

Short Communication:

Knowledge mobilization and ignorance mobilization dynamics in veterinary research

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2012 (updated November 14, 2013)

Available at the uO Research open access website at <http://hdl.handle.net/10393/23406>

Sociology Working Paper

To cite: Gaudet, Joanne, Czub, Stefanie. 2012. "Short Communication: Knowledge mobilization and ignorance mobilization dynamics in veterinary research." Sociology Working Paper. Pages 1-9. <http://hdl.handle.net/10393/23406>.

Short Communication: Knowledge mobilization and ignorance mobilization dynamics in veterinary research

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Abstract

“[I]t is not just the unknowns that [veterinary researchers] should be concerned about but [also] the re-emergence of what we consider to be the ‘knowns’...” (Priestnall and Smith 2012:272). The interplay between knowledge and ignorance is the starting point to explore ignorance communication in veterinary research using a dynamic model of knowledge and ignorance mobilization in science. Harnessing empirical evidence from *The Veterinary Journal* contributions, the aim is to probe dynamics at critical junctures in the model. Finally, Priestnall and Smith’s (2012) overt consideration for veterinary ignorance joins a convergent interest for ignorance from the natural and the social sciences.

Keywords

Ignorance mobilization, knowledge mobilization, communicating ignorance, sociology of ignorance, veterinary research.

Valuing Ignorance and its Communication

Simon Priestnall and Ken Smith’s (2012) guest editorial on tackling the unknown unknowns and the physical process of re-emergence of what was thought to be known in veterinary research reveals the dynamic, complex and symbiotic relationship between knowledge and ignorance. Understood this way, both knowledge and ignorance are valuable for researchers. A value for knowledge lies in potential application. Ignorance, on the other hand, can derive value from ‘successful’ (co)identification or (co)production and then (co)validation of what is *not* known, possibly leading to knowledge production. Stuart Firestein (2012) argued that “[i]f ignorance, even more than data, is what propels science, then it requires the same degree of care and thought that one accords data” (2012:44). Although Firestein’s (2012) understanding of ignorance is reminiscent of ‘science as discovery’, his caution nonetheless reflects current scientific ignorance of *ignorance* and of the *interplay* between knowledge and ignorance (mostly due to a lack of theoretical framing, discussions in Bammer and Smithson 2009:3, Gross 2010:74-78,173, Schneider 1962:508). What is more, Rovelli (2007) drew attention to the complexity of ignorance communication when he proposed that “[s]cience’s leaps forward are most often not solutions to well-established problems. They come from discovering that the problem was ill posed. This is why it is so hard to make sense of scientific evolution as a well-defined problem” (2007:120). A *problem*, in the context of this paper, is understood as a formulation of science ignorance with a goal to eventually lead to knowledge (e.g., solutions). (Re)communication of science ignorance (a.k.a. well-established or ill-posed problems) is therefore also valuable for all actors involved.

Furthermore, Priestnall and Smith’s (2012) guest editorial is an example of *overt* scientific communication of ignorance within the veterinary research community. It is a platitude to state that communicating ignorance requires readily available concepts to convey these. It is telling therefore that Priestnall and Smith (2012) refer to concepts from US Secretary of Defence Donald Rumsfeld’s NATO speech (e.g., ‘unknown unknowns’, see

below for relevant typologies using this concept that pre-date Rumsfeld's speech) to communicate ignorance. To be sure, the investigation of ignorance communication in scientific writing is not new (i.e., Stocking and Holstein 1993, van Asselt 2010:316, Latour and Woolgar 1986:88). What is new in this paper however, is using an approach that attempts to capture ignorance communication through a dynamic model (Gaudet 2013:11) of knowledge and ignorance mobilization that proposes an ensemble of concepts to communicate ignorance (in relation to knowledge) in science.

