The Socially Literate Expert

A New Model of Risk Communication and Social Engagement

Bridging Content and Bridging Process

Kathryne Teresa Hughes

Institute for Sustainable Futures

University of Technology Sydney

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Certificate of authorship/originality

I certify that the work described in this thesis has not been previously submitted for a degree, nor has it been submitted as part requirement for a degree.

I also certify that the thesis has been written by me. Any assistance that I have received from others in my research inquiry and the preparation of the thesis is acknowledged. In addition, I certify that all information, sources and literature used are referred to in the thesis.

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Signature of the candidate

Kathryne Hughes

Kathryne Teresa Hughes

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Abstract

This dissertation is about the capacity of experts to explain the meaning of empirical risk to non-experts. It asks why experts' risk communication might succeed or fail by identifying gaps in communication between the two groups, and identifies factors that can bridge these gaps.

The inquiry focusses on seventeen Australian experts who have undertaken risk communication and social engagement with non-experts about the remediation of contaminated sites located in Sydney, N.S.W.. Remediation experts investigate, characterise and assess site contamination, and apply this knowledge to address the uncertainty it poses. They do this by calculating levels of empirical risk and managing that risk. Experts select risk levels that comply with legislative frameworks and policies, and under licence, deploy destruction technologies to remove contaminants from the environment. In this way, they can generate benefits in terms of reduced pollution, reduced public health risk, improved amenity and urban renewal. The proposition that experts can and will do this is critical to the inquiry, since they might be capable of reducing empirical risks and delivering benefits, but then again, they might not be able to, due to the commercial, legal or professional constraints on their independence. Because of these constraints, experts might not be trusted by non-experts no matter how competent they are, and as a result, the credibility of their risk message can be compromised.

To bridge the communication gap between themselves and non-experts, experts must satisfy four conditions. The first is that they are capable of *the practice of trust* in the social world. No matter how credible a risk message, if people do not trust the person who delivers it, the message will be rejected. It is a case of 'we don't trust you, so we reject your message', or the converse, 'we trust you, so we accept your message'. It reduces to the two key questions around any risk dialogue: 'Who do you trust?' and 'who can you trust?'. A person can be trusted only when they can convince other people that are trustworthy. To do this, experts must exhibit sufficient competence to do what they say they can do. In other words they must be able to demonstrate proof of performance.

Three other conditions apply and they lie within the mental world of thought and experience. Firstly, experts require awareness of self and situation, secondly they must possess a sufficiently balanced *persona,* and thirdly, they must exhibit sufficient social literacy. When these three conditions are satisfied, experts have the capacity to bridge communication gaps. The issue is whether or not they will, and here, we return to the social world where *the practice of trust* comes into play.

This research inquiry explores the knowledge, understanding and experience of experts about risk and uncertainty, and finds that they have varied capacity to communicate with non-experts about them. The variation is associated with the extent to which each expert's *persona* supports a sufficient balance between their scientific literacy and their social literacy. Experts, by definition, must be sufficiently scientifically literate to undertake their specific roles, but as to social literacy, the inquiry finds that not all experts are sufficient in this capacity. Social literacy requires an expert to have sufficient knowledge and experience to understand and engage with, the socio-political and psycho-social aspects of techno-scientific phenomena, which, for this inquiry, is pollution destruction technology. When experts can balance their scientific literacy sufficiently with their social literacy, they can communicate effectively about the empirical risk its mobilisation entails.

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Glossary

The terms listed in the glossary are selected because they are commonly used in the remediation industry and in discussion about it. Other terms used in this dissertation are explained within the text.

2,3,7,8-TCDD: A highly hazardous type of dioxin. A by-product of industrial processes; a contaminant of some pesticides. *Gras and Muller (2004).*

Agent Orange: A chemical weapon used during the Vietnam War. It contained active ingredients (a mixture of the herbicides, 2,4-D and 2,4,5-T), carriers/solvents (aviation fuel or diesel) and the dioxin 2,3,7,8,TCDD as an impurity. *Vietnam Veterans Federation and Pollak (1996).*

Anthropogenic pollution: A situation created by the deliberate or accidental release of hazardous chemicals to the natural environment which causes unacceptable risks to human and ecological health. Author's definition: After *Stromberg (2018).*

Broad-acre remediation: Remediation of a large area of contaminated land such as a landfill, as distinct from remediation of a small well-defined area, such as a petrol station. Author's definition. Adapted from *Pym and Sydney Olympic Park Authority (2001).*

Brownfields remediation: The remediation of degraded and contaminated industrial land to allow for urban development. *Miller and Erikson (2013).*

Civil society: "Stakeholders from the corporate sector, non-government organisations (NGOs), science communities as well as representatives of the public". *Gregory et al. (2006 p.18).*

Community: Those individuals and/or groups residing in the locality where a site assessment is to be conducted and who may be affected by the assessment and/or possible site contamination physically (for example, through risks to health or the environment, loss of amenity) or non-physically (for example, via concern about possible contamination). *Commonwealth of Australia (2013).*

Community engagement: The process of communicating and deliberating with the community and other stakeholders. It can include a variety of project-specific approaches. *Commonwealth of Australia (2013).*

Contamination: A situation whereby (a) chemical substance/s has/have been, added to air, soil or water, as a result of indirect or direct human activity so as to cause the medium to contain levels of the substance/s above background levels, such as they represent a risk to human health or the natural environment*. Adapted from National Environment Protection Council (2013)* and *CRC CARE (2019a).*

