder engagements, ensuring that diverse voices are heard and that the collective expertise is harnessed.

In essence, for KB to truly realize its potential, especially in the challenging terrains of remote regions, a concerted effort from all stakeholders is essential. Leadership, in particular, must be proactive, informed and supportive, ensuring that the bridge between knowledge and practice is not just built but also consistently traversed.

## **6.7 Implications for Policy and Resource Allocation**

The findings of this study underscore the imperative for targeted resource allocation and policy formulation to support KB in HSS. Enhanced KB holds the potential to translate to more informed decision-making, leading to optimized HSS interventions. This, in turn, can reduce redundant or ineffective treatments, potentially translating to cost savings for the HSS system. Moreover, by ensuring that HSS practices are grounded in the latest evidence and research, we can anticipate improved patient or client outcomes, further reducing long-term societal costs associated with complications or prolonged treatments.

However, policymakers advocating for increased resources for KB may confront several challenges. There is the perennial issue of competing priorities within constrained budgets. In the short term, the returns on investment in KB may not be immediately tangible, making it a tougher sell in policy circles. Furthermore, there may be a learning curve associated with understanding the intricacies of KB, which might pose as a barrier for its widespread endorsement among policymakers.

Nevertheless, a strong policy framework that supports KB has potential for broader societal impact. Enhanced evidence-informed practices can improve public trust in the HSS system, as patients and communities recognize the commitment to delivering the best possible care. This trust is particularly vital in an era of information overload, where distinguishing credible information from misinformation is challenging. Furthermore, with equitable KB, even remote and underserved regions can benefit from



cutting-edge HSS practices, thereby promoting care equity. Such equity ensures that every individual, regardless of their geographical location or socio-economic status, has access to the best available care.

## **6.8 Recommendations**

Our findings suggest that while training programs can successfully instill the value and knowledge of KB activities, they are not sufficient for long-term implementation. The decline in intentions and goals indicates the need for organizational policies that facilitate integration of KB activities. Based on the findings, the following recommendations can be made:

1. Enhance organizational support and resources to facilitate KB, including information access and managerial backing.
  - **Why:** At a high level, the practice needs to have buy-in from management and plans on how to implement that practice.
  - **How:**
    - Develop a structured framework that integrates KB activities into regular workflows, ensuring systematic and routine engagement.
    - Establish a dedicated KB unit or assign KB responsibilities within existing roles, with clear KPIs and recognition in performance assessments.
  
2. Foster clear communication and expectation management with mandators.
  - **Why:** Ensures alignment between organizational objectives and KB activities, facilitating targeted, relevant, and impactful interventions.
  - **How:**
    - Facilitate leadership training to ensure managers comprehend the value and process of KB, enabling them to provide effective support and resources.
    - Engage leadership in developing and endorsing KB strategies, ensuring visible backing and commitment.

3. Build awareness and value for KB within the organization and among colleagues.
  - **Why:** Awareness within the organization ensures that more opportunities will surface regarding KB projects.
  - **How:**
    - Develop a KB ambassador program where trained professionals become advocates, sharing insights and benefits of KB within their respective departments.
    - Implement a recognition program that acknowledges and rewards KB efforts and achievements, enhancing its perceived value among peers.
    - Embed KB achievements within professional development and promotional criteria, ensuring tangible benefits for engagement in KB activities.
  
4. Develop adaptable innovation strategies that include structured training, coaching, collaboration, and promotion.
  - **Why:** The complexity of KB suggests the need for continuous support and development opportunities to ensure the maintain of KB activities over time long after the training program.
  - **How:**
    - Embed continuous learning opportunities, ensuring the training is not a one-off event but a continuous journey, thereby supporting long-term skills development and adaptation.
    - Establish a coaching system where experienced KB professionals provide one-on-one guidance, navigating specific challenges and opportunities in real-time KB activities.

- Develop a mentorship program where novice KB professionals are paired with experienced peers, fostering an environment of shared learning and support.
  - Build a KB community of practice, creating a platform for professionals to share insights, challenges, and solutions, fostering a collaborative learning environment.
  - Leverage digital platforms to facilitate virtual collaborations, ensuring sustained interactions despite geographical and temporal barriers.
5. Consider the broader organizational context and be prepared to adapt to changing landscapes and emergencies.
- **Why:** The capacity to separate a KB process into isolated steps may be necessary at times. KB could therefore be seen as a toolbox rather than a process, where individual tools can be used whenever needed.
  - **How:**
    - Establish a KB emergency response framework that details streamlined processes, roles, and responsibilities during crises, ensuring rapid and coherent action.
    - Develop a KB toolkit that provides guidance on adapting and applying KB tools and strategies amid varied and emergent contexts, enhancing its utility and applicability.

## **6.9 Limits and Future Research**

The synthesis of these two articles brings to light some collective limitations and points toward avenues for future research that are distinct from the individual constraints and recommendations of each study.

### **6.9.1 Assessing the Broader Effects**

One limitation is that while both studies delve into the effectiveness of a KB training program and its impact on HSS professionals, they do not fully explore the downstream effects of these KB interventions on HSS outcomes. In other words, does the improved KB capacity translate into better patient care or more effective service delivery?

The omission of these effects was not an oversight but rather stemmed from methodological constraints and the scope of the research. Capturing the direct and indirect outcomes of KB activities presents a labyrinth of complexities. Knowledge gained from research is merely one factor of many that influence the choices of policymakers and practitioners, whereas economic market forces, societal demands, individual and occupational values, financial and staffing limitations, as well as mental and emotional considerations often play a larger role in shaping decision-making (Maag et al., 2018; Scarlett et al., 2020).