The main goal of this exploratory study short research paper is to investigate veterinary research knowledge and ignorance mobilization dynamics building on empirical evidence of science communication in *The Veterinary Journal* contributions and veterinary and sociological scholarship. We do so by probing veterinary science ignorance communication for social, physical and epistemic processes at critical junctures in a model of knowledge and ignorance mobilization dynamics in science (Gaudet 2013:11). First, we tend to our understanding of knowledge and ignorance mobilization. We follow with methodological considerations. Finally, we explore mobilization dynamics in veterinary research. We conclude that Priestnall and Smith's (2012) overt consideration for veterinary ignorance joins a convergent interest towards ignorance from the natural and the social sciences.

Knowledge, Ignorance and Mobilization

Ignorance in this context is non-pejorative. In the proposed typology (Table 1) of what is known and not known, ignorance by in large points to the borders and the limits of knowing. This includes the intentional and the unintentional consideration (*active* non-knowledge) or bracketing out (*latent* non-knowledge) of what is not known. Furthermore, mobilization is the activation and application of individual or organizational resources towards a goal (Gaudet 2013:7). Knowledge and ignorance mobilization thus, is the use of knowledge or ignorance towards the achievement of goals (i.e., economic, professional, social, and political goals) (Gaudet 2013:7). Finally, our sociological mobilization approach looks at how knowledge and ignorance are produced, transmitted, received, evaluated, managed and integrated into existing knowledge and ignorance (Gaudet 2013:8). We focus largely on the communication of ignorance and its dynamics, though the interplay of ignorance with knowledge is at the heart of the study.

Methodological Considerations

Methodologically, we harness empirical evidence in a sampling drawn from 1,213 *The Veterinary Journal* contributions (from 1997 to 2012) containing ignorance-related discourse. The selection of a journal in veterinary research no doubt reflects that as authors we met through a science network that joined human and veterinary researchers in the study of, amongst other things, the zoonotic potential of disease agents (e.g., transmission from animals to humans). What renders the selection of a veterinary journal atypical for the study of ignorance communication in science (and potentially richer for generalization, Flyvbjerg 2006:229) is that veterinary research joins both scientific and professional perspectives (e.g., veterinary research and the veterinary profession) and sometimes ventures into human-related research issues. Consequently, contributions could reflect wider variances in ignorance communication targeted at a broader audience with varying levels of expertise in these divergent areas of research.

With respect to the specific journal selection, *The Veterinary Journal* covers many research areas (including, but not restricted to, infectious diseases, applied biochemistry, parasitology, endocrinology, surgery) and as such is not limited in its scope of veterinary research. This would attract not only a diversity of authors, but also diversity in readership. Furthermore, in 2011 *The Veterinary Journal* ranked in the first quartile of impact factor, 16th out of 125 veterinary journals in the miscellaneous category (excluding specialized

Table 1: Knowledge, Ignorance and Nescience Typology^a with Overarching Categories and Sub-Types

Overarching Category	Sub-Types	
Knowledge An overarching concept that by in large points to knowing including existing knowledge and extended (new) knowledge.	Knowledge (existing)	A justified belief that is connected to purpose or use and is generally associated with intentionality.
	Extended (new) knowledge	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.</i>
Ignorance 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 what is not known. <i>See active and latent non-knowledge.</i>	Active non-knowledge	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 being active, be developed into new knowledge, further active non-knowledge or be transformed into latent non-knowledge where it will no longer be taken into account.</i>
	Latent non-knowledge	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>
Nescience Complete absence of knowledge, which can potentially lead to ignorance. <i>Exists in a distinct class from the above categories as it can only be known and investigated in retrospect.</i>		

^aInspired by Gross (2010:71). A variation on the typology Priestnall and Smith (2012) refer to from US Secretary of Defence Donald Rumsfeld's NATO speech is in use in medical science (Kerwin 1993) and curriculum on medical and other ignorance (Witte et al. 1998). These include the concept of 'unknown unknowns' (e.g., nescience in the typology above).

equine, food animal or small animal journals) (SJR 2011). As this is an exploratory study, *The Veterinary Journal* appears to be a good starting point. In Table 2, we present the database keyword search results and elaborate further on methodology in the Table notes.

