

# In praise of ignorance

Theoretically reconciling  
ignorance mobilization and knowledge mobilization  
towards network epistemic mobilization in  
collaborative science research networks

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2012

Sociology Working Paper on ignorance mobilization at  
[www.ignorancemobilization.com](http://www.ignorancemobilization.com)

**To cite:** Gaudet, Joanne. 2012. 'In praise of ignorance: Theoretically reconciling ignorance mobilization and knowledge mobilization towards network epistemic mobilization in collaborative science research networks'. Sociology Working Paper at [ignorancemobilization.com](http://ignorancemobilization.com).

# **In praise of Ignorance: Theoretically Reconciling Ignorance Mobilization and Knowledge Mobilization Towards Network Epistemic Mobilization in Collaborative Science Research Networks**

## **Abstract**

In knowledge-based economies, how can the epistemic dynamics of academic research be understood in the context of collaborative research networks where knowledge production and use increasingly merge? My starting point is a potential epistemic blind spot in knowledge mobilization research on merging production and use dynamics: ignorance. I propose a new concept, ignorance mobilization, defined as the use of ignorance towards the achievement of goals. From the role of ignorance in research and innovation, to an understanding of epistemic (ignorance and knowledge) mobilization, I develop an interactive model of network epistemic mobilization. The model frames epistemic dynamics in collaborative research networks with production and use contexts. My main argument is that symmetrical social epistemology research can help understand the distinct and dynamic role of ignorance alongside knowledge in research and innovation. I draw from scholarship on the integration of academic research in knowledge-based economies, knowledge mobilization concepts and theory, sociology of knowledge and sociology of ignorance epistemic categories of ignorance and knowledge and their dynamics in research and innovation, and Simmelian and Weberian theories of action. Finally, this exploration is part of a broader collaborative research agenda that I hope can contribute to understanding and dialogue in praise of ignorance.

## **Introduction**

The rise of knowledge-based economies coupled with ‘Big Science’ amplification of the interface between academic science and government, industry and civil society has spurred increased interest in processes related to the merging of academic science knowledge production and use. More specifically, attention has been drawn to how academic science knowledge is produced, transmitted, received, evaluated, and integrated into existing knowledge. In an effort to promote and support merging production and use dynamics, concepts such as ‘knowledge mobilization’ have gained a foothold in Canadian federal funding bodies and, by extension, in funded research. Scholarship into the dynamics of knowledge mobilization (and related concepts) has equally expanded

extensively in the areas of education and health and, more modestly, in the sciences (sampling of scholarship: Metcalfe and Fenwick 2009; Willison 2008; Best and Holmes 2010; Knowledge Translation and Brokering Workshop Committee 2011; Elissalde and Renaud 2010; Campbell et al. 2008; Kazlauskas and Crawford 2007; Levin 2008; Cooper and Levin 2010; Jacobson et al. 2007; Davies et al. 2008; Levin and Cooper 2012; Daudelin et al. 2010). This discussion leads to the question, In knowledge-based economies, how can the epistemic dynamics of academic research be understood in the context of collaborative research networks where knowledge production and use increasingly merge?

My starting point in this paper is a potential epistemic blind spot in the dialogue on knowledge mobilization: ignorance. I thus propose a new concept, ignorance mobilization, defined as the use of ignorance towards the achievement of goals (i.e., social, cultural, political, professional, and economic). This parallels a definition for knowledge mobilization as the use of knowledge towards the achievement of goals (i.e., social, cultural, political, professional, and economic) (see Levin 2008:11-12). Combining both ignorance mobilization and knowledge mobilization yields epistemic mobilization. Ignorance mobilization is especially pertinent for academic research and for research and innovation science policy, I argue, because these are frequently borne of ignorance mobilization by scientists and by policy-makers respectively. Building towards a study of academic science network epistemic mobilization in collaborative research networks, I therefore engage in a theoretical exploration reconciling the concept of knowledge mobilization with that of ignorance mobilization.

Davies (2011) investigated policy experts not only mobilizing (he refers to ‘marshalling’) knowledge but having to remain keenly attuned to discerning ignorance that could potentially lead to new knowledge and innovation (2011:403). Given that no one can actually predict innovation, policy experts thus produce and reproduce a circular process of ‘...collecting information to generate community, and generating community to collect information’ (2011:408) that, I advance, can essentially be understood as creating ignorance mobilization enabling processes. Ensuing collaborative science research network policy and research goals are frequently framed in terms of knowledge production, but research and policy dynamics and processes involve an intricate and

unrelenting interplay between ignorance and knowledge. Moreover, probing ignorance-related social processes as distinct from knowledge-related processes can bring attention to ignorance that is retained (or not) for further scientific research, either intentionally or unintentionally (related discussions in Frickel et al. 2010:445; Frickel and Vincent 2007:182-183; Felt et al. 2009; Danielson 2010; Carvalho et al. 2010; Kelly 2003; Kempner et al. 2011). Viewed this way, ignorance tends to shed its pejorative character and joins knowledge on an equal footing in epistemic understanding.