Isolating the impact of KB amidst this intricate web poses significant challenges. Moreover, given the temporal nature of some outcomes, a longitudinal study spanning several years might be requisite to discern tangible effects, which was beyond the scope of the current study.

The broader implications of this limitation are multifaceted. On one hand, while both articles make a robust case for the efficacy of KB training programs and their immediate impact on professionals,

skeptics might argue the utility of such programs if the bridge to tangible patient or client outcomes remains nebulous. In essence, without unequivocal evidence linking improved KB capacity to enhanced HSS outcomes, garnering widespread support, especially in policy circles or among stakeholders with fiscal concerns, might be challenging.

This highlights a crucial avenue for future research. There is an imperative to design studies that can methodically untangle and quantify the impact of KB activities, given that the time and opportunity for application is present. Further exploring the nuanced interactions between individual, organizational and contextual factors in the long-term implementation of KB, while undoubtedly challenging given the myriad of confounding variables, would be invaluable. More studies have come to light in recent years showcasing the necessary skills to conduct KB and the barriers and facilitators to carrying out such activities in different contexts. It would be interesting for future research to develop a KB framework to help knowledge brokers decide on the best course of action and priorities given their situation. It would not only validate the investment in KB training programs but also provide a clearer roadmap for HSS professionals and policymakers, ensuring that the ultimate goal of superior patient care and service delivery remains at the forefront.

Recent studies have exhibited a trend towards creating measures for effectiveness. Maag et al. (2018) crafted measures to gauge the input of individual knowledge brokers, while Scarlett et al. (2020) pinpointed measures for evaluating KTM and capacity-building efforts. Similarly, Tudisca et al. (2018) formulated measures to evaluate evidence utilization in policymaking. These advancements hint at a renewed focus on appraising the impact of KB endeavors. Employing uniform measures could lead to more consistent and comparable research, enhancing our understanding of the most effective KB practices across different scenarios.

## 6.9.2 Overlooking the Economic Implications

Another limitation is the lack of focus on the cost-effectiveness of implementing such training programs on a large scale. While individual effectiveness and organizational changes are discussed, the economic aspect remains largely untouched. This is crucial for policymakers who need to justify budget allocations and for organizations concerned with return on investment.

The reason for sidestepping cost-effectiveness stemmed from methodological and scope considerations. Firstly, the research questions were designed to explore the experiences of HSS professionals, rather than the quantitative financial implications. Moreover, evaluating cost-effectiveness necessitates a distinct methodological approach, encompassing the collection and analysis of a myriad of financial data points, ranging from the direct costs of training to the indirect savings accrued from improved patient outcomes and resource optimization. Given the complexities involved in such an economic evaluation, it was deemed outside the immediate purview of this study.

Conducting a comprehensive economic evaluation poses its own set of challenges. Acquiring accurate financial data, especially in a HSS setting, can be intricate given the multiplicity of funding sources, reimbursement models and indirect costs. Furthermore, attributing specific cost savings directly to improved KB, amidst other concurrent interventions or changes in HSS delivery, could be methodologically challenging.

However, this limitation underscores a pivotal direction for future research. As policymakers and organizational leaders increasingly demand evidence of cost-effectiveness to justify budgetary allocations, it becomes imperative to conduct rigorous economic evaluations of KB training programs, while also ensuring the proper implementation of KB activities. Such assessments would not only reinforce the value proposition of these programs but also provide a holistic perspective, including both

the qualitative transformations and quantitative economic benefits, thereby solidifying the case for widespread adoption and investment in KB.

### **6.9.3 Integrating Knowledge Brokering with Broader Professional Development**

In terms of future research, there is a pressing need to investigate how KB training integrates with other forms of professional development and training. Is there a synergistic effect or do professionals find it challenging to reconcile different methodologies and approaches?

As the landscape of professional development evolves, a pivotal area awaiting exploration is the integration of KB training with other forms of professional growth. Could the combination of KB with, for example, clinical skills enhancement or leadership training, create a more holistic professional, adept at both EIDM and effective patient care?

Anecdotally, some HSS professionals have intimated that KB provides them with a structured approach to evidence-based practice, which, when coupled with other training, enhances their overall clinical acumen. They suggest that KB serves as a bridge, connecting the theoretical foundations of their profession with the pragmatic realities of HSS delivery. However, on the flip side, other professionals could struggle with reconciling diverse training methodologies. For instance, while KB emphasizes evidence-based decision-making, other trainings might focus more on experiential or heuristic methods.

Such juxtapositions could lead to challenges. Professionals might find themselves in a dilemma, torn between conflicting methodologies or perspectives. There could be instances where the structured approach of KB might appear to clash with more intuitive clinical judgment, necessitating reconciliation. While these challenges are surmountable, they underscore the need for training programs to be



designed with an integrative lens, ensuring that KB not only complements but also enhances other forms of professional development.

Thus, future research should delve into this integration, seeking to discern whether there is a synergistic effect that amplifies the benefits of each training or if professionals find themselves navigating a maze of conflicting methodologies. Such investigations could pave the way for more comprehensive training paradigms, ensuring that HSS professionals are not only well-versed in evidence-based practices but also skilled across a wide range of abilities that define modern HSS delivery.

#### **6.9.4 The Socio-Political Landscape and Global Events Influencing Knowledge Brokering**

Furthermore, the socio-political context, especially the influence of global events like the COVID-19 pandemic, provides fertile ground for future research. How do such significant events affect the implementation of KB activities? Do they accelerate the need for effective knowledge translation, or do they relegate such activities to the background due to more pressing concerns? Although this thesis seems to point towards the latter option, it would be interesting to see studies where participants' professional roles were at the forefront of such activities.

