

## Challenging the Dualistic Assumptions of Academic Writing: Representing Ph.D. Research As Embodied Practice

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**Abstract:** This article will address the tensions between dualistic traditions of our culture (cf. WERTHEIM, 1999) and new ways of understanding how people come to know what they know through embodied practice within biological and social ecosystems (e.g., DAMASIO, 1994; LEAR, 1998; LEMKE, 1995; MATURANA & VARELA, 1992). It will also raise implications of a biosocial system model for research methodology and academic writing. In my Ph.D. thesis in education I demonstrated that a significant role was played in the construction of my knowledge by my body[-mind], much of it initially outside my awareness. However, I found that these were still expected to support the myth that learning which will advance knowledge about education is almost exclusively the product of abstract and systematic logical processes, of a disembodied spirit.

### Table of Contents

- [1. The Intellectual and the Body](#)
- [2. A Biosocial System Model of Knowledge](#)
  - [2.1 Perceptions and emotions](#)
  - [2.2 Other mind-body dependencies](#)
- [3. A Case Study of Biosocial System Analysis](#)
  - [3.1 An investigation of conceptual change](#)
  - [3.2 Adapting the thesis genre to practice a new epistemology](#)
- [4. Conclusion](#)

[Acknowledgements](#)

[References](#)

[Author](#)

[Citation](#)

At the heart of this story is the age-old tension in Western culture between body and mind—in all its myriad manifestations, including that particular manifestation that Christians call the "soul".

(WERTHEIM, 1999, p.30)

### 1. The Intellectual and the Body

As researchers we may no longer believe in objectivity as a key criterion of good research, or even hold that it is a meaningful concept to use in relation to research. By shunning positivism, adopting interpretive approaches to research, and espousing varying degrees of relativism, we think we have escaped the influence of DESCARTES, the 17th century French philosopher who has been blamed both for leading us down an objectivist path of thinking, and for a cult of

individualism responsible for many of the evils of the modern world (cf. BARTHES, 1977; LEMKE, 1995). However, I believe we are mistaken in thinking we have left objectivist practices behind, particularly when it comes to academic writing, and I believe we are not entirely fair to DESCARTES either. It seems to me to be inconsistent to criticize Cartesian dualism and yet to refuse to even consider the implications of taking a non-dualist position for research and research writing, that is, to consider what it might mean in practice to view the mind and body as an integral and inseparable unit: an embodied mind or a thinking-experiencing body. [1]

A particular concern I have in this regard is that, in spite of huge epistemological shifts in the last few decades, the unwritten rules of academic writing have been slow to change. As a consequence there is now some inconsistency between epistemology and genre. It has been my experience that the preferred style of writing is still impersonal and authoritative (within a particular paradigm), with knowledge being represented as the result of straightforward, if complex, conscious logical processes within a single discourse system. The writer is meant to act as though her own learning happened as a unitary, and *purely* intellectual process, and was "uncontaminated" by personal experiences of any kind, and, to a greater or lesser degree (depending on the research paradigm), as though the resultant knowledge was independent of time, place and personal (including bodily) context. [2]

This was an issue that came up repeatedly in relation to my Ph.D. thesis. At the time, I thought I was dealing with epistemological or philosophical arguments but later I began to think that that was only the tip of the iceberg. The bulk of the resistance to what I was proposing, now seems more like the manifestation of subconsciously held cultural beliefs, or, if such beliefs were held more consciously, of a particular moral aesthetic. It seems as though associating body processes with intellectual matters is quite simply taboo in parts of Western culture, including much of the educational research culture as I know it, even that part of it that would want to put the body-mind dualism under erasure. [3]

This may be why the words "there must be death of the Author" has sometimes been taken more literally than ever BARTHES (1977) intended it. In his "Death of the Author" text he was only referring to narrative (novels, myths, etc.). In other parts of the same book, he is present in the text as author. For example, he wrote a preamble to a structural analysis to prepare the reader for an unexpected type of analysis. In yet another chapter, he explained in a footnote that for both poetry and argument (in contrast to narrative), appreciation was "dependent on the cultural level of the consumer" (p.79), which would presumably mean that some further explanation would be needed for a "consumer" at a different cultural level in this implied (monocultural) hierarchy<sup>1</sup>. However, he did also question personal agency in writing and I will discuss this point further below. [4]

1 Note that these days, we would be more likely to allow that understanding is not simply a matter of *level* of education of the reader. Differences in cultural code within the one society could also provide a barrier to understanding for some readers (cf. BERNSTEIN, 1990), and such differences would be seen as qualitative rather than quantitative, that is, that meaning is to a great extent a matter of intertextuality (cf. LEMKE, 1995).