My aim in this paper is to propose a network epistemic mobilization interactive model to better understand ignorance and knowledge mobilization in collaborative science research networks. The mostly theoretical exploration draws from scholarship on the integration of academic research in knowledge-based economies, knowledge mobilization, the sociology of knowledge, the sociology of ignorance and Simmelian and Weberian theories of action. My core argument is that engaging in a symmetrical study of scientific epistemology can help reveal the distinct and dynamic role of ignorance mobilization alongside knowledge mobilization in collaborative science research networks. I further argue that acknowledging ignorance in epistemic mobilization also paves an alternative path to rethinking and valuing the role of non-goal oriented academic basic science research within collaborative research networks. What is more, this reconciliation attempt is a first step within a broader research agenda to collaboratively explore ignorance and knowledge mobilization dynamics. Even though this paper is for the most part a theoretical undertaking, the foundations for exploration are firmly rooted in empirical research with PrioNet Canada, a major scientific research endeavour part of the Networks of Centres of Excellence (NCE).

My exploration proceeds in three stages where, in each stage, I invoke theoretical and empirical building blocks to progress towards my goal. First, I explore the historical inclusion and exclusion of ignorance in scientific considerations. I also look at academic research epistemic considerations inside and outside of the ivory tower. I pay particular attention to concepts and understanding of epistemic dynamics in academic research networks, especially with regard to innovation and knowledge production and use contexts. Next, I look to theoretical and empirical contributions on mobilization, action theory and the epistemic categories of knowledge and of ignorance to theoretically

anchor knowledge mobilization, ignorance mobilization and the combined epistemic mobilization concept. Finally, drawing on the building blocks from the two previous steps, I propose and explore a network epistemic mobilization interactive model. The theoretical reflections I engage in can hopefully contribute to the wider dialogue on academic science in collaborative networks.

### **Reaching beyond the ivory tower – science ignorance and knowledge inside and out**

From at least Plato until modernist founders Galileo and Descartes, the pre-modern worldview of educated individuals included the scope and limits of human knowledge, counting ignorance (Ravetz 1987:160). Moreover, the notion of using the scientific study of nature towards discovery or progress was absent in the pre-modern worldview. Socrates is believed to ‘...have discouraged the study of physics because they engendered uncertainty, and did not augment human happiness’ (Bagehot 2001:90). Modern conceptions of progress are thus diametrically opposed, where science research plays a central role and human happiness is no longer a goal for progress. In the recent modern context, although ignorance continues to be a product of science research (Jagtenberg 1983:23) and an invaluable precursor to continued research and innovation (Davies 2011; Nowotny 2008), it remains largely overshadowed and undervalued in comparison to knowledge, especially outside the laboratory. For example, when performing intra-scientific basic research in the laboratory, scientists expect the unpredictable and acknowledge uncertainty (and thus ignorance) during the epistemic processes of knowledge reliability evaluation and validation (Kastenhofer 2010:19, 24; Kastenhofer 2011; Gross 2010:2, 25-26). In the extra-scientific context outside the laboratory however, epistemological processes tend to exclude uncertainty (and ignorance) and focus instead on epistemological processes of ignorance deletion and knowledge production (Gross, 2010:2). Actors seem to lack epistemological tools to adequately deal with ignorance in comparison to the availability of epistemological tools related to knowledge (in regards to policy experts in Davies 2011; scientists, engineers and policy experts in Gross 2010:66-67).

It would appear that, even though ignorance is integral to scientific practice and innovation and a key indicator of a ‘knowledge’ society, it generally remains ill-

accounted for theoretically and analytically (related discussions in Bammer and Smithson 2009:3; Gross 2010:74-78, 173; Schneider 1962:508). By acknowledging the normal role of ignorance in progress alongside knowledge (Gross 2010:66; wider discussion of normality in sociological analysis in Luhmann 1993:xxvii; Simmel 1906; Latour 2000) the value of scientific ignorance in the extra-scientific context reveals its analytical importance. Davies (2011) illustrated the normalcy of ignorance in innovation with his investigation of how policy experts dealt with scientific uncertainty in their role of informing public decision-makers. Furthermore, in comparison to industry, government ‘...has the potential to invest more heavily in scientific and technological research that embraces uncertainty to a greater extent’ (Davies 2011:404-405). The empirical research project on which this theoretical exploration rests is an example of such a government-funded project: the PrioNet Canada research network was funded by the NCE, a Government of Canada initiative. One of the Government’s main goals for PrioNet Canada in response to the bovine spongiform encephalopathy (BSE) crisis was no doubt to generate natural and social scientific knowledge to help deal with the beef industry’s severe economic fallout (Wong et al. 2011:73-74). The science policy’s main driving force nevertheless cannot be understood in terms of knowledge mobilization – as there was scant scientific knowledge to mobilize. I argue rather that the underlying dynamics and processes can best be understood in terms of mobilizing scientific ignorance to reach political and economic goals – PrioNet Canada as a knowledge and ignorance mobilization initiative.

