

# THEORY, ETHICS AND POLITICS: INTERPRETIVE RESEARCH IN SCIENCE EDUCATION

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## Introduction

In this paper, we consider the role of theory, ethics and politics in interpretive research and focus our discussion on the evolving interpretive framework of Cath's doctoral study of cultural myths in the science classroom. In constructing this framework, Cath is seeking to gain insight into how myths develop, how myths have been identified and interpreted by other researchers, and how others have described the role of myths in society. Her interpretation of other people's research and theorising constitutes a synthesis of the literature (traditionally called a 'literature review') and is assisting her to construct an interpretive framework for a subsequent analysis of classroom discursive practices in school science. During this self-reflective process, Cath is considering how her study is to be legitimated. In this respect, she is examining the relationship between ethics, theory and politics in interpretive research.

## Organising Components of Interpretive Research

In their recently published handbook of qualitative research, Denzin and Lincoln (1994) talk about qualitative research paradigms that are composed of principles about ontology, epistemology and methodology. Ontology encompasses the theoretical framework of the researcher; epistemology the research questions; and methodology considers how the questions will be examined. However, as Cath reflects on her own research she realises that ethics and politics have an equally important role to play in the conduct of her research. Ethics concerns the relationship between our personal values and the research that we are conducting, and politics concerns how our research is legitimated. Although ethics has come out of the closet and is now being discussed explicitly by educational researchers, we believe that the politics of legitimation continues to be an implicit component of most research in science education.

## The Politics and Theory of Research (or How is My Research Legitimated?)

In the past, a common practice in science education research was to write of investigations in a way that assumed that the language used by the researcher was transparent (Foucault, 1974). The assumption was made that the purpose of the language of a research report was to convey the data but that the language per se had no influence on how the data were interpreted. In other words, it was assumed that the data 'spoke for themselves'. One of the outcomes of this assumption about the neutral role of language in the communication of data was the promotion of the use of seemingly non-emotive language in order to distance the researcher from the data. In science education research, it seems that little thought has been given to how language is used artfully (but unwittingly) to convince other researchers of the significance of data and of the appropriateness of interpretations that are generated from the data. That is, the rhetorical nature of research reports remains largely unexamined.

## Research, Title and Narrative

Cath is writing her thesis as a narrative that consists of a beginning, a middle and an end, as do most stories. Although her written thesis implies an orderly progression of thinking from one chapter to the next, this organisational structure does not reflect the way that her ideas developed. Indeed, at times she worked concurrently on up to three chapters. The development of order in the presentation of her ideas required a cyclical approach to her research material so that the ideas that she was developing were mulled over and revisited many times.

The narrative could be described also as composed of a title and a body. The body consists of many separate sections all of importance to the development of Cath's literature synthesis. However, the title is very significant also because it acts as the signpost that highlights some of the significant features of the narrative.

Sociologist Joseph Gusfield (1976) first alerted her to the theoretical and political importance of the title of her thesis. She mulled over the title because it is a most powerful tool for providing immediate recognition to the target audience and is the starting block for the political process of legitimation. She uses the title also to inform her intended audience about her theoretical framework. For Cath, it is very important to ensure that the title is consistent with the methodology of the study so that there is a concordance between the audience's initial interpretations of her theoretical framework and the actual theories she used and developed in her doctoral study. The title that she has crafted (at this stage) is: *Socio-cultural myths and the science classroom: A critical analysis of discursive practice*.

From this title, she is making a political statement to the target audience which, she hopes, will recognise immediately that the accompanying presentation is based on significant research that warrants being considered seriously. If she was addressing a different audience, then she might have entitled the paper differently. For example, *Tall tales and true: Messages from beyond the whiteboard*, if she was writing an article that was attempting to be amusing, or *Odysseus meets Wyatt Earp*, if she wanted to be obscure in a literary classical way. These alternative titles might be appropriate if she wanted to have extracts of her thesis accepted for publication in *The West Australian* or *The Australian* or, perhaps, in *The Practising Administrator*. However, because she is aiming for acceptance by the community of science educators, she attempts to ensure that her title identifies that group as her preferred audience. In this sense, the crafting of the thesis title was a political decision.

The title also indicates to readers something about the nature of the narrative of the research. Firstly, in the title Cath identifies the categories that are the major focus of her research study, namely, 'classrooms' and 'myths'. Secondly, she limits these categories by indicating the attributes that are of greatest interest to her, specifically, 'science' for classroom, and 'cultural' for myths. Further, the title indicates that methodologically she will be constructing evidence of myths in the science classroom by conducting a 'critical analysis' of classroom practices.

