From Knowledge Generation to Knowledge Integration: Analysis of how a government uses research

Carol Campbell and David Fulford,
Ontario Ministry of Education

Contact Details:
Carol.Campbell@ontario.ca
David.Fulford@ontario.ca

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Introduction

This paper explores the dilemmas and possibilities in applying research to inform and improve policy, program and practice decisions and actions. Building on Cooper, Levin and Campbell's (2009) paper in this session, the current paper focuses specifically on the issue of the connections between research and its use by a government education department. Whereas other studies of research-policy-practice connections have focused on the views of policy makers (GSRU, 2007) or practitioners (Figgis et al., 2001), the starting point in this study is an analysis of almost 100 research projects and activities recently completed or active for the Ontario Ministry of Education, Canada. The paper outlines the purpose of examining research use for education policy, a study of research use within a government education department, outlines main findings for the types of research conducted and how these connected to policy processes, and summarizes main themes in relation to dimensions of research use and transitions from generating new knowledge through research to mobilizing, contextualizing, adapting, applying and integrating research knowledge with policy and practice knowledge, decisions and actions.

Research, Policy, Practice Connections: Dilemmas for Understanding Research 'Use' in and by Government

Debates about the nature, purpose and desirability, or otherwise, of research 'use' to inform policy and/or practice have been around for several decades now (Weiss, 1979; see Cooper, Levin and Campbell, 2009). The movement to 'evidence-based' and 'evidence-informed' decision-making and related practices in health, education and other sectors and organizations has provided considerable momentum to questioning, advocating and challenging research/policy/practice interconnections. Cautions about assuming a strong linkage between research evidence and policy decisions have been identified (Levin, 2005; Nutley, 2003; Whitty, 2006), as evidence competes with a range of factors, including personal attitudes, public expectations, political biases, resource constraints and conflicting information (Burns & Schuller, 2007; Hargreaves, 1999). Within the literature on evidence-based decision-making, and related approaches to research use, a considerable amount of attention is given to the challenges in forming strong links between research and policy. Nutley et al (1997), for example, point to challenges in the limitations of the applicability and accessibility of research, to limitations in the non-rational and complexity of policy-making, and to the challenge of sustained interactivity between researchers and policy-makers working in different arenas, with different expectations, sometimes conflicting timelines, and divergent ways of operating (see also, Hargreaves, 1999). The current authors' concern is that much of this literature focuses on challenges and espouses 'shoulds' rather than examining the empirical reality of ways in which research and policy can and do interconnect, interact and influence each other, as discussed further below.

A related concern is the conceptualization and practice of research 'use'. A range of definitions of research 'use' have been developed over time (e.g. Weiss, 1979; Nutley et al, 2007). Nutley et al. (2007), for example, present a continuum of research use ranging from conceptual uses – aimed at changing awareness, knowledge and understanding, and attitudes – through to instrumental uses aimed at practice and policy adaptation and implementation. Indeed, a range of research uses can be identified from the literature, related evidence and our experience working in education research, policy and practice roles. A summary of a range of implications of research 'use' are included in figure 1 below. Each of the types of research 'use' outlined in figure 1 can be found in education research and policy. However, they involve different purposes, approaches and intended outcomes. Taking each of the terms in turn, we outline some key considerations

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Figure 1: Research Use - Some Distinctions and Combinations

Accessing research		Applying findings
Conceptual use		Instrumental use
Replication	Adaptation	Innovation
Transmission		Transformation
Knowledge push		Knowledge pull
Informing	Assessing	Evaluating
Individual	Organizational	Systematic

- **Accessing/Applying**

First, use can be conceived as accessing research, for example by reading a research report or online databases. Indeed, much of the research dissemination literature focuses on how to increase access to existing research reports and materials. However, reading about research is not the same as taking action on that research. Hence, the need to consider additional approaches to research use if the intent is direct, or even indirect, application of the findings.

- **Conceptual/Instrumental**

Second, following from Nutley et al. (2007), research aimed at changing conceptual understanding is important, including in policy-making, but can differ in method, purpose and approach to instrumental conceptions of 'practical' research on 'what works'.

- **Replication/Adaptation/Innovation**

Third, the focus on 'what works' includes scientifically testing and evaluating programs and practices in order to identify potential replication of effective programs across sites (Slavin, 2004). Critics point to the reality of adaptation as research findings are adopted piecemeal and/or adapted to local contexts, professional opinions, values and constraints – hence, the shift from replication to adaptation. However, if adaptation becomes far removed from the original evidence, the fidelity to the original purpose may be reduced and, if intended to bring about quite difference change, the use of research may be as a stimulus to innovation. Indeed, for many researchers, the potential to generate innovative ideas, practices and knowledge is a key purpose of education research.

- **Transmission/Transformation**

The above relates to the fourth distinction in figure 1, the difference between 'transmission' of research findings, essentially telling what the research is to spread that awareness, compared to an intent that is 'transformation' through engaging, interacting and using research to change policy, practice and outcomes. This links to the next distinctions about who is promoting or requiring the research and how the interaction between researcher and user occurs.

- **Knowledge Push/Knowledge Pull**

In 'knowledge push', the provider of the research knowledge is promoting that research, for example through publications, speaking engagements, interactions and/or advocacy work, whereas in 'knowledge pull' the user of the research is actively seeking specific research to support their needs and interests, for example by funding a research proposal or seeking collaboration with a researcher(s).