Table 1 provides a summary in relation to the mind-body issue of the implications of various discourse systems as seen from a biosocial system perspective (which will be explained in the course of this article, see also HANRAHAN, 2002). As with any summary table, it is over-simplified and does not do full justice to the philosophies or research paradigms addressed. It is intended merely to draw attention quickly to my major concerns as a researcher and writer. These concerns are about discourses that in one way or another dismiss the notion of the human person or the necessity of the body for intellectual functioning.

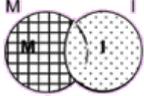
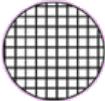
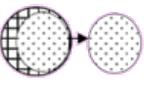
Relationship between the material and the immaterial	Nature of meaning	Mind/"I"	Possible location	Implications for research and academic writing
	Idealist: higher reality obtained by transcending material experience	Mind has agency, can know higher reality by mental work (and denying body)	Platonic idealism, Christianity, French idealism	<ul style="list-style-type: none"> <li>Goal of attaining metaphysical knowledge</li> <li>Writing to exemplify the rational mind and rules of rhetoric</li> </ul>
	Dualist: material and spiritual worlds coexist; knowledge about either based on evidence	Mind has consciousness and agency; is affected by the senses, feelings	Cartesian rationalism	<ul style="list-style-type: none"> <li>Objectivist research; with knowledge to be based on "clear evidence" and justified rationally; universal knowledge as the goal</li> <li>Author may be present but only as an interpreter of "pure intellect"</li> </ul>
	"Monist 1": material world is the only verifiable reality; spiritual world does not affect material world	Mind is a data processor; works best when detached from body processes (e.g., affect, senses); can be both subject and object of knowledge	Pre-relativist science	<ul style="list-style-type: none"> <li>Objectivist research; subjectivity minimised with goal of achieving knowledge with universal value</li> <li>Authoritative, impersonal writing</li> </ul>
	"Monist 2": reality created in discourse; material world = texts; knowers implied but not recognised	Identity (including multiple notions of body, "I", agency, mind, human persons) created by socialization; other contributions seen as irrelevant.	French poststructuralism (as texts)	<ul style="list-style-type: none"> <li>Knowledge/meaning only [meaning]ful at the level of culture; the material is only a construction/textual reading</li> <li>Abstract writing, with author "under erasure"; tension in writing between cultural proprieties and ironic perspective/critique; 'death of the Author'</li> </ul>
	Physical reality exists; part of body-mind may exist without body	Mind is data which in future could be downloaded; multiple subjectivities may co-exist independently	Cyberspace texts	<ul style="list-style-type: none"> <li>Knowledge as discrete data which can exist independently of the body</li> <li>[Mainly science fiction writing] Subjectivity acceptable, including multiple subjectivities</li> </ul>
	Ecological: meaning is embodied practice within the relevant biosocial system	Mind-body unit makes meaning only through interacting with environment which at the same time produces it; consciousness (and sense of "I") may or may not be necessary for the interactions	Biosocial system theories	<ul style="list-style-type: none"> <li>Knowing is embodied practice, the result of interaction between the "person" and internal and external systems; it includes tacit knowledge</li> <li>Writing may reflect practice in several concurrent discourse communities; meaning is negotiated between writer and reader; a personal perspective is inevitable so is best acknowledged</li> </ul>

Table 1: Suggested relationship between schools of thought and beliefs about research writing [5]

Poststructuralists will no doubt be surprised that they figure here as an example of dualist thinking, albeit as only one pole of the binary since they ignore material reality, and no doubt they would contest my categorisation. However, a view of the world in which both human subjectivities and bodies are seen as purely cultural constructs, may paradoxically be based on a subconscious desire to achieve an intellectual state unsullied by association with the body, in somewhat the same way that Greek idealists, traditional Christians and French idealists such as Mallarmé (cf. BARTHES, 1977) sought a metaphysical reality that would transcend (and live on beyond) physical reality (LAGARDE & MICHARD, 1965).