In addition to the undeniable impact of the COVID-19 pandemic, the broader socio-political milieu encompassing global events, policy shifts and economic fluctuations warrants further investigation in the context of KB. Consider, for instance, the emergence of global health and social crises, technological advancements, or significant policy changes in HSS. Each of these events could have ramifications for how KB activities are perceived and prioritized.

The COVID-19 pandemic, particularly, has brought forth unique challenges for HSS professionals in remote regions of Québec. The urgency of the situation necessitated a swift pivot towards immediate

patient care, sidelining certain long-term KB activities. While the findings of this thesis suggest that such pressing needs might relegate KB to the periphery, questions arise on how the narrative might shift for professionals whose roles demanded rapid assimilation and dissemination of emerging knowledge. Should this research have been conducted outside of a significant global event, the challenges or priorities highlighted might differ starkly. Already, the tone of urgency and scale of changes seemed to differ between professionals interviewed in 2021 versus those interviewed in 2023.

Furthermore, reflecting on other global trends, one could consider the impact of digital HSS revolutions. Each of these trends or crises could influence the urgency, methodology or prioritization of KB activities. As we move forward, it becomes imperative to consider these dynamic global events and trends, understanding their nuanced impacts on KB, and thereby tailoring training and implementation strategies to be agile, relevant and effective in diverse and evolving contexts.

#### **6.9.5 Expanding Horizons: The Promise and Challenges of a Multi-Disciplinary Approach**

Lastly, future research could benefit from a multi-disciplinary approach, involving not just HSS professionals but also experts in education, policy formulation and organizational behavior. For example, it appears that bridging the gap between research and practice through KB within the educational sector remains an area lacking sufficient research, challenging to delineate and poorly comprehended at present, although recent demands have emphasized the critical need for more research (Rycroft-Smith, 2022). Different sectors using their own methodology, concepts and tools could provide a more holistic understanding of the complexities involved in implementing effective KB activities and ultimately lead to innovative solutions in HSS settings.

The realm of KB, while anchored in HSS, intersects with various disciplines, each offering unique lenses to understand its intricacies. Advocating for a multi-disciplinary approach amplifies the depth and breadth of insights, painting a richer, more nuanced picture of the challenges and opportunities in KB.

Experts in education, for instance, distinguished by their deep knowledge of pedagogical strategies, could offer valuable insights into refining KB training modules on KB, ensuring that learning methodologies align with the diverse needs of HSS professionals. Their expertise could refine the design of training programs, optimizing them for better retention, application, and adaptability. Meanwhile, specialists in organizational behavior might provide insights into the dynamics of team collaborations, leadership styles and the cultural nuances of HSS settings. Their perspectives could illuminate the often subtle, yet potent, organizational challenges and enablers that influence the uptake and sustainability of KB activities.

However, weaving together insights from diverse disciplines is not without its challenges. Logistically, coordinating multi-disciplinary teams demands meticulous planning, clear communication protocols and alignment of goals. Methodologically, reconciling diverse research approaches, from quantitative studies preferred in some disciplines to ethnographic or qualitative leanings in others, requires a thoughtful, integrative research design. Navigating differing epistemological stances and values across disciplines might necessitate a foundational consensus-building process.

To harness the benefits of such a multi-disciplinary approach, research designs could adopt a mixed methods strategy, combining quantitative assessments with qualitative explorations. Participatory action research, where stakeholders from various disciplines collaboratively identify issues, co-design interventions, and assess outcomes, might be a promising avenue. Such designs foster mutual learning, iterative refinement and holistic understanding, effectively channeling the strengths of each discipline.

In sum, while the multi-disciplinary approach holds the promise of richer, more comprehensive insights, its successful execution demands a careful, collaborative and adaptative research design that respects and integrates the wisdom of each participating discipline.

## CONCLUSION

The conclusion of this thesis highlights the promising potential of KB training programs for improving HSS practices, particularly in remote regions. The InterS4 training program, as evaluated through the lens of the Kirkpatrick Training Effectiveness Model, the TDF and the BCW, has shown to equip HSS professionals with knowledge, skills and attitudes necessary to carry out KB activities.

Based on this collective assessment, several recommendations can be made. First, it advocates for the integration of KB training programs like InterS4 into broader professional development curricula for HSS professionals. This integration should be subject to rigorous measurements of long-term impacts and cost-effectiveness.

Second, future research should adopt a multi-disciplinary and longitudinal approach, involving diverse stakeholders, to more comprehensively assess the long-term efficacy, sustainability and broader impacts of such training programs.

Lastly, given the evolving socio-political landscapes and the significant impact of global events like pandemics on HSS priorities, adaptive frameworks for implementing and evaluating KB must be developed. These frameworks should allow for the flexibility to adapt to changing needs and priorities, while still maintaining the core objectives of effective knowledge translation.

In summary, the articles collectively suggest that while KB training has made considerable strides, much remains to be explored and understood. By addressing the limitations and embracing the recommendations outlined here, future work can make meaningful contributions to this important field, ultimately benefiting both HSS professionals and the communities they serve.

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## **APPENDIX I : PRE-TRAINING QUESTIONNAIRE**

Le questionnaire qui suit vise à obtenir un portrait général de votre profil en plus d'évaluer la place du transfert de connaissances dans vos fonctions.