This returns my attention to the main goal of the paper: contributing to further theoretical understanding of processes related to academic science ignorance and knowledge where production (or co-production) and use (or co-use) contexts are increasingly merged, especially in networks of collaboration (see related discussions in Popp Berman 2012; Elissalde and Renaud 2010; Phillips 2007:70-73; Klenk et al. 2010; Whiteside 2006:109, 126-127; Gross 2007, 2010). In knowledge-based economies, multi-spatial innovation systems (Kitagawa 2006) such as PrioNet Canada bring academic science into collaborative research networks with government, industry and civil society locally to internationally. It might be well to interject Beck’s caution at this point that the concept of ‘knowledge society’ (and by extension knowledge-based economies) is a first

modernity euphemism given that ignorance<sup>1</sup> rules in the modern world<sup>2</sup> (Beck 2009:115). The euphemism combined with the above discussion on the normalcy of ignorance in innovation and progress leads me to propose more precise concepts: epistemic society and epistemic-based economies. In this paper, epistemic refers to the epistemological categories of ignorance and knowledge and their sub-types as discussed below in relation to table 1. In an epistemic-based economy, therefore, scientific ignorance and knowledge production and reproduction, and the capacity to mobilize them, are equally valuable to those who engage in related activities. Much as knowledge can impart power to those who ‘...exercise cognitive authority and influence [...] by [being able to define] what counts as knowledge, by restricting the circulation of relevant knowledge and by enforcing methods of examining expert knowledge’ (Stehr and Grundmann 2011:57). I advance that ignorance can likewise impart power to those who mobilize it.

Studies on the merging of production and use contexts, such as collaborative research networks, help draw attention to two interrelated dynamics. The first group of studies attempts to grasp how academic research is integrated in epistemic-based economies. The second involves understanding the processes and dynamics related to how scientific knowledge is produced, transmitted, received, evaluated, and integrated into existing knowledge, mostly beyond academia in epistemic-based economies.

In the first group of studies, theoretical contexts include academic capitalism (Ylijoki et al. 2011), the market university (Popp Berman 2012) and the entrepreneurial university (Philpott et al. 2001; Todorovic et al. 2011). From this scholarship framing the larger social dynamics, I retain the key concept of institutional logic. Organizational studies propose the concept of institutional logic as ‘...a set of organizing principles for a major social order, such as the market, the state, the family, religion, or science’ (Popp Berman 2012:9; Friedland and Alford 1991:248) and when two or more institutional logics co-exist, they can be in conflict. The logic of markets and the logic of science are two institutional logics that are particularly relevant to understanding the interplay and potential conflicts between the production and use contexts in collaborative science networks (2012:9). The logic of markets sees ‘...the purpose of an activity in its capacity to create economic value’ (2012:173) which in this case renders science ignorance and

knowledge compatible with capitalism. Whereas the logic of science ‘...is fundamentally the pursuit of knowledge, in which practical results are an agreeable but secondary benefit’ (2012:9). To the latter I add the pursuit of ignorance. Below I explore how embedding academic research in collaborative research networks slightly alters the logic of science where ultimate ends, though not necessarily the logic of markets, can stimulate basic research ignorance mobilization.

The ivory-tower stereotype from the logic of science (where scholars are thought to pursue research agendas with no extra-scientific relevance) is one that has a strong influence on the network epistemic mobilization context I propose. How? First, for academic science, the institution of science continues to play a critical role in science in practice (including knowledge evaluation and validation in peer-review) even while embedded in collaborative networks (with potential for conflict, see Evans 2010). Second, it is typically in the logic of science that the social scientific gaze can scrutinize how ignorance is retained (or not) for further scientific research (in the form of hypotheses or research programs for example) either intentionally or unintentionally (related discussions in Frickel et al. 2010:445; Frickel and Vincent 2007:182-183; Felt et al. 2009; Danielson 2010; Carvalho et al. 2010; Kelly 2003; Kempner et al. 2011). Finally, and more importantly however, I argue that the logic of science can help us answer a puzzle, how can academic basic research that is typically remote from the use context flourish in collaborative research networks? It flourishes, I advance, for two main reasons. First, by being part of a network the basic science laboratory is engaging in the scientific method (means) with a potential end (the network goal, i.e., therapeutic application in neurodegenerative disease). Second, because of varying levels of subjective rationality (from Weberian action theory, guiding individual actor actions (Evans 2002:228-229)) that guide academic scientists to engage in a pattern of action (research as means) consistent with collaborative network and economic goals (an applied use, the end). Empirical observations revealed that varying expressions of subjective rationality (high to almost non-existent) are possible between university-based laboratories in great part because of academic and science institutional anchoring. For example, one university researcher can hold multiple patents and establish related

businesses whereas another can engage with industry more peripherally and focus instead on ignorance mobilization and knowledge mobilization inside academia.

