Knowledge Mobilization for Impact: A Multi-Case Study of Education Organizations

Sofya Malik, *University of Toronto*

Abstract

Using a multi-case design, this study draws on empirical evidence and literature to analyze the knowledge mobilization approaches in educational organizations. The sample consists of four different types of education organizations in Ontario, Canada: a school board, a university, a not-for-profit, and a professional association. Data sources include publicly available websites and documents (*n* = 63) and key informant interviews (*n* = 18). Although research impact was operationalized and observed differently in these organizations, measures of impact were found to be ineffectual in all cases. This article validates the findings of existing studies that have found that there are limited instrumental uses of research, wherein research directly influences policy and practice decisions. The study calls for a careful discernment and applicability of research impact.

Keywords Research use; Research impact; Knowledge mobilization; Education policy

Introduction

In recent decades, there has been an international trend among governments and research funders to mobilize research knowledge and understand the impact of these efforts. In the Canadian context, the term *knowledge mobilization* has become a common part of the discourse for researchers and policymakers. Knowledge mobilization

(KMb), the process of connecting research to policy and practice, concerns individual- and organization-level efforts to increase the use of research findings by education stakeholders such as policymakers, practitioners, and the public.

Universities, governments, funding agencies, and education organizations mobilize research knowledge with the intent of informing policy and practice. Education is among the key public service areas, garnering "high levels of government resource and political attention" (Nutley, Walter, & Davies, 2007, p. 4). Since the mid-1990s, federal research funding agencies in Canada have been instigating a more widespread investment in KMb practice (Social Sciences and Humanities Research Council of Canada, 2009). Since the 2000s, more attention has been placed on research quality and research synthesis within KMb in the education sector (Campbell & Levin, 2009; Nutley et al., 2007).

Resources are allocated toward research and innovation to enhance and improve the quality of education every year. However, research and evaluation projects are being conducted with little influence on policy or practice decisions and actions. While education organizations (e.g., government, universities, nonprofit organizations, and professional associations) continue to flow resources into collecting data to determine school improvement and educational outcomes, little is known about how research outcomes are mobilized within organizations and the impact of these efforts in the educational landscape.

This study explored the following research questions: How are four education organizations in Ontario engaging in different approaches to KMb? What evidence do the education organizations collect on the impact of their KMb strategies? What challenges do these organizations encounter in mobilizing knowledge and how do they address these challenges?

Literature review

Ontario is one of the jurisdictions in Canada where KMb has been particularly important in reforming educational provision. Within Ontario, the Ministry of Education, university faculties of education, school boards, and community organizations have engaged in active, intentional efforts toward mobilizing research-based knowledge (Cooper, Levin, & Campbell, 2009; Qi & Levin, 2013).

Organizational factors make a difference to how organizations engage in KMb. Different kinds of organizations vary in their structural, bureaucratic, governance, and staffing models, to name just a few factors. This article discusses some factors and processes relevant to understanding research use in government organizations, universities, school boards and schools, think tanks, and nonprofit organizations.

Government organizations

In the past decade, government organizations have become increasingly interested in research use to influence policy and practice (Cooper et al., 2009; Levin, 2012; Morton, 2015). The widespread interest in research use has generated a stronger interest in KMb as a means for strengthening evidence-based practice. However, while bureaucratic processes are necessary to government systems, they may also limit government engagement with research. In a pan-Canadian study of research use in

government, Creso Sá and Daniel Hamlin (2015) investigated provincial ministries overseeing education, higher education, and science and technology and found that the capacity to generate, access, and use research was limited. Yet, despite the limited use of research, they reported significant efforts to build capacity to share and use evidence among government staff and researchers. The study also identified the Ontario Ministry of Education as one of the most proactive organizations in research use within Canada (Sá & Hamlin, 2015).

Despite a high level of interest in KMb, Carol Campbell and David Fulford (2009) identified knowledge integration as the most important processes at the government level; they noted, however, that there is little research on how governments use research, with evidence that senior policymakers pay little attention to research in the decision-making process. A cross-sector review by Jane Hemsley-Brown (2004) found that knowledge use in the public sector faces resistance not at an individual level but at the institutional level, which does not foster a culture of learning. Organizational culture was found to be a key aspect of facilitating research use (Hemsley-Brown, 2004). Altogether, a review of current studies, with a focus on the Canadian context, revealed a high level of interest in research use across government organizations. Yet, the capacity to share, understand, and actively use research was limited.

Universities

As the single largest producers of research evidence, universities (Cooper, Levin, & Campbell, 2009; Read, Cooper, Edelstein, Sohn, & Levin, 2013) are central to KMb processes (Qi & Levin, 2013; Sá, Li & Faubert, 2011). Universities tend to emphasize, to varying degrees, the conceptual, symbolic, and instrumental uses of research with decision-makers using research in indirect ways rather than in instrumental and direct ways (Amara, Ouimet, & Landry, 2004).