- **Informing/Assessing/Evaluating**

The next set of distinctions – informing, assessing, evaluating – interconnect with when in the policy and practice process research is being used and for what purpose. The bulk of the evidence-based/evidence-informed literature relates to the use of research to inform policy at (usually early) decision-making stages, for

example when a policy is being formed, options scoped and final recommendations agreed. Yet, research – as will be discussed below in our study – can and is used at other stages of the policy process beyond initial decision-making to include assessing current status of a policy or practice, such as assessing the state of classroom teaching practice or early implementation evidence, and evidence is used to evaluate both short, medium and long-term implementation, impact and outcomes of policies and programs.

- **Individual/Organizational/Systemic**

The final distinction in figure 1 relates to level of 'use' – with related questions about the capacity and processes involved – from individual to organizational to systemic. To illustrate the point, an individual user could be a teacher reading, studying or conducting research to inform practice in her/his classroom. If this teacher was based within a school that was committed to being a 'research-engaged school' using research in professional communities and actions, research use could be conceived as an organizational property – it extends beyond an individual to a collective commitment. Further, if that school was located in district that had a commitment and actions to support research use across schools and at the district level, there is a need to consider how to develop the systemic capacity to access and use research in ways that are effective, appropriate and sustainable.

Each of these distinctions is relevant to considering the nature, intent, process and outcomes associated with research use in and by government. As others have noted also (Honig and Coburn, 2008), the nature of research-policy use is complex and multi-faceted and goes beyond a simple language or conception of linear, instrumental and one-directional use.

Notwithstanding challenges to both understanding and advancing research use and policy connections, it is also clear that governments can and do use evidence and that demands for evidence-based policy-making continue to strengthen and spread internationally. As Levin (2004: 2) states, "Governments want to claim that their policies are supported by evidence. Increasing requirements for accountability for public spending also put greater emphasis on evidence." Such demands for transparency, accountability and cost-effectiveness can only be anticipated to increase in periods of economic constraint and high expectations for educational outcomes. Slavin (2002) points also to the importance of formative and summative evaluations of policies implemented with a focus on 'what works' in terms of program impact and outcomes.

Yet, despite growing interest, there is limited research specifically on how governments do use research. Some of the existing commentary is not encouraging for researchers; for example, studies indicating that senior policy makers pay little attention directly to research (Davies, 2007; GSRU, 2007), that "backtracking" from practice and policies to research is complex and mediated

through a web of interactions (Figgis et al., 2001), and that research impact is, at best, cumulative, indirect and mediated over time (Levin, 2004). In this paper, we report a study that explored the reality and possibilities – as well as the challenges inherent – in advancing the use of research connected to education policy and practice by the Ontario Ministry of Education, Canada, as a case study of a large government department committed to advancing evidence-based, research-informed practice.

Background Context: Ontario's Education System

Within Canada, education is a provincial level responsibility. Ontario is the most populous province in Canada with 40% of Canada's 33.6 million residents living in Ontario. Ontario is also a diverse and mobile community with 60% of the 225,000 immigrants arriving in Canada each year settling in Ontario. The geography of Ontario covers one million square kilometres of land ranging from the largest city of Toronto, through suburban communities, to rural and remote areas. Within Ontario, there are 2.1 million students in about 5,000 schools administered through 72 district school boards. Ontario's education system involves four (publicly-funded) governance systems: English public; English Catholic; French public; and French Catholic (approximately 4.5% of the population speak French as their first language).

In fall 2003, a new government was elected with a firm commitment to education as its number one priority. Premier McGuinty has become known as the "Education Premier" and his government since 2003 (and re-elected in 2007) have pursued a range of targets and goals to improve educational processes and outcomes with specific commitments to increase literacy and numeracy rates, improve graduation rates, and reduce primary class sizes. The Ontario Ministry of Education is the provincial government department responsible for the development and delivery of policies, programs and practices to achieve the government and Ministry's three goals of increase student achievement, reduced gaps in performance and increased public confidence. A summary of goals, targets and progress are outlined in figure 2. The government has invested significantly in education, in 2009-10 the projected Grants for Student Needs (GSN) is $19.78 billion (CDN), an increase of 34% (over $5 billion) compared to 2002-03. Policy and strategy directions and capacity-building supports for education improvement have also advanced considerably, particularly through the establishment of a Literacy and Numeracy Secretariat focused on elementary teaching and learning, and a Learning to 18/Student Success strategy focused on high school reform, student engagement and learning pathways. A range of supporting strategies and conditions have also been put in place including the Ontario Leadership Strategy, teacher development, governance and operational effectiveness, community and parent engagement, equity and needs of specific student populations, including special education, English Language Learners, Aboriginal and other students struggling for whatever circumstances. For a fuller discussion of the Ontario strategies see Levin (2008) and Ontario (2008).