Within a collaborative research network therefore, I advance that ignorance production and intra-scientific ignorance mobilization can thrive. Here, basic science individual ignorance-related creativity and unpredictability can remain detached from instrumental economic goals and rationality (related discussion on Simmel's action theory in Levine 1971:364; Shilling and Mellor 2001:62-63; discussion of basic research and innovation in Nowotny 2008) and the contingency of collaborative research network objectified rationality (the latter is the institutionalization of rationality in norms, Brubaker 1984:9; Evans 2002:229). I return to action theory, ignorance and creativity below. Within an innovation-driven market logic, relevant ignorance is a valuable commodity to be mobilized in a collaborative research network (see Davies 2011). I immediately invoke potential for ignorance co-production among government, industry, civil society and academic basic science researchers in the intra-scientific context lest academic basic research ignorance mobilization convey a science as discovery paradigm. In deliberative science, stakeholder participation in epistemic processes such as research question development and research agenda setting (see research above on ignorance retained (or not)) would reflect robust social processes alongside robust epistemic processes in ignorance mobilization (see discussion on robust strategies in Gross 2010:113-116). Funding agencies that prescribe knowledge mobilization approaches sometimes require deliberative science dynamics and processes at the start of a research endeavour, for example.

The research and development policies and the logic of market which produce and reproduce merging production and use contexts likewise imply models to understand research/innovation-policy-practice actor dynamics (Best and Holmes 2010). In health, education and the social sciences where the logic of market is sometimes less applicable, civil society stakeholders in a user-based institutional logic can play a more prominent role. Variations to understand these dynamics include evidence-based policy and practice, community-based research, research uptake, industry collaboration, knowledge translation, knowledge transfer, and knowledge mobilization (a sampling of related scholarship includes Nutley et al. 2002; Metcalfe and Fenwick 2009; Willison 2008; Best

and Holmes 2010; Knowledge Translation and Brokering Workshop Committee 2011; Elissalde and Renaud 2010; Campbell et al. 2008; Kazlauskas and Crawford 2007; Levin 2008; Cooper and Levin 2010; Jacobson et al. 2007; Davies et al. 2008; Schut 2008). It is not my goal here to review the scholarship as others have already contributed to the task (i.e., Davies et al. 2008; Shields and Evans 2008; Best and Holmes 2010). Rather, I build on existing critique and on my empirical observations to concentrate solely on knowledge mobilization. In contrast to translation, transfer and several related concepts, following are a few conceptual strengths that I advance are gained by using the mobilization concept. They include consideration for epistemic and social processes related to non-linearity, power, context, the complexity of co-production and co-use and the complexity of integrating new ignorance or knowledge (related discussion in Davies et al. 2008; Best and Holmes 2010; Levin 2008). Next, I develop the theoretical foundations for epistemic mobilization using action theory and an understanding of the epistemic categories of ignorance and knowledge.

### **Concepts and dynamics of mobilization and ignorance and knowledge epistemic categories**

In this section, I focus on mobilization and the epistemic categories of ignorance and knowledge as they relate to epistemic mobilization. The paper rests on two central concepts: knowledge and ignorance. What do I mean by these? First, I bring attention to a characteristic shared by sociological definitions of knowledge – they imply social action (Stehr and Grundmann 2011:5), such as ‘...knowledge as *the capacity to take social action [...] as the possibility of “setting something in motion”*’ (italics in original, Stehr and Grundmann 2011:2). It is not knowledge per se that is the object of study, but its potential for action. The definition I retain for existing knowledge, a sub-category within the larger epistemic category of knowledge (see table 1), is similar, but incorporates nuances with respect to constituency and action: a justified belief that is connected to purpose or use and is generally associated with intentionality. It is therefore not surprising that definitions in relation to the larger epistemic category of ignorance (see table 1) likewise imply action. Active non-knowledge is a type of ignorance where the limits and the borders of knowing are intentionally or unintentionally taken into account

for immediate or future planning, theorizing and action. Hypotheses are examples of active non-knowledge in academic science. In contrast, latent non-knowledge is a type of ignorance where the limits and the borders of knowing are intentionally or unintentionally not taken into account for immediate or future planning, theorizing and action. For the purposes of this paper this abridged presentation of epistemic categories and sub-categories is adequate. In a forthcoming collaborative contribution, we will propose a science in practice epistemic mobilization ecosystem interactive model where understanding the dynamic interplay between all epistemic categories is critical and will be extensively developed. I briefly return to the upcoming model in the conclusion.