By finding meaning only in texts they reify the intellectual while denying the body<sup>2</sup>). Even while granting that poststructuralist texts demonstrate effectively that a great deal of what we take to be "natural" is in fact a cultural artefact, I believe that human beings can have subjective experiences at various levels of consciousness and agency that go beyond what they have gained through socialisation. Reality is a lived psychophysical experience, not a purely mental one. Awareness is not necessarily totally constructed by culture. [6]

In fact, DESCARTES was less extreme in his separation of the physical and the mental. We are told that in both *cogito ergo sum* and "je pense donc je suis", what has been rendered in English as "I think, therefore I am" in fact is closer to "I experience therefore I exist" in the original (KOYRÉ, 1952/1970). DESCARTES' elaborations make it quite clear that he included feeling, willing, doubting—in fact any form of consciousness, including sensing. DESCARTES thus acknowledged that the body and mind functioned as a unit, in contrast to poststructuralists who write as though the *particular* physical body for all intents and purposes is irrelevant to thinking/discourse. The latter wrote about the body principally as a passive site of inscription. HILLCOAT (1996, p.100) commented,

"the subjectivity of the body is defined entirely through the inscription of social and political discourses ... there is no role for the physical body in inscribing subjectivity ... we get no sense of the mind's location within an active human body". [7]

This would still seem to me to imply a dualistic separation of the body and the mind, or perhaps, in Margaret WERTHEIM's (1999) use of the term, a "monistic" position, since it focuses on one pole only of a binary contrast. Referring to the modern Western scientific view WERTHEIM (1999) wrote,

"It is a complete misnomer to call the modern scientific world picture dualistic; it is monistic, admitting the reality only of physical phenomena. Here, the Christian soul is not the basis for another level of reality, as the medievals believed, but a chimera of the imagination—Gilbert Ryle's 'ghost in the machine.'" (p.153) [8]

For many poststructuralists only discourse artefacts (including the inscribed body read as a text) are allowed reality, and any other reality is denied. Dualism has not been resolved by accepting the mind and the body as two sides of the one coin (cf. the diagram associated with "ecological system theories" in the first

2 BARTHES (1977) clearly did not favour either acknowledgement of personhood, or evidence of live bodies in a symbolic work. He openly expressed dismay at theatre where human emotions and individuality were directly expressed (theatrical expression equates with hysteria [p.173], and elsewhere, the voice "smells" [p.179]). He argues categorically that ideas be presented symbolically divorced from human expression as could be found in Japanese Bunraku theatre. He rejected the notion of the "human person" in the strongest terms, seeing its origin in English empiricism and French rationalism (i.e., Hobbes and Descartes), "this positivism, the epitome and culmination of capitalist ideology" (p.143). In praising the use of stylised puppets and dead-pan voices to communicate, he wrote, "[T]his is what Bunraku accomplishes, this is how it converts the body-fetish into a lovable body, this is how it refuses the antinomy of *animate/inanimate* and dismisses the concept hiding behind all *animation* of matter, that, quite simply, of 'the soul'" (p.173). Elsewhere he rejects "the metonymical contagion of voice and gesture, soul and body" (p.177). Only by pulling apart the verbal and gestural codes could the "sticky organicism" (p.175) found in Western theatre be removed resulting in "the action necessary for the production of the spectacle—work is substituted for interiority" (p.174).

column of Table 1), but by more or less ignoring the relevance of an active role for the individual body. (Other aspects of Table 1 will be explained more fully in the following and later sections of this article.) [9]

This article, then, is a risky attempt to write in a space between sociocultural, philosophical, linguistic and bioscience discourses. However, it does not attempt to bridge the space so much as to take a reader conversant with any or all of these discourses into a new space where a major assumption of all four is called into question: the assumption that human understanding is best served when the intellect transcends the physical, that is, when the mind is shown to use purely intellectual tools and operate independently of the body, in as far as is possible. Ironically but pragmatically, this means using an intellectual argument here to question the superiority of intellectual arguments for communication and learning. (By contrast, in the conference paper which contained the germ of this article [HANRAHAN, 1998], I wrote two alternative discussion sections, one a personal narrative of how my thinking evolved in practice and the second a more "scholarly" impersonal logical argument.) [10]