Figure 2: Ontario Education Goals, Targets and Results

Goals	Targets	Results
✓ High levels of student achievement ✓ Reduced gaps in student achievement ✓ Increased confidence in publicly funded education	75% of elementary students to achieve the provincial standard in reading, writing and mathematics	Improvement from 54% in 2003-04 to 65% in 2007-08 of students at provincial standard overall
	85% of high school students to graduate in a timely manner (after five years) by 2010–2011	Improvement from 68% in 2003-04 to 77% for the 2007-08 graduation rate
	90% of primary class sizes to have a maximum of 20 students by 2008	Improvement from only 31% of primary classes with less than 20 students to 90% of primary classes by 2008.
	Reduced numbers of elementary schools where two-thirds or more students to not meet the provincial standard in Grade 3 reading	Improvement from 19% of elementary schools low performing in 2002-03 to 5% of schools

Of particular relevance to the current paper, the government and Ministry have placed an emphasis on evidence as central to the Ontario change strategies. The Ontario Ministry of Education has developed a Research and Evaluation Strategy to advance the commitment to developing and implementing policies, programs, and practices that are evidence-based, research-informed, and connected to provincial education goals (Ontario, 2009). We will return to the specifics of the Ontario Research and Evaluation Strategy later. As part of developing this strategy, the project described below was undertaken in order to advance the Ministry's use of research both by considering the growing literature on evidence-based decision making and research use and by conducting original research to identify, analyze and understand why, what and how the Ontario Ministry of Education was actually using research with what benefits, opportunities, challenges and scope for enhancements.

Research Use in Government: Overview of Study Purpose and Methods

As indicated above, the context to our study was to understand how to improve research-policy connections in general and specifically for the Ontario Ministry of Education. There were five main purposes to the study:

- To understand how to improve research/policy connections
- To understand the range of research commissioned and conducted, both by external researchers and in-house, for the Ontario Ministry of Education
- To understand how the Ministry uses research and evaluation particularly related to policy, program and practice concerns
- To profile approaches to the use of evidence and research within the Ministry (to build capacity and stimulate research use across the Ministry)
- To inform the development of the Ministry of Education's Research and Evaluation Strategy

In the context of this inquiry, research questions we explored included:

- How are research and evaluation used within the Ontario Ministry of Education?
- What kinds of research and evaluation projects and activities are undertaken and used?
- What issues/concerns drive the research focus?
- How is research and evaluation used to inform policy, program and practice?
- What are some challenges we encounter?
- What are potential future directions?

The following methods and stages in the gathering and analyzing of evidence were used for this study. First we began by gathering information on all research and evaluation projects in process and/or recently completed within the Ministry. A process was established to gather information across the Ministry about research and evaluation activities, to create a database to hold this information in a searchable and categorized form, and to put in place a process for regular updates to the database which is now available on-line to all Ministry staff with information about projects that are ongoing, active and/or recently completed. For our analysis, we began by examining a snapshot of the 97 research and evaluation projects that were active or recently completed at the start of this study in summer 2007. We examined all of the projects to consider why they were being undertaken, what they involved and how/if they were being used to inform policy, program or practice considerations by the Ministry. This resulted in the development of a three-dimensional typology of research/policy connections for further investigation: first, if and how the research connected to stages of policy, program or practice development; second, what research processes were applied, including methods and who conducted the work; and third, what were the connections to advancing evidence-based decision making and the strategic

use of research by government in education. An important first finding was that examining research-to-policy connections exclusively – if conceived of as major policy decisions – would misjudge and misunderstand the complex, nuanced and multi-faceted ways in which research use was interacting with policy and, arguably more so, program development and implementation and work to improve education practice in school districts and schools.

The next step was a more in-depth analysis of 34 of the original 97 projects to identify further themes emerging both from the projects and from their connections to use by the Ministry. The 34 projects were selected to include a sample of different types of research, evaluation and analytical activities and to represent the range of organizational units and responsibilities within the Ministry. Through investigating our central questions of what types of research and how are they used, we identified six key types of research and evaluation activity used by the Ministry:

1. **Literature Reviews and Syntheses**

Literature reviews are often conducted both by in-house staff within the Ministry and by conducting external researchers with expertise in the topic area and/or with research synthesis skills. Often literature reviews are used at initial policy scoping and/or program development areas to identify evidence across jurisdictions/countries and experiences. For external researchers, working on a literature review can provide a mechanism for the researcher(s) to connect with, and inform, policy makers about priority goals. An example of this would be the commissioning of a literature review on leadership practices which was used to inform the development of the Ontario Leadership Framework.

2. **School-Based Inquiry and Research Projects**

The Ontario education strategies place a strong emphasis on building, valuing and supporting local capacity through the professional development of educators. The provincial strategies strive to combine provincial direction and support with local capacity and initiative to blend province-wide strategies with local contexts, experience and needs. One way of supporting this has been through the use of school-based inquiry and research projects, such as support for action research and teacher inquiry. In these cases, often the educator/practitioner is the main researcher with some support from an experienced academic researcher and allocation of resources to support work within the teacher's professional time and classroom. Evidence and learning from this type of research can be used by the Ministry to inform the government about some of the locally contextualized initiatives present within schools and, where relevant, potential evidence and implications for local and provincial strategies across schools. An example is the boys' literacy teacher inquiry project which involved over 140 teacher inquiry projects. The projects supported teachers' development and improved school practices locally and the findings across the projects have informed the

development of evidence on practices and strategies for boys' literacy provincially. As well as implications for education programs and practices, there is support for teacher inquiry to benefit the teachers' own learning as part of their professional learning. The Teacher Leadership and Learning Program provides funding to support experienced teachers undertake study, reflection and practice changes in an area identified by the teacher.