**Table 1:** Proposed Epistemic Categories and Sub-Categories (inspired by Gross (2007:742, 749, 751) and Gross (2010:71))

Epistemic Category	Epistemic Sub-Categories
<p><b>Knowledge</b></p> <p>An overarching concept that, by in large, points to knowing, including existing knowledge and extended (new) knowledge. <i>Can be further be broken down into tacit and explicit knowledge.</i></p>	<p><b>Knowledge (existing)</b> - A justified belief that is connected to purpose or use and is generally associated with intentionality.</p>
	<p><b>Extended (new) knowledge</b> – An outcome of planning, theorizing and/or research with active non-knowledge. <i>Can potentially lead to further iterations of ignorance or active non-knowledge if limits to extended (new) knowledge are uncovered, or it can join existing knowledge.</i></p>
<p><b>Ignorance</b></p> <p>An overarching concept that, by in large, points to the borders and the limits of knowing including the intentional and the unintentional consideration or bracketing out of what is not known.</p>	<p><b>Active non-knowledge</b> – A type of ignorance where the limits and the borders of knowing are intentionally or unintentionally taken into account for immediate or future planning, theorizing and action. <i>What is not known can continue to be active, be developed into further active non-knowledge or be transformed into latent non-knowledge where it will no longer be taken into account.</i></p>
	<p><b>Latent non-knowledge</b> – A type of ignorance where the limits and the borders of knowing are intentionally or unintentionally <i>not</i> taken into account for immediate or future planning, theorizing and action. <i>It can remain latent or be developed into active non-knowledge where it will be taken into account.</i></p>

Knowledge or ignorance understood this way can both precede and follow social action where mobilizing knowledge or ignorance depends on respective actors' prospects to engage in action (with respect to knowledge in Stehr and Grundmann 2011:3-4) which returns to the importance of power in analysis. Consequently then, what is mobilization? Building from the multiplicity of mobilization concepts ranging from political mobilization, economic mobilization, resource mobilization, social mobilization (Cress and Snow 1996; McCarthy and Zald 2001:545-549; Edwards and McCarthy 2004; Peters 2010:160-164; Scott and Marshall 1994:482), I propose the following definition for mobilization: the activation and application of individual or organizational resources towards a goal.

Variations of knowledge mobilization dynamics are currently in use by federal Canadian funding bodies such as the NCE, the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council of Canada (SSHRC) (Halliwell and Smith 2011; NCE 2012; CIHR 2012; SSHRC 2009-11). The variability of the funding agencies' conception of, and prescriptions for, the interplay between knowledge production and use contexts is of little relevance in this paper. Underlying dynamics, in contrast, beg social scientific scrutiny which can only be achieved with the help of analytical and theoretical tools. I pursue and define ignorance mobilization as the use of ignorance towards the achievement of goals. Which finally brings me to a definition for epistemic mobilization as the use of ignorance or knowledge towards the achievement of goals (i.e., social, cultural, political, professional, and economic) (inspired by Levin 2008:11-12). Implicit in the definitions is the action of 'activation and application of resources' by individuals or organizations from the concept of mobilization. This further implies a potential separation between individuals or organisations and ignorance and knowledge that requires activation and application of resources. Finally, 'use' is also multidimensional, varying from instrumental, conceptual, strategic/symbolic (Amara et al. 2004; Elissalde and Renaud 2010: 412-414; Levin and Cooper 2012:18) and inspirational (Elissalde and Renaud 2010: 414). Following are the definitions I retain for each (inspired from Amara et al. 2004. Elissalde and Renaud 2010:412-414 and Levin and Cooper 2012:18). Instrumental use refers to instances where decisions or actions are directly based on mobilized ignorance or knowledge. Conceptual

use refers to changes or adaptations in theoretical or conceptual understanding. Strategic/symbolic use for its part designates the use of ignorance or knowledge to legitimate or justify a position. Finally, Elissalde and Renaud (2010) add inspirational use which is particularly pertinent for inter- and multi-disciplinarity as it refers to the transposition of ignorance or knowledge from one discipline or area to another.

Drawing on resource mobilization theory I go beyond issues of use and emphasize additional mobilization considerations. These include the categories of ignorance and knowledge (discussed above), actors and institutions that control the categories (discussed below, i.e., university, government, industry, civil society) and ignorance and knowledge characteristics such as fungibility, transferability, and propriety (Cress and Snow 1996; McCarthy and Zald 2001:545-549; Edwards and McCarthy 2004). Fungibility refers to context dependence, where ignorance or knowledge that is fully fungible is context independent (i.e., written ignorance or knowledge in publications and books with varying degrees of market-restrictive access such as pay-per-article) or almost not fungible when fully context dependent (i.e., tacit knowledge and the broader category of ignorance, if it has not been codified) (adapted to epistemic considerations from Edwards and McCarthy 2004:128). Issues of ignorance and knowledge transferability are closely linked to fungibility and receptivity (or absorptive capacity) of actors and institutions (discussed below). Finally, propriety issues relate to proprietor control of access to their ignorance and knowledge, and inversely, the ability to gain access to the controlled ignorance and knowledge through intellectual property mechanism, for example (see Evans 2010).