Ici, le transfert des connaissances réfère à l'ensemble des activités et des mécanismes d'interaction favorisant la diffusion, l'adoption et l'appropriation des connaissances les plus à jour possible en vue de leur utilisation dans la pratique professionnelle en matière de santé. Ces activités et mécanismes d'interaction prennent forme à l'intérieur d'un processus englobant le partage, l'échange et la transmission de connaissances entre plusieurs groupes d'acteurs œuvrant dans différents environnements (INSPQ, 2009).

Merci beaucoup !

### **Partie A: Profil**

**A1. Indiquez ici votre code de questionnaires (le chiffre de votre mois de naissance et les trois dernières figures de votre code postal. Par exemple : 31F9). Ceci a pour but de regrouper vos questionnaires pré et post formation : \_\_\_\_\_**

### **A2. Votre région**

- Abitibi-Témiscamingue
- Bas-Saint-Laurent
- Chaudière-Appalaches

- Saguenay-Lac-Saint-Jean
- Autre : \_\_\_\_\_

**A3. À quel moment suivrez-vous la formation? (mois-année) \_\_\_\_\_**

**A4. Quel est votre âge ? \_\_\_\_\_**

**A5. Votre type d'emploi**

- Cadre supérieur
- Cadre intermédiaire
- Professionnel administratif
- Professionnel clinique
- Autre : \_\_\_\_\_

**A6. Votre ancienneté au sein du réseau de la santé et des services sociaux**

- 0 - 4 ans
- 5 - 9 ans
- 10 - 14 ans
- 15 - 19 ans
- 20 ans et +

**A7. Combien de temps consacrez-vous par semaine, en moyenne, à des activités de transfert de connaissances ?**

- Moins de 60 minutes



- Entre 1 et 2 heures
- Entre 3 et 7 heures
- Entre 8 et 14 heures
- Entre 15 et 25 heures
- Plus de 25 heures

**A8. De manière générale, comment évaluez-vous votre habileté à repérer des connaissances scientifiques ?**

- Novice (Connaissances théoriques, mais aucune expérience)
- Débutant (Connaissances théoriques et une certaine expérience)
- Compétent (Une certaine maîtrise, sans avoir la rapidité ou l'efficacité du "performant")
- Performant (Une efficacité et une rapidité à trouver les connaissances recherchées)
- Expert (Grande efficacité et rapidité pour trouver les connaissances recherchées)

**Partie B : Place du transfert de connaissances**

**B1. À quelle fréquence réalisez-vous les activités suivantes dans le cadre de vos fonctions ?**

Jamais

Rarement

Parfois

Souvent

Toujours

- Définir le besoin d'information ou de l'intention décisionnelle.

- Choisir les sources d'information et les produits de courtage les plus pertinents.
- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.
- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts.
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

**B2. Quelle est l'importance que vous accordez aux activités suivantes dans le cadre de vos fonctions ?**

*(Si vous ne savez pas ou si vous ne maîtrisez pas la compétence, n'inscrivez rien svp)*

Pas du tout important

Peu important

Relativement important

Très important

Extrêmement important

- Définir le besoin d'information ou de l'intention décisionnelle.
- Choisir les sources d'information et les produits de courtage les plus pertinents.

- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.
- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts.
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

**B3. Quelle est votre niveau d'aisance dans l'application de ces compétences ?**

Pas du tout facile

Pas très facile

Assez facile

Très facile

Extrêmement facile

- Définir le besoin d'information ou de l'intention décisionnelle.
- Choisir les sources d'information et les produits de courtage les plus pertinents.
- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.

- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts.
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

## APPENDIX II: POST-TRAINING QUESTIONNAIRE

Ce questionnaire fait suite à celui que vous avez complété avant le programme de formation et se divise en trois grandes parties :

- 1- L'évaluation de votre niveau de satisfaction au regard de la formation que vous achevez
- 2- Votre appréciation du modèle de courtage de connaissances qui vous a été enseigné
- 3- La place du transfert de connaissances dans vos fonctions

Merci beaucoup !

### Partie A: Formations suivies

**A1. Indiquez ici votre code de questionnaires (le chiffre de votre mois de naissance et les trois dernières figures de votre code postal. Par exemple : 31F9). Ceci a pour but de regrouper vos questionnaires pré et post formation : \_\_\_\_\_**

**A2. Quelles sont les séances du programme de formation auxquelles vous avez assisté?**

- Jour 1 AM
- Jour 1 PM
- Jour 2 AM
- Jour 2 PM
- Jour 3 AM
- Jour 3 PM
- Jour 4 AM

- Jour 4 PM

**A3. Quelles sont les activités supplémentaires auxquelles vous avez participé?**

- Communautés de pratique
  - Si oui, combien de séances et la durée totale (# / min) : \_\_\_\_\_
- Ateliers de résolution de problèmes
  - Si oui, combien de séances et la durée totale (# / min) : \_\_\_\_\_
- Séances de coaching
  - Si oui, combien de séances et la durée totale (# / min) : \_\_\_\_\_

**A4. Combien de temps prévoyez-vous consacrer par semaine, en moyenne, au transfert de connaissances?**

- Moins de 60 minutes
- Entre 1 et 2 heures
- Entre 3 et 7 heures
- Entre 8 et 14 heures
- Entre 15 et 25 heures
- Plus de 25 heures

**Partie B: Évaluation de la formation**

**B1. En général,**

- Très faible Faible Plutôt faible Indifférent Plutôt élevé Élevé Très élevé Quelle est la probabilité que vous recommandiez cette formation à un collègue ?
- Quel est votre niveau global de satisfaction concernant la formation ?