3. Research Across Multiple-Sites to Identify 'Effective', 'Successful' and 'Promising' Practices

A third form of research activity and use is conducting research across multiple districts and schools to identify and explain 'effective', 'successful' and/or 'promising' practices. The purpose of these projects tends to be to identify, share and foster evidence-based effective practices, drawing on evidence across multiple sites with the intent of applying the identified practices on a larger scale across further schools and districts. This research has taken three main forms.

First, research conducted by the Ministry directly working with schools and districts to identify 'effective practices' to support communication and capacity-building. For example, the 'Unlocking Potential for Learning' series (Campbell, Fullan and Glaze, 2006) involved a summary report and case studies of eight school districts that had demonstrated improvement in literacy and numeracy with the intent of profiling and extending these practices across Ontario's 72 districts.

Second, evidence supplied to the Ministry by schools and/or districts about their practices that is then reviewed, investigated and verified to identify effective practices that have contributed to improvement. An example is the 'Schools on the Move' project which identifies schools that have made substantial improvement, particularly in challenging contexts, through analysis of achievement and demographic data. Fieldwork is then conducted with these schools to observe their practices, interview principals and teachers, and gathered artefacts from the schools. A related stage is producing a report on key effective practices across the schools with case studies and vignettes of the stories and specific practices in each school to support knowledge exchange, networking and capacity building with a wider group of schools.

Third is providing funding for researchers to conduct research on effective, successful and/or promising practices in relation to specific Ministry initiatives and or areas of interest. An example would be work with the Council of Ontario Directors of Education and research teams to investigate local initiatives to implement 'Education for All' to support the integration and achievement of students with special needs into inclusive classrooms and schools. Evaluation of impact across the local initiatives, plus evidence and examples of effective practices is available online and through a research report.

4. Research to Investigate a Policy Question or Concern

Another area of research activity is the Ministry commissioning research experts to investigate, report on, and provide advice in relation to a particular policy question or area of concern. This is generally to inform initial policy scoping or program development, but can also be used at later stages in program review as new questions and concerns arise and/or new evidence is required. An example here is the role of research evidence throughout the development of the Student Success strategies for high school reform. Reporting in 2004, a study of Ontario's high school students and their progression to graduation and beyond revealed the need for attention to the graduation rate, credit accumulation and factors contributing to or hindering graduation, the extent to which school courses, programs and pathways engaged students and developed their range of interests, abilities and ambitions (King, 2004). This study was pivotal to the development of the Student Success strategies including a target and tracking of graduation rates, development of high school indicators including credit accumulation, expanding the range of ways in which students could gain credits and progress through schooling including dual credits, co-op programming and Specialist High Skills Majors, and initiatives to support students to recover credits. Subsequent research has focused on questions relating to which students leave school early and the factors that contribute to engagement and disengagement, and to questions about how to effectively support successful transitions between Grades 8 and 9. This research has, in turn, informed a range of student engagement, voice and transitions initiatives.

5. Data Analysis and Information Tools

Fifth, closely connected to building capacity for research, is the development of analytical tools and information systems, both drawing on and contributing to understanding of data to support research and policy questions, as well as program and practice needs. The Ministry has invested resources and supports in substantially enhancing data collection, information systems and capacity to use, understand and apply data at the provincial, district and school levels. The Managing Information for Student Achievement (MISA) initiative is now in its fourth year of supporting school district local capacity building plans for data management and use, providing a dedicated MISA leader in every school district, and supporting regional networks across districts for Professional Network Centres. While much of the initial work was focused on technology acquisition and data solutions, the work has evolved into supporting evidence-based inquiry and decision making, including research and evaluation activities, to support improvement planning and education practices in districts and schools. At the provincial level, data systems and analysis are being used extensively to investigate and address questions about school performance, contextual variables, progress and growth over time, trajectories and a range of other indicators and analyses which is informing education policy decisions, research work and evaluation of progress and outcomes. One example is the Ontario

Statistical Neighbours project which combines analysis of school performance results (current achievement and trends over time), demographic information (low income, parent education), school program information (special education, additional language learners) and other school contextual information (enrolment size, urban/rural location) to provide a fuller analysis and profile of a school. This type of analysis draws on international evidence concerning school effectiveness and improvement and is being applied to inform programming decisions and targeting, for example, through identification of lower performing schools for the Ontario Focused Intervention Partnership initiative.

6. Policy and Program Evaluations

Finally, and most closely tied to government policy priorities, is major policy and program evaluations. The Ministry commissions independent, external evaluations of its major strategies and programs to provide feedback, evidence and recommendations regarding the implementation, reach, impact and outcomes of Ministry policies and actions. Such evaluations can focus on a single program or initiative, for example a current multi-year evaluation of the New Teacher Induction Program. Even more significant are larger, complex evaluations that monitor and report on impact and outcomes across priority strategies that encompass multiple initiatives and actions, such as the recent evaluations of Learning to 18/Student Success (Canadian Council on Learning, 2008), Literacy and Numeracy Secretariat (Canadian Language and Literacy Research Network, forthcoming) and Primary Class Size Reduction (Canadian Education Association, forthcoming). These evaluations can provide both formative and summative evidence that directly contribute to review, revisions and adaptations of Ministry strategies and actions to improve their implementation, to address any unintended negative outcomes, and to enhance positive impact and spread of practices.