However, not only does the title indicate what the narrative is going to be like, it also positions the researcher in a theoretical sense. The theories that Cath presents, and around which she structures her research, represent her notions about how the world operates. Her personal theories are structured by her personal characteristics and life experiences, and influence the questions that she asks in her research and the assumptions that she makes about knowledge, values and reality (ie., epistemology, ethics and ontology). Use of the terms 'cultural', 'myths' and 'critical' indicate her research interest in specific public theories. This further helps to identify her theoretical position and the particular group of science educators from which she seeks legitimation. Table 1 highlights the importance of the title of Cath's study for indicating to readers some of the underlying theories which inform her study.

Table 1  
*Theories Implicit in the Thesis Title*

Components of the Title	Implicit Theory
critical	critical theory
discursive practice	Foucault, power/knowledge
analysis	interpretive research
myths	semiotics, structuralism, post-structuralism
cultural	the importance of cultural factors to what happens in the classroom

Cath's thesis title signifies that her research study is informed by theories associated with post-structuralism and semiotics. Furthermore, the theoretical framework that is signified by the title indicates also the form of ethics which might be of significance to Cath in the conduct of her research. She believes that, because cultural factors constitute the focus of her research, the ethics that inform the research should also reflect an awareness of, and a concern for, cultural factors.

### Research and Ethics

Ethics are related to the general purpose of research. In Cath's case, her research is based on the assumption that socio-cultural factors have a primary influence on learning and teacher practice in the science classroom. Therefore, the ethics that guide her research must be consistent with this assumption. For many researchers, the ethics that guide their research is based on their notions about knowledge (ie., the focus of their research questions) and on their basic beliefs about the importance of their research. Many reasons are proposed by researchers to explain why their research is important and worthwhile, and to describe the relationship between research and the generation of new knowledge.

Sometimes, researchers might claim that all knowledge is intrinsically good and so the methods that researchers use to gain knowledge is unimportant. Such an argument was used by researchers to claim that present-day scientists should be able to use the data on hypothermia collected by Japanese scientists who experimented on prisoners-of-war during the Second World War, the argument being that the knowledge is worthwhile even though the manner of its generation is considered to be unethical. This type of ethics is called *teleological ethics* and its organising characteristic is the notion that knowledge is value-free.

Other forms of research ethics emerged as researchers examined the relationship between reasons for conducting research and research methods considered to be appropriate. Another example of research ethics is described by the relationship between research that will generate knowledge designed to help individuals, and the belief that such research should be based on an acceptance of universal moral laws such as informed consent. This form of ethical approach is called *deontological ethics*. Examples of research ethics and their relationship to the rationale for conducting research are shown in Table 2.

Table 2  
*Relationships Between Reasons for Conducting Research, Research Ethics and Their Organising Characteristics*

Reasons for Conducting Research	Research Ethics (after Brickhouse, 1993; Flinders, 1992; May, 1980)	Organising Characteristic of Research Ethics
Because knowledge is intrinsically good	Teleological	Knowledge is value-free
Because knowledge is useful	Utilitarian	For the harm/good of society
Because knowledge will help individuals	Deontological	Universal moral laws exist
For a better society	Advocacy/ Emancipatory	To empower minorities
For fidelity/care	Covenantal/ Relational	Caring relationships are of primary importance
For socio-cultural awareness	Ecological	All relationships and individuals exist in webs of culture

The theoretical framework that Cath is evolving is consistent with the *ecological ethics* of David Flinders (1992) who argues that research should examine the classroom as a community and habitat. Within this ethical approach, analysis of metaphors is important, particularly

'dead' metaphors which "generate taken-for-granted patterns of cultural understanding" (p. 106) that we call 'cultural myths'. Ecological ethics aims for cultural awareness in the generation of knowledge from research. This includes an explicit awareness of the nature and role of language, especially the style of expression used throughout the research. This ethical approach emphasises the aspects of research that Cath thinks are important and constitutes an ethical framework for her research. Because she believes that the ethical, theoretical, political, epistemological and methodological frameworks of the study are inter-related, the literature synthesis of the study is an examination of the siting of her research in the cultural web of science education research.

### The Politics and Ethics of Theory and Literature

Some interpretive researchers believe that researchers either should have no theoretical framework or should suppress their personal frameworks before they start generating data. They argue that early recognition of a theoretical framework might restrict the range of data that they generate. However, do researchers who say that, "I don't read anything before I go into the field. I want to keep my mind open" really mean that "I don't want to read about the area of research I'm involved in, I might have to reassess my personal theories before I get into the field," or "I don't want anything to get in the way of my theories"?