**B2. Quel est votre degré d'accord avec les énoncés suivants ?**

Pas du tout d'accord Pas d'accord Plutôt pas d'accord Indifférent Plutôt d'accord  
D'accord Tout à fait d'accord

- Les contenus ont rencontré mes attentes.
- Les contenus présentés me seront utiles dans mon travail.
- Le plan et les objectifs de chaque atelier étaient clairs.
- Les méthodes pédagogiques ont favorisé le développement de mes compétences.
- Le formateur a tenu compte de mes connaissances et de mes expériences.
- Le formateur répondait de manière satisfaisante à mes questions.
- Le formateur a fait suffisamment de liens entre les notions et les applications pratiques.

**B3. Qu'avez-vous apprécié dans la formation?**

**B4. Qu'avez-vous moins apprécié dans la formation?**

**B5. Avez-vous des suggestions pour améliorer la formation?**

**Partie C: Appréciation du modèle de courtage de connaissances**

**C1. Quel est votre degré d'accord avec chacun des énoncés suivants ?**

Pas du tout d'accord    Pas d'accord    Plutôt pas d'accord    Indifférent    Plutôt d'accord  
D'accord    Tout à fait d'accord

- Le courtage de connaissances est une méthode crédible.
- Le courtage de connaissances est un outil utile.
- Le courtage de connaissances peut contribuer à améliorer la santé des usagers.
- Le courtage de connaissances peut contribuer à améliorer la performance de notre établissement.
- Le courtage de connaissances favorise l'innovation.
- Le courtage de connaissances procure de nouvelles options.
- Le courtage de connaissances facilite le processus de changement.
- Le courtage de connaissances favorise l'adoption des meilleures connaissances.
- La connaissance représente une ressource importante pour l'organisation.

**Partie D: Place du transfert de connaissances**

**D1. Quelle est la fréquence avec laquelle vous réalisez ces activités dans le cadre de vos fonctions ?**

Jamais

Rarement

Parfois

Souvent

Toujours



- Définir le besoin d'information ou de l'intention décisionnelle
- Choisir les sources d'information et les produits de courtage les plus pertinents
- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.
- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

**D2. Quelle est l'importance que vous accordez à ces activités dans le cadre de vos fonctions ? (Si vous ne savez pas ou si vous ne faites pas ces activités, n'inscrivez rien svp.)**

- 

Pas du tout important

Peu important

Relativement important

Très important

Extrêmement important Définir le besoin d'information ou de l'intention décisionnelle

- Choisir les sources d'information et les produits de courtage les plus pertinents
- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.
- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

**D3. Quelle est votre degré d'aisance dans l'accomplissement de ces activités ?**

Pas du tout facile

Pas très facile

Assez facile

Très facile

Extrêmement facile

- Définir le besoin d'information ou de l'intention décisionnelle
- Choisir les sources d'information et les produits de courtage les plus pertinents

- Valider, clarifier et anticiper le besoin.
- Trouver de l'information grâce à une recension des écrits.
- Trouver des meilleures pratiques.
- Trouver des chercheurs ou experts.
- Animer un exercice permettant d'obtenir de l'information d'experts.
- Analyser de manière critique l'information.
- Sélectionner les connaissances à utiliser.
- Organiser et adapter l'information obtenue au besoin de mon organisation ou de ma clientèle.
- Connecter les parties prenantes aux informations pertinentes.
- Évaluer la stratégie de transfert de connaissances et ses effets.

## **APPENDIX III : SEMI-STRUCTURED INTERVIEW GUIDE**

### **In context**

- What is your job title? Could you briefly describe to me what your position entails and the activities you have to perform?
- Why are you interested in knowledge brokering? What were your motivations for taking the training program?

### **Process and Factors: Motivational Factors**

- What do you think of knowledge brokering as a method of problem solving?
- What are the expected benefits of your knowledge brokering interventions?

### **Knowledge brokering activities**

- Since the training program, what knowledge brokering activities have you carried out?
- What do you think have been the effects of these activities? What changes have they been able to produce?

### **Processes and Factors: Perceptual Capability Factors**

- How would you rate your knowledge and skills to undertake knowledge brokering activities?
- Are there parts of the knowledge brokering process that you are more comfortable with?  
Which?
- Are there parts of the knowledge brokering process that you are less comfortable with?  
Which?

### **Processes and factors: Environmental factors**

- In your work, what is the general attitude of your colleagues and superiors towards knowledge brokering?

- How does your manager support you in your knowledge brokering activities?
- What resources are available to you to carry out knowledge brokering activities (for example: support from other professionals, scientific resources available, time allocated)?
- What resources are you missing?

#### **Feedback on the experience**

- What have been your greatest enablers so far, what has helped you the most, to carry out knowledge brokering activities?
- What have been your biggest challenges with knowledge brokering activities?

#### **Conclusion**

- What are your next steps in terms of learning about knowledge brokering?
- What would your needs be?
- Are there any aspects that have not been covered that you would like to talk about? Would you have anything else to add?