In general, universities have weak KMb practice at the institutional level (Levin, 2012). Universities predominantly engage in evidence production rather than the dissemination and communication of findings. Sá et al. (2011) found that universities focus on the development of research-based products, particularly on websites, as a means for disseminating research. Their research shows that websites are not being used strategically to facilitate a broader dissemination of research work. Because the nature of research uptake is complex, in order to reach user audiences, efforts need to extend beyond simply posting information on a website. Often, target audiences may not be aware that the website exists, they may not access the website, and if the website is accessed, mediation activities are needed in order to understand and apply the use of research findings. With concentrated and sustained efforts to influence policy and practice, research programs based out of universities have strong potential for KMb impact (Read et al., 2013). Yet, despite this potential, the processes taken to facilitate research use and uptake are limited (Sá, et al., 2011).

Schools and school districts

School boards predominantly engage in research related to school-based data and student achievement. In times of diminishing resources, educators face increasing pressures to "use data to inform their practices specifically and improve the organi-

zation more generally" (Farrell, 2015, pp. 439–444; see also, Brown, Schildkamp, & Hubers, 2017). Capacity-building efforts tend to centre on supporting school administrators in understanding and using data for decision-making at the local school level. Attempts to implement evidence-based reforms are often highly vulnerable to traditional hierarchical, highly political practices (Datnow, 2000) and top-down approaches (Brown, Schildkamp, & Hubers, 2017).

In general, schools and school districts have a particularly weak capacity to find, use, share, and apply research to practice (Coburn, Honig, & Stein, 2006; Sheppard, Galway, Wiens, & Brown, 2013). Findings from studies on school districts' uses of research suggest that practices need to strongly align with the district purpose and its vision for using the data to improve student outcomes (Honig & Coburn, 2008; Wohlstetter, Datnow, & Park, 2008). A study specific to the Toronto District School Board illustrated the importance of collaboration as a means to improve teacher work by "mobilizing knowledge champions to assist teachers in real-time, in their classrooms to improve their teaching" (Edge, 2005, p. 50) and ultimately result in better student achievement. Altogether, efforts to engage teachers in research use continue to pose ongoing challenges, as KMb is often a lower priority endeavour amid administrative and curricular tasks.

Think tanks and nonprofit organizations

Organizations with a specific KMb focus such as think tanks tend to have stronger connections between their research, communication, and the application of findings (Sin, 2008). In order to address the gap between research and practice, a number of third-party or nonprofit organizations and think tanks have emerged (Cooper et al., 2009). These kinds of organizations share similar purposes to facilitate evidence-based decision-making and knowledge exchange. However, funding for such think tanks can be tenuous, as federal government funding can be discontinued.

Key issues and tensions

The major debates in this field pertain to what counts as evidence, quality criteria for evidence, what evidence to mobilize and to whom, how to measure impact, and understanding effective practices for mobilizing research knowledge with intended audiences (Bennet & Bennet, 2007; Boaz, Grayson, Levitt, & Solesbury, 2008; Landry, Amara, & Lamari, 2001; Landry, Lamari, & Amara, 2003). What counts as evidence for one individual or organization may differ for another. Vivian Tseng (2012) argues that educators have differing notions about what "counts" as evidence, largely because of their perceptions about the relevance of research to their daily work and who is producing the research. Even within the same organization, there may be differing perceptions between individuals about what counts as evidence.

In addition to determining what counts as evidence, there are no established criteria for the quality of evidence. The perceived quality of research is a "key factor in shaping whether or not potential users say it will be used" (Nutley et al., 2007, p. 68), shaping the extent to which policymakers and practitioners use the findings. In many cases, social and political factors may drive decisions about what knowledge to mobilize and to whom. Louise Shaxson, Alex Bielak, Ibrahim Ahmed, Derek Brien,

Bernadette Conant, Catherine Fisher, Elin Gwyn, Laurens Klerkx, Anne Middleton, Sarah Morton, Laxmi Pant, and David Phipps (2012) agree that "[c]hoosing what knowledge needs sharing, with whom, and for what purpose, is a value-laden process, particularly where issues are heavily politicized and characterized by conflict and competition" (p. 16). In this context, social and political tensions play a role in influencing organizational approaches to KMb.

Understanding impact

Impact is the most problematic aspect of studying KMb. Many scholars acknowledge the shortcomings of impact and the highly complex and intangible nature of tracing research use. Carol Weiss' (1979) theory of research use, broken into instrumental use, conceptual use, and symbolic use, is essential to understanding impact. Scholars have since adapted these concepts to apply to KMb. Understanding research use in its various forms can inform how impact is measured. Huw Davies and Sandra Nutley (2008) define impact as "how and where research-based knowledge gets used by policymakers and practitioners and the consequences (i.e., impacts) of that use" (p. 3). Challenges, however, persist in tracing the indirect routes of research use.