Dioxins: A group of hazardous compounds that belong to a larger family of persistent organic pollutants. They share similar chemical structure, properties and biological characteristics and tend to accumulate in body fats. *Environment Protection and Heritage Council (2005).*

Environmental health: A subset of public health which focuses on environmental conditions and hazards, which affect, or have the potential to affect, human health, either directly or indirectly. It includes the protection of good health, the promotion of aesthetic, social and economic values and amenity, and the prevention of illness or injury by promoting positive environmental factor and reducing potential hazards - physical, biological, chemical or radiological. *enHealth Council (2001).*

Epidemiology: The study of the occurrence of disease. *Ahlbom (1993).*

Exposure: Exposure occurs when a chemical, physical or biological agent makes contact with the human body through breathing, skin contact or ingestion; for example, contaminants in soil, water and air. *Commonwealth of Australia (2013)*

Grey literature: A form of knowledge. Refers to research that is either unpublished or has been published in non-commercial form, and includes government reports, policy statements and issues papers. *University of New England (2019)*

Halogenated compounds: Substances that are characterised by the presence of halogens, the most important being chlorine and bromine. The presence of these elements in a compound provide it with a highly stable chemical structure. *Fiedler (2007).*

Hazard: Hazard is the intrinsic capacity of a chemical, biological, physical or social agent to produce a particular type of adverse health or ecological effect. *Commonwealth of Australia (2013).*

HCB: Hexachlorobenzene. A fungicide, a by-product of pesticide manufacture, or a POPs waste. *Australian Department of Agriculture (2004).*

Local community: A group of people living in the same physical locality. Author's definition.

Mass media: "technological channels for predominantly one-way distribution of messages by organizations with the objective if creating and maintaining audiences for commercial or other purposes". *Macnamara (2014 p.36.)*

NGOs: Non-Government Organisations excluding private commercial organisations. Part of the large grouping known collectively as civil society. Includes organisations focused on environmental, public health and social justice issues. Author's definition.

PFAS/Perfluorinated Compounds/PFCs: Fluorinated substances is a general, nonspecific name that describes a universe of organic and inorganic substances that contain at least 1F atom, with vastly different physical, chemical, and biological properties. *Buck et al. (2011 p.513).*

PCBs: Polychlorinated bi-phenyls. A group of POPs chemicals once used in electrical industries and now banned under the Stockholm Convention. *UNEP (2002b).*

POPs: Persistent Organic Pollutants. A wide range of industrial chemicals that are highly toxic, persistent in the environment and animal tissue, and are globally mobile. *Adapted from UNEP (2005).*

Regulator: A public servant with responsibility to implement laws and regulations, for example about pollution control and remediation. (Author's definition).

Remediation: the clean-up or mitigation of pollution or of contamination of soil or water by various methods. *Commonwealth of Australia (2013 p.26).*

Risk: the probability in a certain timeframe that an adverse outcome will occur in a person, group, or ecological system that is exposed to a particular dose or concentration of a hazardous agent; that is, it depends on both the level of toxicity of hazardous agent and the level of exposure. *Commonwealth of Australia (2013).*

Risk Assessment: the process of estimating the potential impact of a chemical, physical, microbiological or social hazard on a specified human population or ecosystem under a specific set of conditions within a certain timeframe. *Commonwealth of Australia (2013).*

Risk Communication: an interactive process involving the exchange among individuals, groups and institutions of information and expert opinion about the nature, severity and acceptability of risks and the decisions to be taken to combat them. Risk communication is delivered most efficiently in the context of a well-structured community engagement process. *Commonwealth of Australia (2013).*

Risk Perception: the subjective judgment that people make about the characteristics and severity of a risk. *Commonwealth of Australia (2013).*

Stakeholder: An individual, group, organisation, or other entity that has an interest in a decision-making process. *(CRC CARE, 2019a , p.7).*

Sustainable development: development that meets the needs of the present without compromising the ability of future generations to meet their own needs. *Commonwealth of Australia (2013).*

Key to ascription in the text.

This research inquiry draws on literature from peer-reviewed publications, from web-published content, and from a variety of grey literature. Primary sources are also used.

Double quotation marks indicate a quotation from the literature. For ease of reading, once an oft-quoted author has been identified using an EndNote reference, further reference to their work using EndNote might not be included.

Single quotation marks indicate a colloquial, novel or useful concept, word or phrase.

Quotations sourced from interview and focus group transcripts are italicized.

Sometimes, in a direct quote from the literature, the writer uses italics or underlining to emphasis a word or phrase, and this is acknowledged within the text.

Occasionally, I have underlined a section of the text as a way to draw the reader's attention to a word or phrase.

Note to the Reader.

In those sections where data from the in-depth interviews or focus group are used, I present it using a narrative style which combines individual data fragments to create sets of italicized quotes. In doing this, I apply Butt et al. (1995)'s definition of narrative, which is "to tell a story as a means of making sense of the events and happenings in the world" (p.142).This technique allows me to provide a composite narrative that reveals how different experts and non-experts consider the same phenomenon, experience or situation. It lets all their voices be heard.

The use of auxiliary verbs (e.g. might, must, could, should, would, can, will) is critical to the construction of my argument which uses abduction as the mode of inference. I make this point to draw attention to the power that auxiliary verbs have to confer potential, compulsion, motivation or timing to any act.

Data is occasionally used more than once, and in different chapters, because it is able to illuminate different situations.

In some sections, I use rhetorical questioning as a way assist the reader by signalling places in the text where I move to a new point of argument.

When I refer to 'science', 'scientists' or 'scientific research', I am referring to bio-physical scientists and the work they do.