**APPENDIX IV: QUANTITATIVE STATISTICS OF ARTICLE 1**

**Table V.1 Statistics of paired samples**

		<b>Sample Size</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Standard Error of the Mean</b>
Pair 1	PreQ1	25	2.5200	1.12250	.22450
	PostQ1	25	2.6400	.86023	.17205
Pair 2	PreQ2a	20	3.2000	.61559	.13765
	PostQ2a	20	3.1500	.48936	.10942
Pair 3	PreQ2b	21	2.6667	.85635	.18687
	PostQ2b	21	2.7619	.70034	.15283
Pair 4	PreQ2c	21	3.1905	.87287	.19048
	PostQ2c	21	3.1905	.51177	.11168
Pair 5	PreQ2d	20	2.8000	1.00525	.22478
	PostQ2d	20	2.8500	.93330	.20869
Pair 6	PreQ2e	21	3.0952	.88909	.19401
	PostQ2e	21	2.9048	.70034	.15283
Pair 7	PreQ2f	20	2.7000	.73270	.16384
	PostQ2f	20	2.4500	.75915	.16975
Pair 8	PreQ2g	17	2.4706	.87447	.21209
	PostQ2g	17	2.7647	.66421	.16109
Pair 9	PreQ2h	20	3.2500	.91047	.20359
	PostQ2h	20	3.4500	.60481	.13524
Pair 10	PreQ2i	20	3.1000	.96791	.21643
	PostQ2i	20	3.3500	.58714	.13129
Pair 11	PreQ2j	19	3.2632	.80568	.18484
	PostQ2j	19	3.2632	.73349	.16827
Pair 12	PreQ2k	20	3.2000	.61559	.13765
	PostQ2k	20	3.2000	.83351	.18638
Pair 13	PreQ2l	19	2.7895	.71328	.16364
	PostQ2l	19	3.1579	.68825	.15789

**Table V.2 Correlations of paired samples**

	Sample Size	Correlation Coefficient	Signification	
			unilateral p-value	bilateral p-value
Q1	25	.806	<.001	<.001*
Q2a	20	.245	.149	.299
Q2b	21	.528	.007	.014*
Q2c	21	.139	.275	.549
Q2d	20	.752	<.001	<.001*
Q2e	21	.096	.340	.680
Q2f	20	.539	.007	.014*
Q2g	17	.095	.359	.717
Q2h	20	.550	.006	.012*
Q2i	20	.306	.095	.190
Q2j	19	.440	.030	.059
Q2k	20	.123	.303	.605
Q2l	19	.524	.011	.021*

**Table V.3 Test of Paired Samples**

		Paired Differences					<i>t</i>	Degrees of freedom	Signification	
		<i>M</i>	<i>SD</i>	Standard Error of the Mean	95% CI				unilateral <i>p</i> -value	bilateral <i>p</i> -value
					Lower	Upper				
Pair 1	PreQ1 – PostQ1	-,12000	,66583	,13317	-,39484	,15484	-,901	24	,188	,376
Pair 2	PreQ2a – PostQ2a	,05000	,68633	,15347	-,27121	,37121	,326	19	,374	,748
Pair 3	PreQ2b – PostQ2b	-,09524	,76842	,16768	-,44502	,25454	-,568	20	,288	,576
Pair 4	PreQ2c – PostQ2c	,00000	,94868	,20702	-,43184	,43184	,000	20	,500	1,000
Pair 5	PreQ2d – PostQ2d	-,05000	,68633	,15347	-,37121	,27121	-,326	19	,374	,748
Pair 6	PreQ2e – PostQ2e	,19048	1,07792	,23522	-,30019	,68114	,810	20	,214	,428
Pair 7	PreQ2f – PostQ2f	,25000	,71635	,16018	-,08526	,58526	1,561	19	,068	,135
Pair 8	PreQ2g – PostQ2g	-,29412	1,04670	,25386	-,83228	,24405	-1,159	16	,132	,264
Pair 9	PreQ2h – PostQ2h	-,20000	,76777	,17168	-,55933	,15933	-1,165	19	,129	,258
Pair 10	PreQ2i – PostQ2i	-,25000	,96655	,21613	-,70236	,20236	-1,157	19	,131	,262
Pair 11	PreQ2j – PostQ2j	,00000	,81650	,18732	-,39354	,39354	,000	18	,500	1,000
Pair 12	PreQ2k – PostQ2k	,00000	,97333	,21764	-,45553	,45553	,000	19	,500	1,000
Pair 13	PreQ2l – PostQ2l	-,36842	,68399	,15692	-,69809	-,03875	-2,348	18	,015	,031



## APPENDIX V: THEORETICAL DOMAINS FRAMEWORK SURVEY

Questionnaire Theoretical Domains Framework (TDF)  
(Traduction libre de Huijg et al., 2014 par Arnautu, 2020)

Indiquez ici votre code de questionnaires (le chiffre de votre mois de naissance et les trois dernières figures de votre code postal. Par exemple : 31F9). Ceci a pour but de regrouper vos questionnaires pré et post formation : \_\_\_\_\_

Pour chaque énoncé, veuillez indiquer le choix de réponse qui représente le mieux votre situation.

1. Je sais comment mener des activités de courtage de connaissances.
2. Les objectifs du courtage de connaissances et mon rôle dans ce domaine sont clairs pour moi.
3. Je sais quelles sont mes responsabilités en ce qui concerne le courtage de connaissances.
4. Dans mon travail de courtage de connaissances, je sais exactement ce qu'on attend de moi.
5. J'ai été suffisamment formé pour réaliser des activités de courtage de connaissances.
6. J'ai les compétences nécessaires pour réaliser des activités de courtage de connaissances.
7. J'ai l'habitude d'effectuer des activités de courtage de connaissances.
8. Réaliser des activités de courtage de connaissances fait partie de mon travail.
9. En tant que professionnel de la santé, c'est mon travail d'effectuer des activités de courtage de connaissances.