Of interest from the above findings is the range of types of evidence from research, evaluation and data analysis that is being used, and the ways in which it intersects with policy, program and practice at different points and for different purposes. While much of the evidence-based decision-making literature tends to focus on use of evidence at the point of **policy decision** – for example, in the case of a government department when major decisions are being made such as in a Cabinet Submission – our research indicates the influence of evidence throughout the policy process and into implementation. The examples we investigated included the use of research and evidence to inform all stages of **program development, implementation and review**. For example, having made a policy commitment to raise literacy and numeracy achievement (including consideration of international evidence as to why this is a priority focus), research is also being used in the design of specific initiatives – such as interventions and supports for low achieving schools – and the approaches to implementing capacity building strategies and reviewing the effectiveness of these initiatives. Research and evidence are also being used for **operational**

and strategic planning purposes to identify needs, priorities, processes for improvement and goals to be achieved. As indicated above, research is also supporting defining the what, why and how of **effective practices** to foster and support their implementation on a larger scale and with deeper precision across districts, schools and classrooms. In order to achieve such implementation and improvement, research knowledge on professional learning, change and improvement is also being used to support **professional capacity building** strategies, as well as research evidence and syntheses on content knowledge in specific domains, such as reading comprehension, assessment for learning, and other priority teaching and learning strategies. Finally, research and evidence are being used in **communications, reporting and issues management** material and resources, for example providing evidence about why government strategies have been developed, their impact to date and results achieved, and/or to respond to request for information about research evidence on the current state of specific practices within Ontario. This overview of the ways in which research and evidence are being used across policy, program and practice considerations indicates the need to expand our conceptualization and investigation of evidence-based decision-making processes.

Further research involving semi-structured interviews with 12 policy officials from the Ministry of Education probed the process by which decisions were made as to when and why to use research, how research was accessed and applied to decision-making, and challenges of being evidence-based in practice. These interviews revealed:

- the importance of having access to research with content highly relevant to policy-makers;
- the vital role of communication and mobilization strategies to make such research accessible in a timely way;
- the need to develop capacity amongst government officials to understand how to access, interpret and apply research and also to build the capacity of researchers to navigate within policy processes; and
- the crucial role of collaboration between research and policy communities to interact, influence and develop shared knowledge.

The initial stages of the study focusing on research and evaluation projects had given some insight into the multiple types and ways in which research was conducted, commissioned and applied. However, the focus on projects specifically underplayed the importance of processes and people through both formal and informal interactions. Examples of formal interactions and influence are the strategic appointment of experts and advisors to provide advice to the Ministry and government. This can take the form of an individual providing expertise and consultancy, for example the Ministry hired a 'Researcher-in-Residence' to shape the initial development of the Research Strategy. Expert researchers can also be engaged in a range of partnership bodies, stakeholder networks and Ministry committees that exist across the majority of strategy areas

for the Ministry. Informal influence is also exerted through a wider network of communication and contact in which researchers interconnect with educators and policy-makers to shape ideas, discourse, attitudes, expectations and proposals. Our analysis of these processes associated with research use through direct and indirect influence led to a conceptualization of four main forms of processes supporting research use within the Ministry of Education and, indeed, wider education and government sectors. As outlined above and in figure 3, processes to support research use include consideration of: the attraction/utility of the content of research for specific policy concerns and contexts; building capacity on both the research and policy fronts to understand each others needs and how best to apply research to policy; fostering collaboration and networks (formal and informal) between researchers, educators and policy-makers; and attention to a range of communication modes and mechanisms to make research understandable, accessible and usable in a timely way.