It seems to be a naive approach to positing the relationship between empirical research and theory to assume that the researcher's mind, unfettered by theoretical notions, can be the perfect conduit for collecting theoretically-unpolluted data from an experimental situation. It reminds us of the 'philosopher's stone' of 'inductive-empiricism' which advocates theory-free observation. It seems to us that, if researchers do not read widely of previous research reports related to their area of research interest, then they have not read about a range of theoretical possibilities and, consequently, their idiosyncratic theories are likely to have an inordinate influence on their observations and data generation. According to ethnographer Martin Hammersley (1992), "we neglect theory at our peril" (p. 34).

According to Merriam (1988), in relation to a research study our theoretical lenses influence the nature of the research questions, research design, how data are generated, the role of the researcher, and the analysis and interpretation of the data. We believe that the development of a theoretical framework allows the researcher to develop a coherent theory of their own. Importantly, it assists the researcher to reflect critically on their extant personal theories and cultural myths. Reading widely can make the researcher aware of other theoretical options. Cath believes that this stage of theoretical development is essential if she is to make sense, in an insightful way, of what happens in science classrooms that she visits.

#### *Theory and the Use of Language*

As we mentioned previously in this paper, the language used in research reports is recognised by the members of a specific research group, such as science education, and has meaning for the members of that group. However, often the language used to express ideas in science education research is unexamined. When we write in a particular way or use particular grammar and syntax we are signifying to our audience that we hope to belong to a particular research 'camp'. For example, if we write about 'sample' or 'participants', 'data' or 'texts', and 'learning environment' or 'classroom', we identify ourselves as belonging to one or other of particular (and sometimes competing) theoretical enclaves. Although our choice of language depends on our theoretical perspective, the choice also is ethical and political.

The style that we select to use in our presentations of our research (including this paper) is important because it indicates our theoretical orientation. As we conduct a literature synthesis, we interpret reports from other researchers about a particular aspect of research that provides background for our own study. When we present these interpretations in writing, we write to make our interpretations convincing. Consider the following contrasting language styles of extracts taken from a research report by Hackling and Garnett (1991) and from Cath's thesis. Both present interpretations of a report by Woolnough and Allsop (1985) on the purposes of practical activities in the science classroom.

Woolnough and Allsop (1985) have identified three aims that can be validly achieved through laboratory work: the development of process skills and laboratory techniques; getting a feel for the phenomena; and being a problem-solving scientist.

(Hackling & Garnett, 1991, p.1)

The emergence of matters-of-fact through observation of nature in the practical activity and the emittance of the experimental report have led to the mythification of the practical activity in the school science classroom. Practical activities are also designed to introduce students to the craft of science where they learn to use equipment appropriately and to the culture of science through investigations that apparently mimic the work of scientists (Woolnough & Allsop, 1985).

(Milne, 1994 in preparation)

Clearly, both groups of researchers used the paper by Woolnough and Allsop for the purpose of illustrating or supporting a particular notion about the role of practical work in the school science classroom. However, their underlying theoretical perspectives are very different, and this difference leads to the use in each case of a different form of prose. Hackling and Garnett use apparently non-emotive language to distance themselves from their interpretations of the Woolnough and Allsop paper. Their prose seems to imply that they are factually reporting on the data from the paper and that anyone else who reads that paper would make the same interpretations that they have made about this paper. By contrast, Cath wants to convince readers that they should share her concern about the need to be aware of the temptation of identifying practical activity as equivalent to science education, a process in which a metonym (in which a part is equated with a whole) becomes a myth in which the part is the whole.

Cath uses emotive language to encourage her readers to think about practical activities in a different way. In this case, her theoretical underpinnings are that myths are important, that as educators we need to be aware of them, that it is possible to use socio-linguistic theory to construct evidence of myths in classroom practice, and that there is the possibility that there exists myths associated with the use of matters of fact, practical activities, experimental reports and scientific language in the science classroom. Her approach is rhetorical to the extent that she attempts to persuade her readers that her claims have merit (Melia, 1992).

### Conclusion

In this paper, we have discussed briefly the role of theory, legitimation and values in interpretive research. We have argued that researchers' personal premises about these key organising components influence the methodology of their research and the literary form used to report it. We believe that it is important for interpretive researchers to address these issues when they are planning, conducting and reporting their research. In order to be critically self-reflective researchers need to consider their perspectives not just with regard to theory, research questions and methodology but also in relation to the ethics that inform their research and the politics of their narrative.

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