Table 2: Ignorance-related discourse keyword search in *The Veterinary Journal* contributions (1997-2012) ^a.

Keywords (alphabetical order)	Total number of search returns (N total)^b
ignorance	9
not known	188
priority / priorities ^c	104
speculated	94
surprise / surprising (excluding ‘unsurprising’, ‘not surprising’, ‘not surprised’, ‘no surprise’)	104
thought to / not thought to	363
unclear	353
unexpected (excluding ‘not unexpected’)	95
unknown	580
unresolved	14
Total Contributions by Keywords (excluding priority/priorities)	1800
Total Contributions (Excluding multiple keywords per contribution and excluding priority/priorities)	1213

^a Keyword searches performed in the Science Direct database (vol. 153:1 to 193:1) for *The Veterinary Journal* on July 16, July 24, and August 9, 2012. Table 2 reflects August 9, 2012 search (see methodological discussion in Gaudet et al., 2012:10-11, Stocking and Holstein 1993, van Asselt, 2012:316, Latour and Woolgar, 1986:88). Contributions with ignorance-related search returns reflect a wide range of researcher understanding for the concept of ignorance. These include: (1) limits of knowledge with respect to methodological considerations for which knowledge could be obtained, but was not available for publication, (2) limits to veterinary knowledge, and (3) deficiencies in an individual’s knowledge. Keyword selection is not exhaustive and absolute search return count does not reflect prevalence of ignorance considerations. Taken as a whole, however, and in the context of an exploratory study, they reveal underlying ignorance and knowledge dynamics. Contributions include published and in press research and original articles, short communications, reviews, editorials, and personal views.

^b Total N is approximate given variations in search query returns.

^c Keywords related to the social dynamics of knowledge and ignorance mobilization.

Table 3 lists the exploratory sampling and the selection criteria. Our strategy in this short research report is to highlight social, physical and epistemic processes at critical junctures in the dynamic model (Gaudet 2013:11). We start with Priestnall and Smith’s guest editorial and then turn to the sampling.

Communicating Ignorance in Veterinary Research

The guest editorial that serves as a starting point for this paper is entitled “Canine infectious respiratory disease: Tackling the unknown unknowns” (Priestnall and Smith 2012:271). The unknown unknowns to which Priestnall and Smith (2012) refer are nescience in the proposed typology. Understood here as the complete absence of knowledge, nescience lies outside of the model and can only be known in retrospect. Nescience therefore cannot be mobilized, but can lead to ignorance. The main case study the editors analyzed pointed to larger dynamics, triggered by nescience identification, amongst steps two, three, and seven in