The context for research use is essential to facilitating research uptake. Nutley et al. (2007) argue that a separate set of factors affect policy and practice environments. In the policy context, they found that research was more likely to be used when: 1) the research aligns individual interests and organizational goals, 2) the findings coincide with existing ideology in the policy environment, 3) researchers and policymakers are brought together, and 4) organizational culture exists at a local level that broadly supports research use. In the context of practice, Nutley et al., (2007) found factors that hindered the use of research in organizations: 1) lack of time to read research, 2) limited ability to act upon research findings, 3) lack of resources to support change of practice, and 4) cultural resistance at the local level to research use. Contextual factors must be taken into consideration when determining appropriate KMb approaches and activities.

All in all, the challenges to studying research impact are characterized by the prominent tensions around defining impact, distinguishing between research use and impact, and designing metrics to assess impact. Scholars acknowledge the challenges of measuring impact and recognize the limitations of seeing the immediate impact of research use.

Conceptual framework

The framework of this study draws from the major recurring concepts, terms, definitions, models, and theories from the KMb field to investigate the phenomena of KMb in organizations. The conceptual framework for this study (Malik, 2016), outlined in Figure 1, builds on John Lavis, Dave Robertson, Jennifer M. Woodside, Christopher B. McLeod, and Julia Abelson's (2003) knowledge transfer strategy. Five questions guide the conceptual framework for understanding KMb in Ontario education organizations: Why are the organizations engaging in KMb? (Purpose); What knowledge are they producing? (Evidence production); Who are the organizations seeking to engage through their KMb efforts? (Target audiences); How are organiza-

tions engaging in KMb? (Products, events, networks, and capacity building [PEN-C] and mediation strategies); What are the implications of these efforts? (Impact and challenges). The KMb approaches to these dimensions vary according to contextual factors, such as the organizational mission, context, and capacity, and the social and political context.

Figure 1. Conceptual framework of education organizations engaging in KMb in Ontario
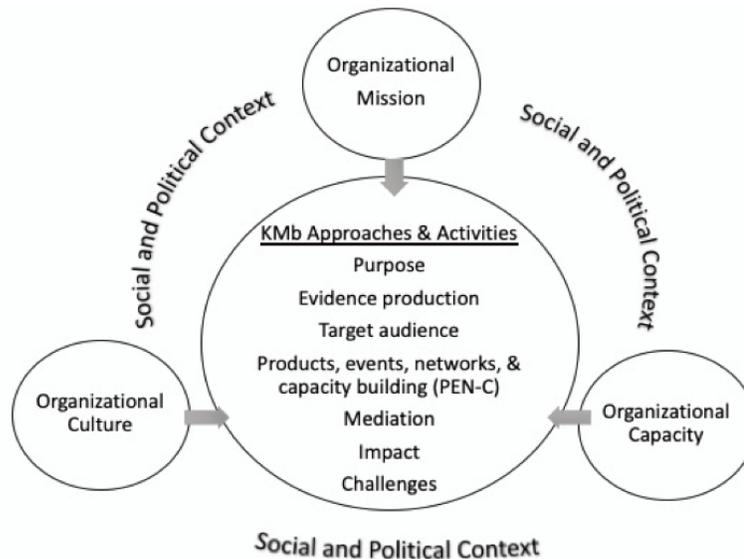
Source: Malik, 2016

Why are the organizations engaging in KMb? (Purpose)

Purpose influences how KMb functions in organizations. The organizational purpose can include sharing knowledge among individuals, co-producing knowledge, drawing knowledge into an organization, and disseminating knowledge (Shaxson et al., 2012). By understanding the purpose for doing KMb work, insights may be gained into what evidence is being mobilized and to whom.

What are they mobilizing? (Evidence production)

Organizations engage in evidence production as part of the KMb process. Evidence production is the conduct and provision of research, evaluation, and data analysis (Campbell & Fulford, 2009). Knowledge generation, as Campbell and Fulford (2009) put it, is the pursuit of new knowledge and can be a primary aim of conducting research.

Who are the organizations seeking to engage through their KMb efforts? (Target audiences)

Target audiences are the end users that organizations aim to engage through their KMb approaches and activities. The research literature indicates that target audiences need to be clearly identified with a specific strategy that considers an organization's contextual factors (Lavis et al., 2003). To be effective, KMb strategies must take the interests and needs of different kinds of target audiences into consideration (Lavis et al., 2003). Considering the needs of user audiences when it comes to dissemination strategies is essential to research uptake.