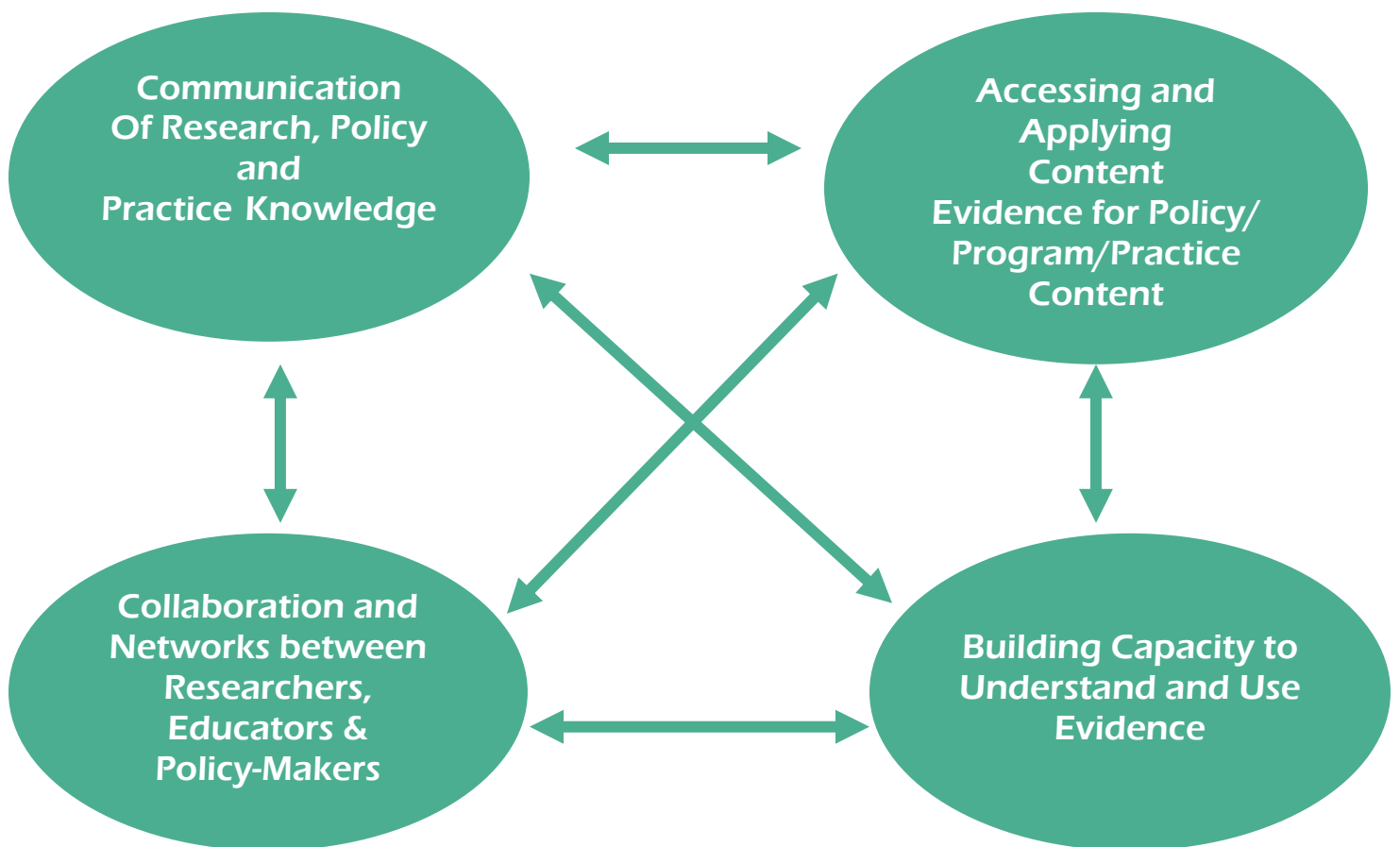## From Knowledge Generation to Integration with Policy and Practice

Building on the themes of knowledge animation (Stoll, 2009) and knowledge mobilization (Cooper, Levin and Campbell, 2009) in other papers for this session, the study presented in this paper has informed our conceptualization of six forms and stages of knowledge development related to research use, in this case for use in a government education department although similar processes could be discerned for research-to-practice connections.

First, **knowledge generation** in which new or different knowledge on topics of policy relevance is created through original research and analysis. Of the types of research identified in our study, research designed to provide new or expert advice on policy questions, issues or concerns was most closely linked to this type of knowledge. Frequently, this quest for new knowledge is considered to be a primary purpose of research.

However, in many instances there is also a need to consider what existing research can already demonstrate, especially on a systematic basis across multiple studies and meta-analyses. This connects with the growing prominence of **knowledge mobilization** as a process involving improving timely, concise and clear access to and interaction with research information. While producing reports in a variety of formats, including concise, plain language versions with clear findings, is a definite advantage from a policy-maker's perspective, knowledge mobilization goes beyond producing reports. As Cooper et al. (2009), indicate effective knowledge mobilization is interactive, dynamic, multi-directional and social. For the government officials in our study, this combination of communication and collaboration were important for accessing, understanding and engaging with research. Further "sustained interactivity" (Nutley et al., 1997) can also generate relationships in which trust and respect across the partners

involved develop and make fertile ground for exchange of ideas. Where such exchanges encourage expression of divergent as well as common views, research can influence new thinking on policy issues. Examples of knowledge mobilization in our study range from commissioning literature reviews, to research input to education materials and professional development supports, to website content, to individual and groups of researchers being appointed or approached for their advice and participation in policy discussions.

Figure 3: Supporting Processes for Evidence-Based Decision-Making and Research Use

Communication Of Research, Policy and Practice Knowledge

Accessing and Applying Content Evidence for Policy/ Program/Practice Content

Collaboration and Networks between Researchers, Educators & Policy-Makers

Building Capacity to Understand and Use Evidence

Third, **knowledge contextualization** is an important lens through which researchers and policy-makers make sense of the potential implications of research findings from other contexts for current needs. These contexts can be different geographical contexts, for example findings from inner city Los Angeles and potential implications, or otherwise, for rural Ontario. The different contexts can also be political, social, cultural and/or values based, as research is more likely to have a stronger influence when it strikes a chord with the prevailing climate politically or publicly. Another contextual factor is time and whether the research's findings are timely and appropriate with some established and foundational research enduring and other research moving in and out of appeal over time. Ultimately, research relevance can be a function of context and values with use being a local level phenomenon depending on the reciprocity and needs of local actors (Lather, 2004). Examples of knowledge contextualization in the current study include research involving multiple schools and districts to explore the variety of local contexts and needs and how these affect policy direction and implementation, for example in the case of primary class size reduction the international literature was consulted but differences in approach were created for Ontario's provincial and local contexts.

This contributes to the fourth dimension of **knowledge adaptation** as emerging and/or established knowledge from research becomes adapted to government interests and needs, whether political or pragmatically driven, and to practice concerns at the local level. It is rare for a research study to be adopted in its entirety. Sometimes this is because the research may not offer firm recommendations or practical application. Oftentimes it is because there is a need (real and/or perceived) to adapt the research to be applicable within the specific context, opportunities present and challenges potential, including congruence with current values and opinions, resource limitations, reflection of local contexts, experiences and professional expertise, and so on. In our study, examples of knowledge adaptation include drawing on research about high school graduation and factors contributing to drop out rates and then adapting the research knowledge into policy recommendations and practical strategies taking account of the legal, educational, social and economic contexts of school attendance, participation and engagement across Ontario.