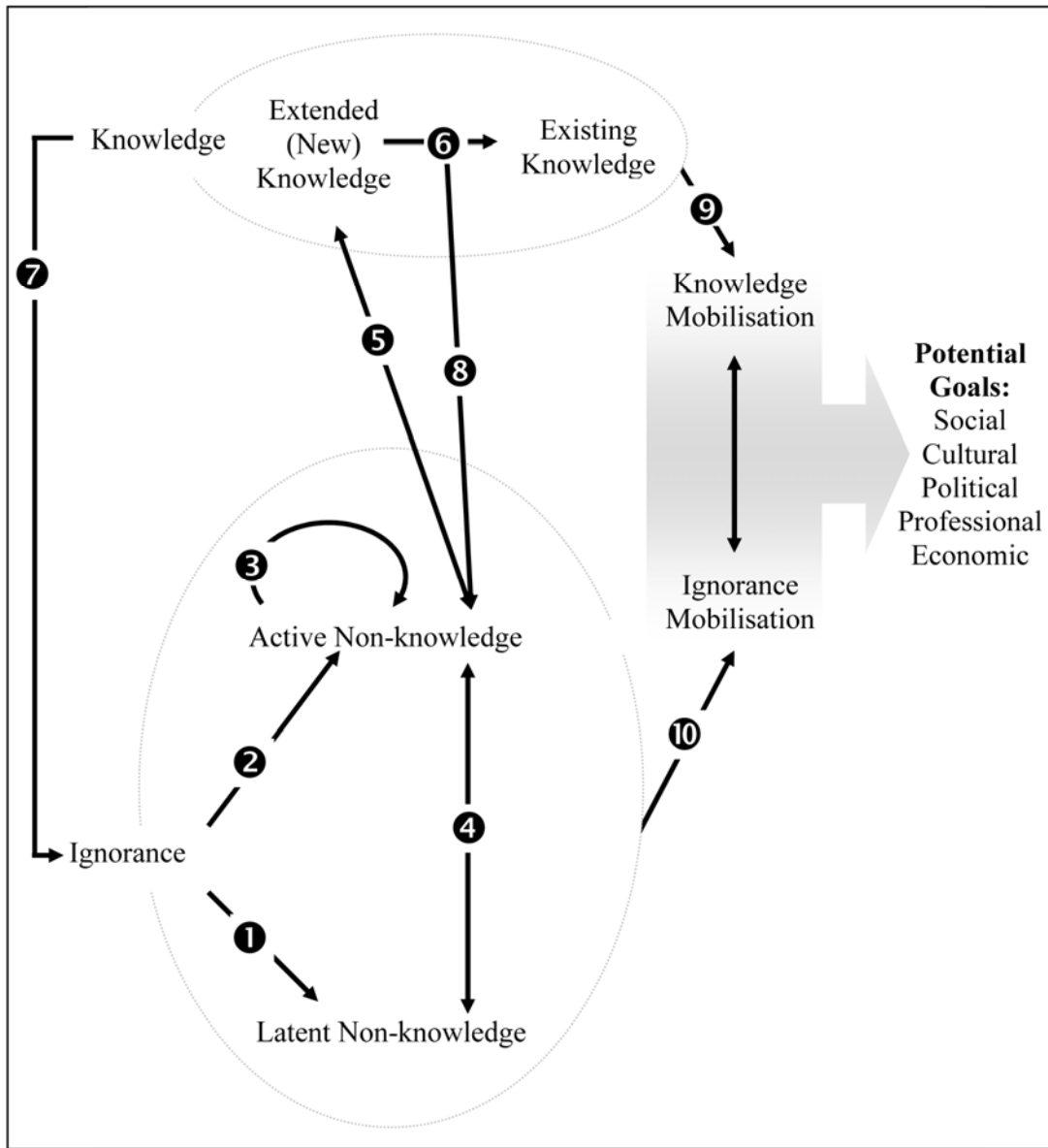
Table 3: Dynamic model step relevance in Fig. 1 for sample contributions from *The Veterinary Journal* (1997-2012)^a.

Sample contributions (alphabetical order)	Step(s) relevance in Fig. 1
Bateson, P., 2004. Do animals suffer like us? – the assessment of animal welfare. <i>The Veterinary Journal</i> 167, 110-111.	Between steps 1 or 2 (potentially step 4), and step 10
Blomme, E.A.G., 2011. The ARRIVE guidelines: A resource for authors and reviewers to ensure that submissions to <i>The Veterinary Journal</i> meet minimal expectations of completeness, accuracy and transparency. <i>The Veterinary Journal</i> 189, 237-238.	Steps 5, 6, 9 and 10
Cruz-Chan, J.V., Quijano-Hernandez, I., Ramirez-Sierra, M.J., Dumonteil, E., 2010. <i>Dirofilaria immitis</i> and <i>Trypanosoma cruzi</i> natural co-infection in dogs. <i>The Veterinary Journal</i> 186, 399-401.	Steps 3, 5, 9 and 10
KuKanich, B., 2011. Analgesia and pain assessment in veterinary research and clinical trials. <i>The Veterinary Journal</i> 188, 1-2.	Between steps 1 or 2 (potentially step 4), and step 10
Menzies-Gow, N.J., 2011. Laminitis epidemiology data: Still severely lacking... <i>The Veterinary Journal</i> 189, 242.	Between steps 1 or 2 (potentially step 4), and step 10
Pritchard, J. C., 2010. Animal traction and transport in the 21st century: Getting the priorities right. <i>The Veterinary Journal</i> 186, 271-274.	Between steps 1 or 2 (potentially step 4), and step 10
Van der Zeijst, B.A.M., 2008. Infectious diseases know no borders: A plea for more collaboration between researchers in human and veterinary vaccines. <i>The Veterinary Journal</i> 178, 1-2.	Between steps 1 or 2 (potentially step 4), and step 10