How are organizations engaging in KMb? (Products, events, networks, and mediation strategies)

Based on reviews of the literature, products, events, networks, and capacity building are the main overall ways of categorizing KMb strategies (Cooper, 2012; Qi & Levin, 2013; Sá et al., 2012). These strategies, used in combination, may facilitate the exchange of evidence within an organization, with partners external to the organization, and with intended user communities. In recognition of the multiple processes and routes of KMb functions, organizations may use these strategies to varying degrees. Mediation activities occur through multiple means, such as the creation, translation, sharing, and understanding of research-based evidence.

What are the implications of these efforts? (Impact and challenges)

As KMb happens in instrumental, conceptual, and symbolic ways, there are also multiple ways of measuring impact. The most predominant forms of evaluation measure the instrumental uses of research (Nutley et al., 2007). The oft-contested aspects of what research to mobilize, to whom, and for what impact are riddled with tensions in the KMb field. A general lack of understanding about impact measurement augments these tensions.

The KMb approaches of these dimensions vary according to contextual factors, such as the organizational mission, context, and capacity, and the social and political context.

Each component of the conceptual framework is discussed in detail in the following subsections.

The social and political context

The outer circle of the conceptual framework consists of factors affecting KMb approaches. The social and political context affects research use differently in different kinds of organizations. The social and political context can also influence the organizational mission, culture, and capacity. Organizational responses to external pressures can affect how organizations approach KMb (Shaxson et al., 2012). The social and political context plays an influential role in the research, policy, and practice domains, affecting the organizational mission, capacity, and culture for KMb.

Organizational mission

Understanding the organization's mission is necessary as part of gaining insight into the overall mandate that can "guide the strategic plan of the entire organization" (McDonald, 2007, p. 257). The organizational mission may affect the extent to which an organization engages in evidence production and how much an organization values research use.

Organizational capacity

Organizational capacity is about the resources, internal processes, and ability of an organization to meet its goals. Because strategic KMb efforts tend to be perceived as lower priority pursuits (Cooper et al., 2009), fewer resources are allocated to support these efforts. Within organizations, the flow of information occurs in many different facets

and forms, requiring active, deliberate communication efforts to reach target audiences (Contandriopoulos, Lemire, Denis, & Tremblay, 2010; Knott & Wildavsky, 1980).

Organizational culture

Organizational culture refers to the "behavioral norms, assumptions, and beliefs of an organization" (Owens & Valesky, 2011, p. 142). Norms and assumptions are essential to defining organizational culture. Cultural norms and assumptions are often the implicit, unstated ways that individuals approach problems and strategies in organizations. The culture of an organization can influence whether research is used to support decision-making and practice, and to what extent.

Using the conceptual framework as a guide, this study considered how different kinds of organizations approach KMb and the research impact.

Methodology

To understand the phenomena of research impact, a case study approach provided insight into the complex ways organizations understand and evaluate KMb efforts. The objective of the case study is to "collect data about actual human events and behavior or to capture the distinctive perspectives of the participants in your case study (or both)" (Yin, 2014, p. 102). The case study approach offers a "wider view of the channels through which research can flow" (Nutley et al., 2007, p. 66). Using a multiple-case design of four "cases," or education organizations, this study used document review (n = 63) and key informant interviews (n = 18).

Document review

The Ontario Education Research Panel commissioned the researcher to conduct a scan of existing KMb initiatives across the province in education.

The scan began with a keyword internet search strategy to create a preliminary list of networks, organizations, and organizational KMb efforts that focus on a particular area of knowledge, policy, and practice within kindergarten to Grade 12 (K–12) education in the province. Public records include administrative documents (e.g., KMb strategies, proposals, progress reports, etc.), government policy documents, formal evaluations, and news media articles (Olsun, 2010). The researcher reviewed organization websites for PEN-C strategies: products, events, networks (Cooper, 2012) and capacity-building activities (Malik, 2013). The product strategies included reports, executive summaries, literature reviews, systematic reviews, reference lists, policy briefs, fact sheets, success stories, multimedia, and toolkits (Cooper, 2012). Event activities reviewed included conferences, seminars, academic workshops, symposia, and exhibitions, when the aim of these activities was to disseminate research to practitioners and users (Cooper, 2012). Network strategies included a review of glossaries, frequently asked questions (FAQs), online tutorials, and research support services (Cooper, 2012). Capacity-building strategies refer to organizational efforts to develop KMb skills, practice, and understanding for individuals and groups (Malik, 2013). As part of this study's document review process, any data voluntarily provided by key informants was included. KMb efforts were coded according to these categories, including data available on the websites with key informant responses.

Altogether, the scan report summarized Ontario programs and initiatives demonstrating KMb systems approaches in publicly funded and nonprofit education networks, institutions, and organizations. The scan report found that while a range of education organizations in Ontario are engaging in KMb, these efforts are sparse and largely uncoordinated. The initial scan served as a basis for the selection of the organizations in this study.