A social scientific epistemic mobilization approach therefore looks at processes and dynamics of how academic scientific ignorance and knowledge are produced, transmitted, received, evaluated, managed and integrated into existing ignorance and knowledge (inspired by Levin 2008:11-12). Though not explicit, the approach implies the concept of co-construction of knowledge and ignorance with academic research (e.g., production and co-production). By incorporating both ignorance and knowledge in mobilization, I further argue the importance of including academic science epistemic production (co-production) dynamics and processes in the interactive model so as not to focus exclusively on use (co-use). Maintaining a focus on both contexts is recognizing

their intricate relationship, especially within the institution of science, and dialogical dynamics where production and use are both complementary and antagonistic.

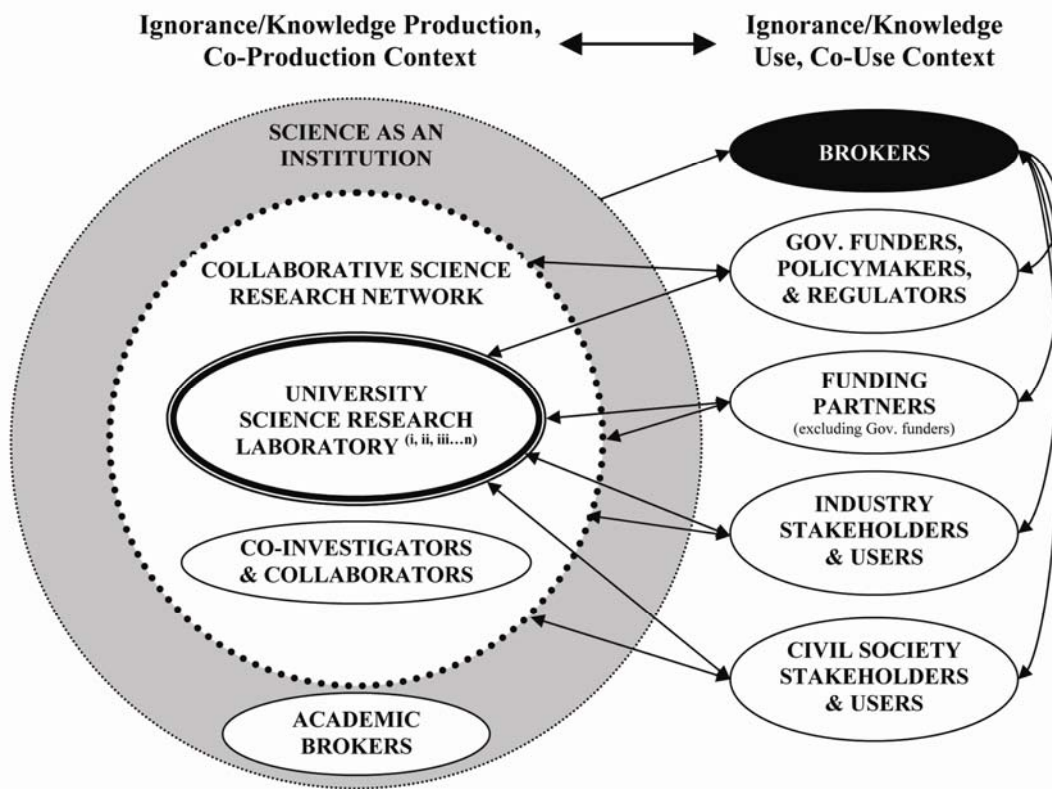
There are two additional reasons I include academic science in the context, creativity and relevance to innovation. In the institutional logic of science, I advance that ignorance and intra-scientific ignorance mobilization are often products of academic basic science research creativity and unpredictability that cannot be tied to instrumental economic goals (Levine 1971:364; Shilling and Mellor 2001:62-63) but do play an important role in stimulating and sustaining innovation (Nowotny 2008). Action with respect to ignorance by a basic science researcher can therefore be understood as theoretically different from action driven by instrumentality and goals. The absence of goals in action, according to Simmel (Levine 1971), also shifts temporal understanding where the present is not rigidly linked with fixed future goals clearly delineating 'now' and 'later' (Levine 1971:360-361; Shilling and Mellor 2001:62-63). Viewed this way, acknowledging the role of ignorance in epistemic mobilization allows for (1) symmetrical analysis including ignorance and knowledge, and (2) paves an alternative path to rethinking temporality in academic research and the role of non-goal oriented academic basic science research within an epistemic-based economy, albeit within clearly defined ends as delimited by the collaborative research endeavour. Creative action is therefore set in opposition to Weber's formal rationality. In the latter the scientific method is seen as a formally rational institution excluding discussion of research ends to focus exclusively on knowledge production where experimentation, a means, becomes an end (Evans 2002:17). In the final analytical phase, I reach the main goal of this paper and propose a collaborative science research network epistemic mobilization interactive model.