^a See Table 2 for ignorance-related keyword search methodology. Table 3 sample selection meets the following criteria: (1) each article holds epistemic pertinence by referring to a limit in, or a border of, veterinary knowledge, and (2) overall, the selection reflects the range of knowledge and ignorance mobilization dynamics in Fig. 1 (steps 1 to 10).

Fig. 1. Following nescience recognition, mobilization of existing knowledge and new ignorance could lead to active non-knowledge from “...hitherto unknown canine respiratory coronavirus and the observation of unusually severe disease caused by *Streptococcus equi* subsp. *Zooepidemicus*, a pathogen previously thought to be relatively trivial in dogs” (2012:271). Intertwined were physical processes in relation to serum collections and tissue samples for retrospective analysis (contamination of samples; storage issues), socio-economic processes (increasingly scarce financing), and socio-ethical processes (informed client consent; client confidentiality). Finally, in closing their editorial, Priestnall and Smith communicated the precariousness of knowledge in relation to ignorance at step seven in Fig. 1, “it is not just the unknowns that [veterinary researchers] should be concerned about but [also] the re-emergence of what we consider to be the ‘knowns’ ...” (Priestnall and Smith 2012:272).

Figure 1: Dynamic model of knowledge and ignorance mobilisation (Gaudet, 2013:11)*



* Numbering is for ease of reference and numbering does not denote a sequence. Arrows are conceptual and sometimes depict causal relationships. Model extends ‘house of the unknown’ model by Gross (2010:71) to capture complex, symbiotic and temporally changing knowledge mobilization and ignorance mobilization processes and dynamics. Recursive relationships can create new instances of ignorance or knowledge and their sub-components (identified with subscript (n, n+1...∞)). Ignorance can lead to more ignorance (steps 1 to 4) or knowledge (step 5), and knowledge can lead to more knowledge (step 6) or ignorance (steps 7 and 8). Nescience (the complete absence of knowledge) lies outside of the model and can lead to ignorance if retrospectively acknowledged.

In contrast to the guest editors who overtly valued ignorance in their veterinary academic communication, in the sampling below we explore less conspicuous ignorance valuation. We tackle the exploratory sampling in three phases.

The first five contributions mainly draw attention to dynamics between steps one and two in Fig. 1. Communicating these dynamics frequently involved discourse related to

priorities. A priority typically leads to active non-knowledge, whereas non-prioritized research agendas or areas of study are relegated to latent non-knowledge (see related in Frickel et al., 2010; Kempner et al., 2011). Butch KuKanich (2011), Nicola Menzies-Gow (2011), and Joy Pritchard (2010) highlighted socio-economic (lack of funding) and social processes of valuation (setting research priorities and agendas; long-term versus short-term goals). Patrick Bateson (2004) added consideration of the social and epistemic processes of setting welfare assessment criteria. The contribution by Pritchard (2010) delved further into the importance of co-production of knowledge (communication of the co-production of ignorance was implicit, not explicit) where mobilization could involve a wider community of stakeholders. Furthermore, KuKanich (2011) and Bernard Van der Zeijst (2008) emphasized the interplay between social and physical processes (zoonotic applications and collaboration in veterinary research and clinical trials).