Fifth, **knowledge application** is the process through which research either directly informs or indirectly influences actions for policy and practice outcomes. What is interesting is the recognition that knowledge application – or research use in this particular form – does not necessarily directly occur through all of the other processes. Knowledge application is about practical strategies and actions. A current example from Ontario is the development of a School Effectiveness Framework, informed by school effectiveness and school improvement research, which schools are supported to use for self-evaluation, professional reflection and improvement planning. In this example, research and professional expertise are informing the provincial framework and local applications.

And lastly, but arguably most importantly and challenging, is **knowledge integration** over the longer-term where the cumulative impact of significant bodies of research knowledge and policy-research collaborative interactions results in research knowledge become part of the discourse, implicit attitudes and routine practices of policy-makers. With increased attention on evidence-based decision-making and knowledge mobilization, researchers can think strategically about how to promote their ideas and findings both in policy circles and in public debate (Levin, 2005, 2006). Often in situations of quick decision making and discussion, research's strongest influence is in being part of the common knowledge, understanding and implicit and explicit assumptions of policy discussions and decisions to shape thinking. For example, in Ontario, the focus on student achievement in literacy and numeracy has been strongly influenced by evidence about the importance of establishing a strong foundation in these key skills as early as possible and international moves to focus student improvement in these domains. This evidence has become part of the common understanding and lexicon across policy-makers and educators across the province having now shaped thinking, policies and related actions.

We propose, therefore, that narrower definitions of research use ignore the multi-faceted ways in which research knowledge does or does not move from initial generation of findings through to contextualization, adaptation, application and integration into policy decisions and changed educational practices. Furthermore, any attempt to seriously increase research use in and by government must take account of the range of forms of use, types of research, connections to policy processes and stages of knowledge development. We are attempting this task in Ontario, as outlined below.

Putting Research into Policy and Practice: The Ontario Education and Evaluation Research Strategy

As discussed earlier, this study is part of developing and advancing a multi-stranded Ontario Education Research and Evaluation Strategy. The findings from this study have informed the ongoing development of the strategy to increase access and use of research through a multi-stranded range of initiatives, capacities and opportunities. The overarching goal of this strategy is to support the Ontario Ministry of Education's commitment to developing and implementing policies, programs and practices that are evidence-based, research-informed and connected to the provincial education goals of increasing student achievement, reducing gaps in performance, and increasing public confidence in publicly-funded education. The approach of the Ontario Research and Evaluation Strategy is to develop a shared strategy designed to be inclusive of staff from across all parts of the Ministry and to foster collaboration with partners across the education and research community to connect research to policy, program and practice.

The Ontario Research and Evaluation Strategy includes six key components, which include attention to the nature and content of research itself as well as to a range of knowledge mobilization, capacity building, communication, collaboration and networking approaches to extend research connections, interaction and application. Initiatives included within each of the six main components of the Research and Evaluation Strategy are outlined below:

1. **Leading the ministry's research strategy**

The Ministry has developed its internal capacity, leadership and infrastructure to support the use, application and valuing of research. This involves both cultural and structural considerations. Organizationally, strategic leadership has been developed to advance the Ministry's commitment to research from the leadership of the Deputy Minister (senior government official), to the establishment of an Assistant Deputy Ministers' (senior officials) Research Committee, to the appointment of Ontario's Chief Research Officer and formation of an Education Research and Evaluation Strategy Branch within the Ministry to lead co-ordinated action, and the existence of the Ministry Research Coordination Team involving policy analysts from across the Ministry's program areas, as well as support for building research capacity and use across all parts of the Ministry. Of note, these organizational functions have been put in place within the past four years and some as recently as nine months ago. The development of the Ministry's organization and leadership of research has been strongly influenced by senior official and political support for the use of evidence, as well as support from education partners.

2. **Building research capacity**

As discussed in the findings from our study, building capacity to access, understand and apply research is critical if evidence-based decision-making is going to advance and become sustained. A range of initiatives have been put in place to support capacity building both within the Ministry and across the education sector.

Within the Ministry, we have established a six module Evaluation and Research Learning Program providing in-depth training for policy analysts on concepts of evidence-based decision-making and research use in policy, how to design research projects and contracts, how to conduct literature searches, scans and reviews, how to understand program evaluation models, how to determine data needs and analysis, and how to communicate evidence clearly and effectively in a policy-context. In addition, two professional learning series involve drop in sessions for Ministry staff on specific areas of research and policy: Policy Research Connections involves Ministry staff sharing their policy work and

related research; and the Research Strategy Speaker Series involves academic experts presenting topical work relevant to Ministry priorities.

The Ministry is also supporting capacity building in the use of research and data across the education sector, for example: the Institute of Education Leadership supports research and capacity building in the field of leadership; the Teacher Learning and Leadership Program supports experienced teachers to conduct research as part of their professional learning; and the Managing Information for Student Achievement (MISA) initiatives provides resources, supports and networking to involve district staff in using data and evidence.