### **Epistemic mobilization – mobilizing knowledge and/or ignorance**

The collaborative science research network epistemic mobilization interactive model I propose is displayed in figure 1. A quick overview reveals two main contexts: ignorance or knowledge production (or co-production) and use (or co-use) that are distinct, but hold potential for dialogical dynamics. Conceptually, the interaction between production-based actors and organizations and use-based actors and organizations allows for multi-level analysis portrayed in figure 1 using bi-directional relationships for each

level. The academic research university-laboratory is at the meso level of analysis (principal investigators could be the object of study at the micro level) and the collaborative science research network is at the macro level of analysis. This multi-level potential reflects empirical observations at PrioNet Canada where research project principal investigators engaged with use-based stakeholders directly and independently from the collaborative research network that engaged with use-based stakeholders.

**Figure 1:** Collaborative Science Research Network Epistemic Mobilization Interactive Model



Although the proposed interactive model was inspired by Levin and Cooper (2012:20) and shares some of its concepts, it also holds markedly distinct theoretical and conceptual underpinnings. First, I retained the production/use context dichotomy, but conceptually these are now in a dialogical dynamic where they are complementary and antagonistic, including the potential for co-production and co-use. Porous delimitations support co-production and co-use. One of the most important differences is in relation to

temporality. Levin and Cooper (2012) conceptualize a production to use flow of time with production at the start and use at the end. In figure 1, co-production and co-use and potential for recursivity can imply considerations for future use therefore I did not integrate temporal elements in figure 1. A second important difference is in the conceptualization of actors. As discussed above, the academic science university research laboratory at the centre of production can potentially be the unit of analysis within science (viewed as an institution). Co-investigators and collaborators within the research network also fall under the institution of science. I conceptualize academic epistemic brokers as brokering ignorance and knowledge between individual actors in the network and the institution of science. Examples include knowledge mobilization activities such as publishing, oral and poster presentations and intellectual property registration. These mobilization activities are institutionally constructed and regulated where peer review, for example, is an institutionally recognized epistemic process for ignorance and knowledge reliability evaluation and validation. Most of these mobilization activities are also components of the academic scientists' reward system within academia – where promotions and recognition are tied to scientific production. A discussion of the implications is beyond the scope of this paper but the role of academic epistemic brokers highlights the complexity of academic-government-industry-stakeholder interactions with competing goals.

Moving to the use/co-use context, the first group of actors is epistemic brokers who can be experts (defined as knowledge mediators and brokers in Stehr and Grundmann 2011:39, 41) or even academics from the production context that play dual roles. Succinctly, the role of epistemic brokers is to '...pass on access to specialized [ignorance and] knowledge to the apparently rapidly growing groups of those who require and seek advice' (Stehr and Grundmann 2011:39), although this conceptualization does not capture the co-production of ignorance and knowledge that can be brokered by the epistemic brokers (Bielak and deGraaf 2011:19) (discussion on role of broker in Shaxson 2010; Campbell et al. 2008; Bielak and deGraaf 2011). The role of epistemic brokers is especially pertinent where individuals or organizations cannot activate or apply resources towards mobilization. Deficiencies in the ability to integrate new ignorance or new knowledge is a study of mobilization receptivity (or absorptive

capacity) (Shaxson 2010:5, 11, 19; Elissalde and Renaud 2010:410; Lehoux et al. 2010:740).

The second group of actors, government funders, policy-makers and regulators, deploy mobilization strategies to identify academic research ignorance mobilization initiatives as explored by Davies (2011). The governmental role then extends to funding and regulating where mobilization strategies can involve epistemic brokers (Bielak and deGraaf 2011).

Other funding partners, the third group of actors, can include individual donors, industry and civil society stakeholder organizations. In each case the relationship can be directly with a research project principal investigator (such as the case in PrioNet Canada where a researcher established companies that funded research) or the collaborative science research network. How non-governmental funding can influence ignorance or knowledge mobilization or how mobilization occurs is particularly relevant in the context of understand the impact on academic research (Evans 2010).

Understanding epistemic mobilization with the two remaining groups of actors, ‘industry stakeholders and users’ and ‘civil society stakeholders and users’ (excluding funders from these respective groups), is equally critical, if not more. This is due to collaborative science research networks frequently performing research in health, social issues or the environment. These areas inherently imply potentially wider social participation in co-production of ignorance and knowledge or greater market-driven industry dynamics in relation to therapeutics. In the conclusion, I will reflect on the theoretical contributions and implications of integrating ignorance in epistemic analysis.

## **Conclusion**

At the outset of this theoretical exploration I proposed a new concept, ignorance mobilization, and argued that engaging in a symmetrical study of epistemology could help reveal the distinct and dynamic role of ignorance mobilization alongside knowledge mobilization in collaborative science research networks. I proposed to combine ignorance and knowledge mobilization to yield epistemic mobilization which in turn served as a building block to the elaboration of a collaborative science research network epistemic mobilization interactive model. Only time will tell how the interactive model holds under

empirical and theoretical scrutiny – but my initial validation with a PrioNet Canada case study bodes well.