In this article I take what I would like to call a *post*-posthumanist view (cf. KNIGHT, 1995). I take the position that the physical world exists quite apart from our awareness of it, and that it includes living beings (including humans) that interact with each other and the rest of their environment in ways that depend as much on the existence of the physical properties of such bodies (including their role in psychological activity such as perceptions and emotions) as they do on larger cultural and physical systems. My main concern with seeing meaning being treated as properly the province of the intellect alone is that, for me, there is a material world system. To differentiate such a system from a "meaning system", LEMKE (1995) referred to it as a "dynamic open [biophysical] system" (p.162) or "an interaction system" (p.183). This world includes living, interacting bodies, and the intellect as we know it is an inseparable component of this material, biophysical system, and is circum-scribed by it as much as culture is in-scribed on the material world as we see it. [11]

I will begin by reviewing the evidence that bodily processes such as perceptions and emotions are integral to intellectual thought, and then explore some other facets of human understanding that are also dependent on characteristics of brain-body functioning that are not necessarily conscious, beginning with a tendency towards automatic associative thinking. The latter, together with other processes that could collectively be called *tacit knowledge* are processes of brains and bodies that would seem to be independent of both socialization and logico-deductive information processing. (Note that I am referring here to the psycho-physiological processes themselves and not their content). Having presented the case for knowledge as embodied practice within a biosocial system, I will then address its implications for academic learning and writing. In particular I will focus on the traditional doctoral thesis genre which is both a product of and a site of learning for epistemological beliefs about knowledge as a unitary product of a singular and purely logico-deductive meaning-system. This written genre seems

to be particularly inconsistent with epistemological beliefs about knowledge as both individual and social practice within a biosocial system. [12]

I will be illustrating my argument by referring in particular to my own doctoral thesis and the criticisms it attracted from post-structural commentators when I insisted on giving it a structure and style which would be epistemologically consistent with the view of learning and knowing that had resulted from my doctoral research. I saw the knowledge I wanted to present in my thesis as the practice of a particular mind-body in contemporaneous interaction (on both conscious and subconscious levels) with several somewhat incommensurable discourse communities and believed that such knowledge could not be adequately represented by a thesis presented as a tidy intellectual argument set within a single paradigm. [13]

## 2. A Biosocial System Model of Knowledge

### 2.1 Perceptions and emotions

One could argue that some aspects of the mind are dependent on the body while others are not, just as DESCARTES (1637/1990) separated pure intellect (which he saw as reliable) and the evidence of the senses (which were less reliable). However, this case for pure intellect starts to seem analogous to having a "God of the gaps" who is needed less and less as an explanatory principle the more science advances. How much of "pure intellect" will remain after a few more decades of neuroscientific investigation? Even Princess Elizabeth of Bohemia, a pupil of DESCARTES', pondered in her correspondence with him,

"It is very hard to see how a soul such as you describe, after possessing the power and the habit of correct reasoning, may lose all that because of some vapours [in the brain]; or why the soul is so much governed by the body, when it can subsist separately, and has nothing in common with it." (ANSCOMBE & GEACH, 1970, p.278) [14]

Most obviously what one senses (feels, hears, tastes, smells, sees) is usually (but not always, as DESCARTES pointed out) at least partly explicable in terms of the organs of perception interacting with the immediate environment. The emotions are also generally attributed to "less-than-pure" intellect, particularly as they are usually demonstrated in obvious ways by the body (blushing, facial expressions, posture, tone of voice, quickened heartbeat, etc.). The fact that some of such shows of expression can be suppressed to a greater or lesser degree may suggest that they are under the control of "higher" mental processes. However it now appears that the reverse may be true, or at least that a two-way process is involved. Recent research, for example that of DAMASIO (1994) which deals with people who have had particular kinds of brain damage, suggests that the emotions are in fact *integral* to the workings of what are usually considered higher mental functions such as problem-solving, decision-making, and creativity. [15]

DAMASIO (1994), a neurologist who became interested "in the neural underpinnings of reason" (p.1), did a particular study of people whose ability to experience emotions and feelings was impaired, and became convinced that reason was dependent on emotions for effective functioning. He proposed that feeling states act as "somatic markers", signals in the body that are used to evaluate one's options almost instantaneously according to past experience. These result in increased attention being accorded to whatever sparks the emotion underlying the feeling state. He wrote:

"I propose that a somatic state, negative or positive, caused by the appearance of a given representation, operates not only as a marker for the value of what is represented, but also as a booster for continued working memory and attention. The proceedings are 'energised' by signs that the process is actually being evaluated, positively or negatively, in terms of the individual's preferences and goals. The allocation and maintenance of attention and working memory do not happen by miracle. They are first motivated by preferences inherent in the organism, and then by preferences and goals acquired on the basis of the inherent ones." (DAMASIO, 1994, p.198) [16]

Hence he concluded that:

"The action of biological drives, body states, and emotions may be an indispensable foundation for rationality. ... Rationality is probably shaped and modulated by body signals, even as it performs the most sublime distinctions and acts accordingly." (p.200) [17]

He found that lack of feelings (which could be found in individuals who had suffered particular brain damage) did not prevent logical processing; what it prevented was "knowing" what to do with the result: there was no necessary connection between thought and subsequent thought or action. Will was similarly dependent on evaluation linked to somatic markers.