Sampling

The scan led to the identification of 60 education organizations involved in K–12-focused KMb efforts at the system-level in the province of Ontario. From the scan, six different types of education organizations were identified: 1) the Ministry of Education, 2) university faculties of education, 3) school boards, 4) professional organizations, 5) nonprofit and other organizations, and 6) organizational partnerships. One reputational case was selected based on the PEN-C framework for each type of organization: university faculty of education, school board, professional, and nonprofit. Because of time constraints and the scope of this study, two categories were excluded from the case sample. The ministry was omitted because it is a large, complex organization that comprises several divisions and branches with potentially complicated ethical and accessibility issues. Organizational partnerships were also omitted because they are not actual "organizations," and because of the complex nature of partnership agreements.

From the scan report, the following four reputational organizations were identified from the four types of education organizations based on the PEN-C framework: the Ontario College of Teachers (OCT), People for Education (P4E), the Toronto District School Board (TDSB), and York University (York U). The OCT is a regulatory professional organization and all publicly practicing teachers across the province are members. P4E is a small nonprofit organization with noteworthy KMb efforts focused on parent engagement and advocacy in education. The TDSB, the largest school board in Canada, served as an example of KMb efforts in a large education organization located in one of the most populous and diverse urban settings in the province. York U is an example of an organization with active KMb efforts, including involvement with a provincial research partnership (i.e., Knowledge Network for Applied Education Research).

Key informant interviews

Key informants were identified based on their role within the organizations (e.g., directors, senior administrators) or with KMb efforts (e.g., researchers, program coordinators). Key informants also included former staff members of the organization who have been involved in KMb efforts. Sampling was purposeful, reputational, and based on initial data gathered about the organization through the documentation process. Snowball sampling occurred; within each organization one interviewee recommended another colleague as appropriate to the research study. Altogether, the informants include chief executive officers, directors, coordinators, researchers, and department managers. The interviews were conducted in person at the organizations or by telephone, depending on participant preferences. The interviewees are referred to with the short abbreviated of the organization, followed by Informant #1, #2, #3, #4, or #5.

The conceptual framework was used to guide the coding of the interview data. Themes were prioritized according to their relevance and importance to the study's focus and research questions. Relationships between themes, within and across organizational cases, were developed based on the conceptual framework of interview data collected. Data were coded manually using the following main steps from the Carl Auerbach and Louise Silverstein (2003) framework:

- pre-code,
- code based on research questions and pull out participant responses,
- code based on the conceptual framework,
- note emergent themes, and
- pull out relevant quotes.

In the pre-coding process, manuscripts were reviewed using the conceptual framework to identify themes. Using and seeking only "relevant data" that aligned with the conceptual framework, key quotations were highlighted. As Auerbach and Silverstein (2003) elaborate, the coding procedure is a way of "organizing the text of the transcripts, and discovering patterns within that organizational structure" (p. 31). Coding was conducted in stages, beginning with what is relevant to the research questions, coding based on the conceptual framework, and noting the pervasiveness and repetition of ideas (Auerbach & Silverstein, 2003). In order to conduct a more detailed analysis after the initial coding, the researcher used analytic memos to document and reflect on coding choices and processes (Saldaña, 2015). As part of the additional coding process, any discrepancies, contradictions, and gaps were identified between the document and interview data.

Validation strategies

This study draws from validation strategies to enhance the credibility and rigorousness of this research (Creswell & Miller, 2000). The data was triangulated with the various forms of data that were collected in this study (i.e., interviews and online documents). The researcher applied Robert Stake's (1995) "critique checklist" (p. 131) to assess the quality of the cases in the report, and Stake's (2006) *Multiple Case Study Analysis* guided the analysis and writing of the study. One individual case would not provide a sufficient picture into Ontario's KMb landscape. By looking at multiple sites, the study investigated how different kinds of organizations approach KMb. The researcher discerned the particularities of individual cases along with the generalities of cases as a whole (Stake, 2006). Furthermore, member-checking was conducted to verify data and interpretations with participants in order to check the accuracy and plausibility of the results (Lincoln & Guba, 1985; Merriam, 1998). Member-checking was performed first with the interview transcripts and then with a draft manuscript for participants to correct, modify, or provide feedback on.

Findings

This study analyzed responses to three key questions, which are summarized and presented below.

How are four education organizations in Ontario engaging in different approaches to KMb?

The findings suggest that the four educational organizations—while varying in composition and structure—value KMb, have clearly defined purposes for this work, are actively engaged in KMb efforts, and are using multiple strategies to reach target audiences. However, the findings indicate greater attention must be paid to understanding the specific needs of target audiences to ensure a more widespread use of evidence. When it comes to KMb strategies, there is evidence of a range of activities taking place, from social media to research products. Building the capacity to trust and understand research findings encourages use. From an organizational standpoint, this study finds two factors that contribute to evidence use: 1) the reporting structure and value of a research services department in the organization, and 2) staff dedicated to KMb work full-time, or with designated KMb functions as part of their role.