10. Il est de ma responsabilité en tant que professionnel de la santé d'effectuer des activités de courtage de connaissances.
11. Je suis convaincu que je peux effectuer des activités de courtage de connaissances.
12. Je suis convaincu que je peux effectuer des activités de courtage de connaissances même si mes collègues n'en font pas.
13. Je suis convaincu que je peux effectuer des activités de courtage de connaissances même si j'ai peu de temps.
14. Je suis convaincu que je peux effectuer des activités de courtage de connaissances même si les autres parties prenantes ne sont pas motivées.
15. J'ai le contrôle sur les activités de courtage de connaissances que j'effectue.
16. Pour moi, faire des activités de courtage de connaissances est facile.
17. Pour moi, faire l'analyse de la demande de courtage est facile.
18. Pour moi, faire l'évaluation des besoins en courtage de connaissances est facile.
19. Pour moi, rendre compte de mes activités de courtage de connaissances à mon gestionnaire est facile.
20. Dans mon travail, en période d'incertitude, je m'attends généralement au meilleur.
21. Dans mon travail, je suis toujours optimiste quant à l'avenir.
22. Dans mon travail, dans l'ensemble, je m'attends à plus de bonnes choses qu'à de mauvaises.
23. Pour moi, effectuer des activités de courtage de connaissances est utile.
24. Pour moi, effectuer des activités de courtage de connaissances vaut les efforts.
25. Pour moi, effectuer des activités de courtage de connaissances est agréable.

26. Pour moi, effectuer des activités de courtage de connaissances est intéressant.
27. Si j'effectue des activités de courtage de connaissances en suivant les directives, il sera plus efficace.
28. Si j'effectue des activités de courtage de connaissances en suivant les directives, les autres professionnels de la santé l'apprécieront.
29. Si j'effectue des activités de courtage de connaissances en suivant les directives, cela renforcera ma collaboration avec les professionnels avec qui j'effectue ces activités.
30. Si j'effectue des activités de courtage de connaissances en suivant les directives, je serai satisfait.
31. Si j'effectue des activités de courtage de connaissances en suivant les directives, cela aidera les demandeurs à résoudre leurs problèmes.
32. Lorsque j'effectue des activités de courtage de connaissances, je reçois une reconnaissance de mon travail.
33. Lorsque j'effectue des activités de courtage de connaissances, je reçois la reconnaissance de mes collègues.
34. J'ai l'intention d'effectuer des activités de courtage de connaissances au cours des trois prochains mois.
35. Je vais certainement effectuer des activités de courtage de connaissances dans les trois prochains mois.
36. Pour moi, effectuer des activités de courtage de connaissances est une priorité qui passe avant autre chose.
37. Pour moi, effectuer des activités de courtage de connaissances est plus urgent que de travailler sur autre chose.

38. Il est possible d'adapter les activités de courtage de connaissances aux besoins des demandeurs.
39. Le courtage de connaissances prend peu de temps à effectuer.
40. Le courtage de connaissances est compatible avec ma pratique quotidienne.
41. Le courtage de connaissances est simple à réaliser.
42. Le gouvernement et les autorités locales fournissent un soutien suffisant à des interventions telles que le courtage de connaissances.
43. Les soins de santé primaires sont suffisamment orientés vers la recherche et l'utilisation de nouvelles données probantes.
44. Dans l'organisation dans laquelle je travaille, toutes les ressources nécessaires sont disponibles pour réaliser des activités de courtage de connaissances.
45. Je peux compter sur le soutien de la direction de l'organisation dans laquelle je travaille lorsque les choses deviennent difficiles.
46. La direction de l'organisation dans laquelle je travaille est disposée à écouter mes défis de prestation de courtage de connaissances.
47. La gestion de l'organisation dans laquelle je travaille est soutenante pour m'aider à réaliser des activités de courtage de connaissances.
48. Les demandeurs impliqués dans les activités de courtage de connaissances sont motivés.
49. Les demandeurs impliqués dans les activités de courtage de connaissances ont une opinion positive du courtage de connaissances.
50. L'organisation fournit suffisamment de matériel pour effectuer des activités de courtage de connaissances.

51. L'organisation fournit une assistance aux professionnels pour la prestation de courtage de connaissances.
52. L'organisation prépare des réunions pour les professionnels.
53. L'organisation donne un aperçu des résultats des activités de courtage de connaissances.
54. La plupart des gens qui sont importants pour moi pensent que je devrais effectuer des activités de courtage de connaissances.
55. Les professionnels avec qui j'effectue des activités de courtage de connaissances pensent que je devrais effectuer ces activités.
56. Les professionnels avec qui j'effectue des activités de courtage de connaissances le font en suivant des directives.
57. D'autres professionnels qui effectuent des activités de courtage de connaissances le font en suivant des directives.
58. Je peux compter sur le soutien des professionnels avec qui j'effectue des activités de courtage de connaissances lorsque les choses se compliquent.
59. Les professionnels avec qui j'effectue du courtage de connaissances sont prêts à écouter mes problèmes avec la prestation de ces activités.
60. Les professionnels avec qui j'effectue des activités de courtage de connaissances sont prêts à m'aider pour effectuer ces activités.
61. Lorsque j'effectue des activités de courtage de connaissances, je me sens optimiste.
62. Lorsque j'effectue des activités de courtage de connaissances, je me sens à l'aise.
63. Lorsque j'effectue des activités de courtage de connaissances, je me sens calme.