"Willpower draws on the evaluation of a prospect, and that evaluation may not take place if attention is not properly driven to both the immediate trouble and the future payoff, to both the suffering now and the future gratification. Remove the latter and you remove the lift from under your willpower's wings. Willpower is just another name for the idea of choosing according to long-term outcomes rather than short-term ones." (DAMASIO, 1994, p.175) [18]

It should be noted that DAMASIO did not dispute the influence of external social factors on what came to be defined as feelings, though he did believe that primary emotions were present from the beginning and were the foundations on which others were built. Hence he did not deny the influence of "education" on how feelings were associated with concepts in ways that meant the latter were then more (or less) valued.

"Beliefs, feelings, and intentions are indeed the result of a number of factors rooted in our organisms and in the culture in which we have been immersed, even if such

factors may be remote and we may not be aware of them. If there are neurophysiological and educational reasons making it likely for some people to be honest and generous, so be it." (DAMASIO, 1994, p.176) [19]

Similarly, as I have explained in more detail elsewhere (HANRAHAN, 1998), research in the cognitive and neuro-sciences on creativity, (scientific) intuition, and insight has suggested that (the physiological as well as cognitive components of) feelings have an important role to play in such processes (e.g., see COLLINS, BROWN & NEWMAN, 1989; FENSHAM & MARTON, 1992; POINCARÉ, 1913; SACKS, 1998; SEIFERT, MEYER, DAVIDSON, PATALANO & YANIV, 1995). Briefly, feelings alert the mind to what is important to attend to, provide the motivation for goal-directed persistence, create frustration that begs to be resolved, and, finally, can give great pleasure when insight is achieved which, besides being rewarding in itself, predisposes for similar experiences in the future. I also argued that mood changes (which have physiological correlates) may affect both the nature and the content of thinking, and that there are many mental disorders that affect thinking processes, some of which have a physiological component that may be altered using drug therapy alone, with thinking processes changing substantially as a result. [20]

## 2.2 Other mind-body dependencies

It is not only *feelings* which can be highlighted as a neglected area that links the processes of the mind with the body. Another is the process of *association*, of making automatic links that do not depend on logic. In an earlier work I wrote that LEAR (1998), a psychoanalyst who was concerned with the apparent restlessness of the mind, "posits that an important property of the mind is the making of associations which, although apparently random, can be recruited for one's purposes" (HANRAHAN, 1998, Insight, paragraph 4). I further commented that

"the 'antechamber' or the 'back of the mind' phenomena seems to suggest that when we are motivated to solve unsolved problems or to resolve cognitive conflict, then cues for such problems are held within reach, just outside consciousness but easily available for associative thinking." (HANRAHAN, 1998, Insight, paragraph 4) [21]

Such "back of the mind" phenomena as well as processes of perception and affect (as referred to in the previous section) could be subsumed under the term *tacit knowledge*, alongside other facets of memory and embodied knowledge which may operate at a tacit level. I believe these have been largely unacknowledged in academic research. Memory is a facet of the functioning of humans (and other organisms) that is crucial to successful participation in complex systems, and tacit knowledge could be seen as an inescapably organic aspect of memory and mental functioning. [22]

In HANRAHAN (1998), besides referring to tacit knowledge which "may enter awareness in an incomplete form such as (a) compelling intuitions, and (b) dissonant emotional or other behavioural reactions" (Tacit Knowledge, paragraph 2), I referred to further tacit processes of knowing, citing POLANYI:

"Polanyi (1966/1983, p.40) wrote, 'we can know more than we can tell'. Some components of such knowledge are almost entirely outside conscious control but could be brought to awareness to some extent if required. These include (a) prior knowledge which has become automatic, for example, ways of perceiving and ways of interrelating interpersonally, which will include both ordinary and technical language use as well as non-verbal behaviour, (b) assumptions about what is or is not of particular value for problem solving in the area, (c) generalised beliefs about oneself and one's capabilities, and also about how others are likely to behave."  
(HANRAHAN, 1998, Tacit Knowledge, paragraph 1) [23]