3. Applying research to inform policy, program and practice

The Ministry continues to focus on and strengthen approaches to applying research to inform policy, program and practices in education. The analysis of 97 projects reported in this paper has informed a movement to identify priorities for future research, to strengthen coordination across common areas of interest, to reduce duplication of effort, and to enhance information sharing and research use across the Ministry. The Ministry has also moved forward with major evaluations and significant research work aligned with priority goals and strategies with a focus on applying and communicating findings. Currently, the development of a Ministry Forward Plan for research and evaluation projects is in process both to align and prioritize work within the Ministry and also to make these priorities transparent to researchers interested in working with the Ministry. Linked to these plans, the Ministry has also changed and improved its processes for commissioning research services from academic and private researchers to increase opportunities for research expertise and policy needs to connect.

4. Communicating research findings

Prior to the Research and Evaluation Strategy, little explicit attention had been given to how best to communicate research findings from Ministry-funded projects, as well as how to access information from other research projects with high interest and relevance to Ontario. We are in the process of developing our knowledge mobilization processes with a focus on both print and electronic communications, and opportunities for interaction, face-to-face communication and dialogue. Examples of work underway are an increased profile of research on the Ministry's public website with a 50% increase in 'hits' in 2008-09 compared to 2007-09 (http:www.edu.gov.on.ca/eng/research/). Similarly, an intranet site within the Ministry, Research@EDU, provides Ministry staff with a range of updates, databases, materials and information about research and related activities. A deliberate part of the Research and Evaluation Strategy has also been to increase interactions between researchers, policy-makers and

educators including a range of speaking engagement, meetings, events, workshops, symposia and other forms, as discussed further below.

5. **Fostering research collaboration through networking and partnerships**

The Research and Evaluation Strategy is intended to be collaborative within and across research, policy and education communities, be inclusive of a range of people, ideas and approaches, and to engage interested individuals and organizations in action to use evidence for educational improvement. One mechanism to support networking and partnerships is the formation of the Ontario Education Research Panel, now in its third year, which brings together 14 individuals nominated and appointed because of their research and educational expertise and their provincial networks and connections. Panel members are champions of research-to-practice connections to support student learning and achievement. Another successful approach to fostering collaboration is the Annual Ontario Education Research Symposium. Now with 4 symposia delivered, the Symposium has moved from being a new idea to bring together research, policy-makers and educators in one room to discuss common research interests to now being a stimulus for ongoing dialogue, collaborative research partnerships, joint action, and a range of provincial, regional and local networks and interactions both in person and virtual through wikis and other technologies.

6. **Contributing to an international body of knowledge**

Finally, as well as drawing on local, national and international research, the Ministry's Research and Evaluation Strategy includes a commitment to contribute to research knowledge. Our approach incorporates inquiry and evidence throughout in relation to policy issues, program development, education practices, and in the area of understanding evidence-based decision-making and research use (as in this paper). The Ministry contributes – both individually and collaboratively with partners – to research conferences, papers, articles, presentations, discussions, reports and events.

Concluding Remarks

Although there are undoubtedly challenges and frustrations in attempting to increase the connections between research and policy decision-making – for all parties involved - ranging from time considerations, resources and divergent interests, values and views; it is also clear that there are considerable opportunities and possibilities in advancing a commitment to being evidence-based and research-informed in education. Developing these opportunities and

creating new possibilities requires careful consideration of the multiple and distinct forms of research 'use' with differing intents, approaches and anticipated outcomes.

In this paper, we have explored a study of one government department, the Ontario Ministry of Education's approach to advancing and using research and evaluation evidence. The study explored how to improve research-policy connections by starting from an analysis of current projects and practices. We discovered a range of types of approaches to research and evaluation projects and activities with the main forms being literature reviews, research investigations of policy questions/concerns, support for teacher inquiry, multi-site studies of effective and/or promising practices, expanding data analysis and information tools to inform work; and substantial policy and program evaluations. These different approaches to gathering and analyzing evidence also intersected with range of different purposes for use in policy, program and/or education practice actions. The purposes extended beyond policy decisions at the high level to more detailed program development, implementation and review evidence, to informing planning processes, identifying effective practices implemented, informing capacity building activities, and providing information and evidence for a range of communications and reporting purposes.

The multiple intersections of different forms of use, different types of research and evaluation activities, and different applications for policy, program and practices purposes has led us to conclude the need to expand both the conceptualization and investigation of the nature of evidence-based decision-making in education. By studying existing research activities by a government department, we have analyzed their purpose and use. However, through further research and our own experience, we have identified also the need to investigate beyond research projects and activities into the wider supporting processes of capacity building, communication and collaboration involving researchers, policy-makers and educators. We propose, therefore, that narrower definitions of research use ignore the multi-faceted ways in which research knowledge does or does not move from initial generation of findings through to contextualization, adaptation, application and integration into policy decisions and changed educational practices. Furthermore, any attempt to seriously increase research use in and by government must take account of the range of forms of use, types of research, connections to policy processes, and stages of knowledge development. We are attempting this task in Ontario through attention to a strategy encompassing leading strategically, building capacity within the Ministry and sector, accessing and applying research evidence, communicating findings and sharing information, fostering collaboration through networks and partnerships, and committing to draw on and contribute to evidence about how to use research to inform and support educational improvement. There remains considerably more to be investigated, understood and done to advance research-to-policy connections, however while challenges persist, there are also emerging

successes and further possibilities to build on in collaboration between research, policy and practitioner communities.

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