Combinations of the processes above hindered or altered mobilization of ignorance to active non-knowledge (step two, where ignorance can be further mobilized), leading rather mostly to latent non-knowledge (step one, where ignorance remains dormant). Researchers also overtly advocated latent non-knowledge to active non-knowledge mobilization (step four), though combinations of the processes above were explicitly communicated as hindrances to successful mobilization. Objects of study included multi-species and cost effective methods of assessing pain and analgesia, production of laminitis epidemiology data, animal traction and transport research, and zoonotic vaccine development. The varied actors mobilizing ignorance (policy-makers, politicians or researchers) revealed multiple goals including economic, political, social, and professional.

Shifting to steps three and five, Julio Cruz-Chan et al. (2010) produced and communicated further active non-knowledge (step three) on the interference of co-infection in host responses in dogs. This prompted them to warn researchers and clinicians of added active non-knowledge mobilization at step five. The authors urged epistemic process change where "...great care should be taken in the interpretation of [...] data from naturally infected animals, as such co-infection may interfere significantly with host responses and should be taken into account" (2010:401). In this example, communicating ignorance (or more precisely active non-knowledge) of potential interference and its impact on new knowledge production understood through the dynamic model (Fig. 1) renders the *recursive* relationship between knowledge and ignorance at least somewhat visible.

Finally, Eric Blomme (2011) drew attention to dynamics at step six that could influence step five. He communicated the integration of an additional social editorial review process criterion reflecting the social valuation of animal welfare at step six. This new process would join existing social (valuation of research goals) and epistemic (knowledge and ignorance reliability evaluation and validation) processes that typically mediate the mobilization of new knowledge and new ignorance into scientific written communication (step six). In essence, these social and epistemic processes shape knowledge and ignorance production and *how* knowledge and ignorance can be mobilized and communicated in research. The additional social editorial review process criterion states that "*The Veterinary Journal will reject any paper where there is reason to believe that animals have been subjected to unnecessary or avoidable pain or distress*" (2011:237). Processes in the mobilization of active non-knowledge to new knowledge (step five) therefore now need to incorporate *explicit* epistemic validation of animal welfare valuation into methodological considerations¹ and communication. Here, ignorance mobilization targeted mainly social and professional goals.

¹ This consideration involves a second epistemology of ignorance (Sullivan and Tuana, 2007:1). In order to be able to publish in *The Veterinary Journal*, researchers can no longer deploy *strategic ignorance* (where individuals remain purposefully uninformed thereby cultivating ignorance (McGoey 2012:255, Larson 2010)) with respect to animal welfare.

Ignorance, a Converging Natural and Social Scientific Interest

To conclude, this exploratory study short paper contributes to further understanding of ignorance communication in veterinary research (and in science more generally) by having rendered knowledge and ignorance mobilization interaction at least partially *visible*. In combination with the dynamic model (Gaudet 2013:11), the proposed ignorance and knowledge typology (inspired by Gross 2010) also provides concepts for natural and social science researchers looking to incorporate ignorance explicitly in communication (oral and written). Enhanced interdisciplinary collaboration between natural scientists and social science ignorance scholars could help (co)validate concepts for the communication of ignorance.

In this context, Priestnall and Smith's (2012) overt attention to and written communication of ignorance-related issues are significant. They reflect a growing and convergent interest from the natural (i.e., Gale 2011, Firestein 2012, Vitek and Jackson 2008, Witte et al. 1998, Kerwin 1993) and the social sciences (i.e., Gross 2010, McGoey 2012, Littlewood 2007, High et al. 2012, Davies 2011, Kempner et al. 2011) for ignorance and its dynamics. We welcome further interdisciplinary dialogue.

Acknowledgements

This research was supported in part by Joanne Gaudet's Joseph-Armand Bombardier Canada Graduate Scholarship from the Social Sciences and Humanities Research Council of Canada (SSHRC). Joanne Gaudet first proposed the concept of ignorance mobilization while working as a Highly Qualified Personnel research assistantship in a PrioNet Canada research project directed by Professor Nathan Young and supported by the Networks of Centres of Excellence of Canada.

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