64. Lorsque j'effectue des activités de courtage de connaissances, je me sens détendu.
65. Lorsque j'effectue des activités de courtage de connaissances, je me sens joyeux.
66. Lorsque j'effectue des activités de courtage de connaissances, je me sens ravi.
67. Lorsque j'effectue des activités de courtage de connaissances, je me sens nerveux.
68. Lorsque j'effectue des activités de courtage de connaissances, je me sens pessimiste.
69. Lorsque j'effectue des activités de courtage de connaissances, je me sens déprimé.
70. Lorsque j'effectue des activités de courtage de connaissances, je me sens agité.
71. Lorsque j'effectue des activités de courtage de connaissances, je me sens triste.
72. Lorsque j'effectue des activités de courtage de connaissances, je me sens mal à l'aise.
73. J'ai un plan clair de la façon dont je vais effectuer des activités de courtage de connaissances.
74. J'ai un plan clair dans quelles circonstances j'effectuerai des activités de courtage de connaissances.
75. J'ai un plan clair du moment où j'effectuerai des activités de courtage de connaissances.
76. J'ai un plan clair concernant la prestation d'activités de courtage de connaissances lorsque les demandeurs ne sont pas motivés.
77. J'ai un plan clair concernant la prestation d'activités de courtage de connaissances quand il y a peu de temps.
78. J'ai un plan clair concernant la prestation d'activités de courtage de connaissances lorsque les autres professionnels avec qui je dois effectuer ces activités ne les font pas.
79. Effectuer des activités de courtage de connaissances est quelque chose que je fais automatiquement.

80. Effectuer des activités de courtage de connaissances est quelque chose que je fais sans avoir à me souvenir de le faire consciemment.
81. Effectuer des activités de courtage de connaissances est quelque chose que je fais sans réfléchir.
82. Effectuer des activités de courtage de connaissances est quelque chose que je commence à faire avant de réaliser que je le fais.
83. Effectuer des activités de courtage de connaissances est quelque chose que j'oublie rarement.
84. Effectuer des activités de courtage de connaissances est quelque chose que j'oublie souvent.

## **APPENDIX VI: PHENOMENOLOGICAL EXPERIENCES OF PARTICIPANTS**

**Case 1: Sarah.** The structured approach in the training helped Sarah understand the steps clearly, enabling better organization of straightforward requests. Previously, she conducted searches, reached out to contacts, and provided recommendations without a structured process. She now appreciates the increased rigor and value of her approach, recognizing the improved quality of data in



her KB efforts. Sarah felt more organized and thorough in her research, avoiding biased searches, and selecting more appropriate sources. The training helped her better prioritize sources and methods, allowing her to choose suitable combinations for data collection. She appreciated the training section on different KB products, particularly the challenges of synthesis and creating visually appealing and concise materials. While not an expert in infographics, she welcomed templates and guidance to enhance her skills. Her challenge remains synthesizing information effectively.

**Case 2: Jennifer.** Jennifer expressed a high level of comfort and confidence in her ability to engage in KB, even prior to the training. She is well-versed in the field and has been practicing related tasks for years. She finds particular ease in conducting research, considering it an important part of her role. As time progresses, she became more at ease in writing reports, giving opinions, and interacting with medical professionals. Her confidence grew in delivering syntheses and presentations to groups of experts. She acknowledged challenges in formulating concise and impactful content, but claims to having gained confidence in writing, finding value in her work and its impact on saving others' time. She also discusses her proficiency in translating complex medical language for different audiences. Initially, she faced difficulties in translating between managerial and frontline employee language, but she feels to have become adept at bridging this gap. She developed strategies to maintain focus and relevance when dealing with large amounts of information.

Jennifer was also interviewed a second time. While initially struggling with concise writing, she claimed in her second interview to have now embraced her own style. She reads articles, creates tables, and then summarizes the content in her own words, finding comfort in this approach. She acknowledged her writing process and has developed a working method that suits her. She no longer tries to force a different writing style and has accepted her way of working.

**Case 3: Linda.** Linda mentioned finding it challenging to complete a KB task within a short time frame, as she prefers to present well-supported and clear information. She wants her presentations to be useful and practical, especially given the challenges of changing practices in a busy environment. Initially, she was not comfortable with quick tasks, but she had to present information quickly and found some parts were accurate while others needed refinement. She expressed that with her couple of years of experience, she feels about 90% confident in her KB abilities. The remaining 10% pertains to research, where she struggles to efficiently search scientific literature. While she has a full toolbox of skills and resources, she was initially not at ease with quickly finding information on platforms like Google Scholar. Despite this, she felt well-equipped overall and confident in her knowledge, continuously learning and improving their abilities.

On her second interview, Linda claimed to have developed a more strategic approach to managing her tasks. She now prioritizes mandates by consulting with her advisor to draft a preliminary plan before proceeding. This change helped her avoid feeling overwhelmed and allowed her to focus on completing one project at a time. She expressed newfound confidence in utilizing research databases like Google Scholar, which expedited the process of fulfilling specific research mandates. With more time and experience, she was able to understand more accurately how long a certain task will take. She was able to break down larger projects into manageable parts and offer incremental delivery, which had the potential to fulfill immediate needs even if the entire project was not completed. Overall, Linda shifted her mindset toward a more patient and realistic view of her work. She appeared less anxious about the time-consuming nature of large projects and understood that good work takes time.

**Case 4: Michelle.** Michelle indicated still being a novice in KB and lacking confidence. She acknowledged having tools and support available, but felt inexperienced due to limited opportunities. Despite this, she felt adequately equipped. She mentioned feeling less confident with tasks like working

with English texts since she is not bilingual. She appreciated using comparative tables to consolidate data and found them helpful in syntheses. She expressed being less comfortable with aspects such as clarifying the mandate at the beginning of a task, understanding its importance however for staying on the right track.

On the second interview, Michelle mentioned the KB process taking a lot of time, mostly due to the iterative process whenever best practices change and require to review the current findings. She mentioned the training program reminded her that she can verify her work with experts to ensure its validity and applicability in practice. Overall, Michelle had limited opportunity to exert KB activities and did not seem to use a systematic process, rather using pieces of the training to improve her current practices.