Sharing, exchanging, and transferring knowledge can have an impact on practice

A common theme among organizations was a belief that the ability to share, exchange, and transfer evidence-based knowledge has a transformational influence on practice. The intention behind the work, according to OCT Informant #1, is "to get research into the hands of practitioners, but in ways that is accessible to them, that are not intimidating and that can advance student learning and transform their practice." The TDSB demonstrates its belief in transformative practice by focusing efforts on building capacity among principals to share, understand, and use school-based data. By concentrating its efforts on service delivery, York U's KMb Unit believes that practice among academics can be transformed. Through its research, York U's Faculty of Education is more strongly linked with generating new research to support the teaching profession. P4E demonstrated dedicated efforts to influence policy and decision-making related to current issues in public education. In different ways, these four organizations are producing knowledge with the intent of directly and indirectly influencing policymakers, decision-makers, parents, and practitioners.

Key organizational informants believe the co-creation of knowledge is a priority and intend to co-construct policies that represent multiple perspectives

There is evidence of collaborative KMb models being used as a way of engaging multi-level stakeholders. York U, for example, arrived at a collaborative model via an iterative process that moved from producer push to co-creation. The OCT invites participation in policy development from a range of stakeholders, including students, parents, and community groups. Stakeholders can participate through social media, taking the resources developed collaboratively and applying them to their own contexts to support KMb. The OCT's ability to communicate with all teachers is powerful. At times, the OCT sends call-outs or invitations to members through its *Professionally Speaking* magazine. Such call-outs ask teachers to participate in provincial policy development and support the ongoing revision of the professional learning framework. The OCT Informant #2 observed that they may receive hundreds of interested participants within a week of the magazine issuing the call-out.

Altogether, when it comes to KMb approaches, organizations are using PEN-C strategies to mobilize knowledge within and outside of their organizations. There was an over-reliance on traditional forms of sharing evidence-based products, primarily through organizational websites. Other traditional forms of dissemination include publishing in academic journals—particularly ones with limited access. A York U informant criticized the widespread misconceptions about dissemination vehicles, noting that universities are guilty of retaining their use of traditional modes of dissemination.

Table 1 summarizes the cases' key approaches and activities based on the conceptual framework for the study (Malik, 2016).

Table 1: KMb approaches and activities in the cases

KMb approaches & activities	OCT	P4E	TDSB	York U
Purpose	The regulation of the teaching profession	Communication, dissemination, and advocacy in public education	Improving student achievement	Knowledge production, knowledge brokering, and service delivery
Evidence production	Focus groups and surveys about the teaching profession	Surveys, Measuring What Matters project	Student and parent census, extensive school and community database, data dashboard	Scholarly by faculty, KMb Unit focused on knowledge brokering
Target audience	Public, members, and other regulatory bodies	Parents, policymakers, and the public	Administrators, senior leadership, teachers, students, parents, and the public	Faculty, graduate students, staff, community, and government and public
PEN-C	Professional magazine and reports, member events, work with cross-sectoral regulators, courses and workshops	Annual report, research reports, parental FAQs, conferences, parent councils, workshops, and parent support line	Research reports, fact sheets, literature reviews, conferences, workshops	Plain-language summaries, KMb workshops, KMb certificate pilot program, conferences
Mediation	Regulatory sector collaboration, public awareness initiative, inter-organizational collaboration	Relationship with Parent Involvement Councils (PICs), media, cross-sectoral partners	Partnerships with external agencies and applied researchers, capacity building among school administrators	Knowledge brokering model within university, communities, and other institutions
Impact	No short-term or long-term measures specific to KMb	Limited impact measurement activities specific to KMb	Limited impact measurement activities specific to KMb	Some impact measurement activities specific to KMb
Challenges	Moving beyond "dissemination as use" traditional forms of dissemination	Funding and resources to support innovative approaches	Media and public scrutiny leading to reactive rather than proactive approaches	Widening reach of KMb tools and strategies, improving impact measurement

Apart from the mission statements, there are obvious differences between the organizations in terms of size, role, governance models, culture, and capacity for KMb.

What evidence do the education organizations collect on the impact of their KMb strategies?

This study found measures of KMb activities to occur predominantly around measuring outputs and tracking website visits using tools such as Google Analytics. Measures of impact occur by measuring outputs. Organizations in the sample primarily track outputs through patterns and visits to their website. Informants recognized the importance of measuring KMb impact as a means to inform program improvements and target the needs of user audiences. An important distinction was noted by York Informant #1, where measures of impact may be confused with measures of "activity." The York U KMb Unit tracks and reports on their KMb activities. Measures of impact in KMb may be traced through narrative case studies, a method discovered by research into the Research Evaluation Framework in the UK.