Of particular interest in the proposed network epistemic mobilization interactive model, I believe, is the potential for multi-level analysis – at the principal investigator, university laboratory or collaborative science network levels. This opens up opportunities for comparative analysis where comparative sites and indicators can hold inner-network and outer-network validity, perhaps even between social science research studies. In addition, integrating the institution of science conceptually gives institutional considerations a prominent role and acknowledges the complexity of agent-structure constraints and opportunities. What is more, integrating ignorance and knowledge considerations in academic research firmly anchored within the institution of science is fertile conceptually to rethink the role of basic science research in such networks. Understood through Simmel's action theory, academic research ignorance and intra-scientific ignorance mobilization can thrive under individual creativity and unpredictability when detached from instrumental economic goals. Ignorance, in an epistemic-based economy, can become a valuable resource and academic basic science can be a prime provider. I advanced, however, that ignorance co-production with stakeholders is not mutually exclusive to regarding academic basic science research as creative and unpredictable.

Furthermore, understanding research/innovation-policy-practice processes and dynamics through the lens of an epistemic-based economy instead of the paradoxical knowledge-based economy designation can help construct ignorance and ignorance mobilization as valuable. Although valued in the intra-scientific context, ignorance has a ways to go in shedding its pejorative connotation in the extra-scientific context. Continued sociology of ignorance related investigation such as that performed by Davies (2011), Gross (2007, 2010), Kazlauskas and Crawford (2007), Kempner et al. (Kempner et al. 2011) and Frickel et al. (2010) will undoubtedly contribute to change. More pointedly for this investigation though is the consideration of ignorance in epistemic mobilization research. When Levin<sup>3</sup> and Cooper (2012) acknowledge that '...knowledge emerging from research is not always correct and is subject to revision as time goes on' (Levin and Cooper 2012:18), I advance they are acknowledging a limitation in the current

conceptualization of knowledge mobilization. Knowledge and ignorance are intricately intertwined epistemic categories. It is only through sustained efforts to join them in analysis that, I advance, that as social scientists, we will be able to (1) acknowledge the complexity of the dynamics and processes we are attempting to understand, (2) provide greater analytical understanding of academic science limitations and still mostly hidden potentialities in ignorance, and (3) heighten sensitivity to scientific humility.

Moreover, can the concept of ignorance mobilization be of potential use beyond academic research in collaborative research networks? In social construction of ignorance research (see related research and discussion in Ungar 2000, Proctor and Schiebinger 2008), I advance that ignorance mobilization could lead to further understanding of how powerful actors promote ignorance (or not knowing) in the political arena, for example.

One of the next steps in the broader research agenda in which this paper is located is the deployment of a science in practice epistemic mobilization ecosystem interactive model. The detailed interactive model builds on the ‘house of the unknown’ conceptualization of ignorance and related concepts by Gross (2010:71). Furthermore the upcoming model combines science in practice interplay between the categories of ignorance (and its sub-categories) and knowledge (and its sub-categories) in a larger epistemic mobilization context. A proof of principle application, based on a PrioNet Canada laboratory study, will hopefully spur further reflection and dialogue on the dynamics of ignorance and knowledge in science research and policy in praise of ignorance. The upcoming interactive model could inch closer to fulfilling policy makers’ dreams ‘...that one day it might be possible to really know the logic buried within uncertain processes’ (Davies 2011:405) though not to know the unknowable<sup>4</sup>, but rather to better understand ignorance and knowledge research/innovation-policy-practice related social dynamics and processes.

### **Acknowledgements**

I thank Professor Nathan Young for his comments and France Bergeron for her critical eye and unflinching support. Financial support was provided in part by a SSHRC Joseph Armand Bombardier Canada Graduate Scholarship and a Highly Qualified Personnel

research assistantship in a PrioNet Canada research project directed by Professor Nathan Young.

## Notes

[1] Beck refers to non-knowledge instead of ignorance but in relation to the typology I adopt, ignorance appears to be more appropriate.

[2] As new knowledge increases in modernity, ignorance likewise increases while potentially yielding greater unintended uncertainties – which can in turn lead to more ignorance (related discussions in Beck [1986]2008:22; Beck [1999]2007:6 ;Gross 2010:173; Gross 2007:743; Gross 2003:53; Smithson 2009:24; Kasperson 2009:337-338; Smithson 1993:133).

[3] Ben Levin (in the field of education) is one of the instigators of knowledge mobilization.

[4] See Nonaka and Takeuchi (1995) for what purports to be a study of the transformation from tacit to explicit knowledge. I argue the tacit to explicit dynamics are not always well delineated and appear to involve ignorance mobilization.

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