KMb happens through multiple channels and processes. Because of the indirect nature of KMb, processes, stories, and case examples demonstrate some ways of measuring impact. The York U case highlights the use of stories as an important means of understanding impact over a period of three to five years. By staying in contact with research partners, the KMb Unit at York U strives to learn lessons from KMb in practice. P4E acknowledged that impact measurement is an area that the organization needs to work on in order to better track outcomes and inform its KMb strategies. The TDSB informants cited ongoing tracking, monitoring, and measuring activities. However, it was not clear whether and to what extent these actions were specific to measuring the impact of KMb. Similarly, the OCT has the least amount of KMb-specific strategies among the organizations, with measurement functions being primarily about the teaching profession itself, rather than tracking and monitoring KMb strategies. Formal and informal processes are in place to gather evidence on approaches related to its professional magazine and also the teaching profession. OCT Informant #1 said "that does to a certain extent let us know what's been effective or where members are engaging in ongoing professional learning that might be related to KMb in transforming practice." The informant acknowledged a greater need for targeted efforts,

> But I wouldn't say that it's probably as robust as it could be, but again, our practice has been more focused on mobilizing the knowledge and less about did we hit the mark, which probably is something that we should turn our attention to. (OCT Informant #1)

The informants shared positive results of their efforts to obtain feedback with diverse stakeholder groups. The informants in this study admitted, however, that no short- and long-term measures of impact were in place to assess KMb efforts. As measures of impact remain weak and unclear, this can affect the understanding of what is working and limit the ability to make evidence-informed program improvements and decisions.

What challenges do these organizations encounter in mobilizing knowledge and how do they address these challenges?

Assessing impact

Impact is the area of greatest challenge for education organizations. As OCT Informant #1 observed, assessing impact is important in learning which strategies are working and understanding the intended impact. OCT Informant #1 noted:

> I think we need to look to examples of really accessible KMb strategies or projects and promote those more, reflect on them, and see what were the principles that underpinned it and made it successful. I think the advice would be to myself, but also other organizations, is look at successful projects and see what you can borrow from the structures that are within them [*sic*].

One strategy mentioned here is to look at successful projects in order to garner lessons learned and glean guidance about how to replicate existing practices and structures that work. Keeping impact and successful strategies at the forefront is key, as one OCT informant stated, whether it is through conferences, symposia, or meetings:

> What are we doing? What research is out there? What is informing practice and … connecting those various communities? We have individuals who are researchers. We have individuals whose research would have a real impact. I think continuing to connect those groups is key in looking for the natural networks where that can happen. (OCT Informant #1)

Essential components are networking, communicating, and relationship building with the "right people," a process that also requires self-reflection. OCT Informant #2 encouraged asking the following questions as part of self-reflection:

> You have to have the list of questions. What is it that you want to achieve? Who is it that you need to achieve it? How are you going to get that information, and how best are you going to implement it?

While participants called for a greater investment in measuring impact, most seemed unclear about how to strengthen these efforts.

The findings suggest that, in general, measuring impact is an underdeveloped area in the field of KMb, with a lack of knowledge about how to approach measurement. In order to measure impact, the senior leadership at P4E and York U recommended "telling the story of impact." This method of understanding impact speaks to the multiple complex channels through which research use happens.

Incentives, reinforcement, and promotion

When research use is tied to the promotion process for senior staff and administrators, there is a greater chance of uptake. TDSB Informant #2 observed that recently promoted principals tend to be more adept at using the data because it is a requirement in the promotion process at the board. In order to get promoted, principals are required to prove their abilities to use evidence to inform decision-making in their instructional and leadership practices. As this is a more recent requirement, principals who were promoted many years ago generally tend to be less accustomed

to making decisions on the same basis. While research use in this context is primarily about student-achievement data, the nature of KMb is also quite different. Similarly, there were no signs of formal rewards or reinforcement to support KMb work at the OCT or P4E.

Conversely, faculty members at universities are not mandated to engage in KMb. It is often because of funded projects that faculty are required to have a KMb plan. At York U, there is also no requirement for any of the researchers to access support from the KMb Unit. The university promotion and tenure process for faculty tends to reward "academic currency" (York Informant #2), such as conference papers, peer-reviewed articles, and excellence in teaching.

An alternate viewpoint is one that questions the value of placing such incentives on faculty. York Informant #1 weighed in on the merit of tenure and promotion that values KMb. If truly dedicated to advancing KMb efforts, organizations may consider awards and reinforcements to support internal KMb efforts. This study includes four different kinds of education organizations. The nature and type of suitable reinforcements will, of course, vary according to their differing mandates.

Partnerships

Another identified barrier to KMb is the ability to work effectively with partners. Partnerships can be a means to facilitate KMb efforts, primarily through mediation and brokering strategies. P4E prides itself on developing strong partnerships across the sector, including with government, civil society organizations, and funders. P4E has encountered many successes by focusing its attention on building partnerships across the sector. However, organizational cases in this study acknowledged that efforts to build partnerships can be rife with challenges. A York U informant reported on the challenges of funding, collaborations, and partnerships:

> Our current funding programs do not easily fund academic partners, and if we accept that our partners are critical mediators of impact, then we must assign ways of working with partners that rewards them for the work that they are doing. And right now what our researchers do is they don't put them on as co-applicants, they put them on as collaborators or partners. So we don't have a culture of creating authentic partnerships. (York Informant #1)

A commitment to developing networks and partnerships is an aspect that participants believe supports KMb success. The OCT tries to develop networks based on recommendations from its members or the public. OCT Informant #2 observed, "I think the fact that we are committed to dialogic processes that are highly democratic and that really open pathways and doors for people to actually identify what they need and suggest opportunities for KMb." The OCT maintains partnerships with community colleges, universities, school boards, different professional organizations, and regulatory bodies. OCT Informant #2 believes in the importance of "fostering the leadership of the membership in order to enable them to take leadership and ownership in terms of KMb, and inviting parents and stakeholders [to do the same]." The OCT uses diverse processes to engage individuals in the co-creation of knowledge.

KMb is an integrated service delivery model at the TDSB. The partnerships, according to TDSB Informant #3, have had a tremendous impact on encouraging the use of research, particularly in the board's partnership with the ministry. An interviewee noted:

> The whole world is moving more and more to integrated service delivery. We have examples of that in the TDSB and we're doing the research around it and we're supporting that research, because ultimately that will be a direction that will help the province. (TDSB Informant #3)

Considerations such as the constantly evolving nature of partnerships also require responsiveness to social and political factors external to the organization. At points of change, TDSB Informant #1 suggested critically examining milestones and regression points over a four-year period in order to recover and strengthen action plans.

While efforts to build partnerships were evident across the four cases, apart from York U's KMb Unit, there was not always a clear connection to mediation and brokering functions. P4E quite clearly develops partnerships within education and across the sector with intentional brokering strategies in place. The TDSB demonstrated an interest in fostering partnerships in order to have an integrated service delivery model that shares and uses research. The OCT primarily partners with other similar regulatory bodies nationally and internationally on best practices for professional practice.

Discussion

Ultimately, the goal of most education stakeholders is improving outcomes for children, youth, and communities through more effective development of policies, programs, and services. Across the cases, impact was an underdeveloped area, with a prevailing lack of knowledge in the field about how to engage in measurement in a way that moves beyond counting outputs. The limitations of seeing the immediate impact of research use have been well documented by researchers (Davies & Nutley, 2008). In addition to limitations in measuring the impact of evidence use, it is important to note the different forms that use can take. Measuring impact is an area identified as needing considerable attention; greater focus; and increased learning, practice, and action. However, the conceptual and instrumental functions are perhaps the most challenging to measure, understand, and navigate. Organizations may lack the supports necessary to approach the recommendations proposed by Davies and Nutley (2008).

Altogether, from the literature, the barriers to KMb cover a range of potential challenges to facilitate research impact. In sum, these barriers can vary according to the organizational context and current social and political pressures. Further, dedicated resources, including financial and human, are required to support the formal and informal processes through which impact measurement is developed and established. Understanding the common challenges to measuring impact can facilitate the development of strategies to minimize those challenges. Within a broader social and political context, these challenges need to be considered with respect to organizational mission, culture, and capacity.

This study acknowledges the influence of social and political factors and recommends that organizations develop tools and processes to measure the conceptual and instrumental impact of their KMb efforts, which go beyond simple measures of outputs. Greater efforts made toward collaborating with partners and cross-sectoral stakeholders may improve measurement practices. The study recommends that organizations give greater attention to defining measurement criteria, selecting an appropriate evaluation framework, and building in evaluation throughout KMb efforts.

Taken together, the aforementioned focus areas can help organizations integrate KMb strategies with organizational processes and functions. Other efforts that can support developing measures of impact include identifying the key components for stakeholders to consider, understanding research use in user communities, and evaluating initiatives aimed at increasing research use (Davies & Nutley, 2008). Although the proposed areas sound practical, the actual prioritization and implementation require dedicated efforts.

Collaborative approaches are some ways that organizations in this study believe they are enhancing democratic practices. Although the organizations differ in their mandates, there was an altogether common fundamental and general commitment to connecting research to policy or practice. This could be mitigated by involving different groups of citizens in research agenda setting that reflects diverse perspectives while honouring democratic values (Gough, 2007).

Website

Google Analytics, https://analytics.google.com/analytics/web/provision/#/provision

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