Rather than being irrelevant to thinking, such tacit processes, which can be seen as part of the physical structure and functioning of the body, are integral to mental functioning. In this light, knowledge has to be seen as embodied practice, rather than as a thing, a construction, which can be isolated or objectified. A language artefact may be a thing but its meaning can only be decoded as part of human practice within a particular system (HANRAHAN, 1999; LEMKE, 1995; MATURANA & VARELA, 1992). [24]

Like DAMASIO (1994), MATURANA and VARELA (1992) were prompted by what they learnt from neuroscience to investigate "the biology of human understanding". However, like LEMKE (1995), they situated human understanding as a dynamic component of a larger ecological system, which in their case meant a *biological* system, whereas LEMKE's focus was the *social* system. MATURANA and VARELA's principal conclusion was that knowledge was a matter of practice, with an organism at any level—including the human—mutually interacting with its environment (including other organisms) in a complex way involving the integration of many bodily processes. In HANRAHAN (1998) I explained this view of *knowledge as practice* and looked at its implications. The following passage, referring to the MATURANA and VARELA (1992) text, also indicates how this view (which I was later to refer to as an "ecobiosocial system"<sup>3</sup> perspective (HANRAHAN, 1999) and now prefer to call more simply a "biosocial system" perspective) is both consistent with and different from a sociocultural perspective.

"Knowledge is seen as 'effective action, that is, operating effectively in the domain of existence of living beings' (p.29), and can be summed up in two aphorisms, 'All doing is knowing and all knowing is doing' and 'Everything said is said by someone' (Maturana & Varela, 1992, p.26).

They [MATURANA & VARELA] argue against a representational view of knowledge as 'information' which is held and used for action. Rather they see 'animal and environment as two sides of the one coin' (p.253), mutually dependent with neither being able to be defined effectively in isolation from the other. Knowledge is the result of both history and *present circumstances*.

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3 LEMKE (1995) used the term *ecosocial system* to describe the system which contributes to the development of a particular discourse; in my Ph.D., I described my methodology as *ecobiosocial system analysis* because I explicitly wanted to include the physical part of the ecosystem in my theory of learning in science classrooms and in research itself. In this article (as in HANRAHAN, 2002) I have referred to the perspective I take more simply as a *biosocial system perspective*.

They have elaborated their theory of the biology of human understanding progressively, beginning with the origin of unicellular life on earth, and tracing it through the history of its development into multicellular organisms and thence to complex organisms with nervous systems to more complex systems which may have developed logical accounting, cognitive acts, social and cultural phenomena, language and reflective consciousness, and finally reflexivity and ethics.

Knowledge in humans, therefore, is not restricted to conscious cognitive activity, but represents the sum total of their recurrent behaviour in relation to their environment, whether they are conscious of it or not." (HANRAHAN, 1998, *The Biology of Human Understanding*, paragraphs 1-4) [25]

In some ways this is dealing with knowledge as sociology deals with it: a cultural and historical production. The notable difference is that knowledge is seen here as differing from individual to individual (person to person) because each is active in the process as a different em-body-ed and en-history-ed individual; rather than being formed by their environment in a one-way process, the behaviour of each is the result of an interaction between that particular organic individual and the environment.

"Understanding the part played by components in a system involves understanding that no environmental or even internal factor is ever a "cause" of change in the organism; the most it can be is a trigger for a chain of events whose outcome will depend on structure and functioning of the system which itself will depend to some extent on the presence of other elements in the organism's environment."  
(HANRAHAN, 1998, *The Biology of Human Understanding*, paragraph 5) [26]

Knowledge is embodied practice and as such cannot exist without the body (and hence digital downloading of the brain, even if it were possible, would not result in a computer possessing the knowledge of a living person/body). Even genes, MATURANA and VARELA argued, should be seen in this light, as they are not predestined to be realised in a particular way, but rather interact with the environment to produce a particular result which will depend on the nature of that environment<sup>4</sup>. Such interactivity, they argue, is necessary for successful adaptation to a changing environment.

"This is to the advantage of the organism, as it means it develops in such a way that its essential features are compatible with its environment rather than in a way which, being predetermined, might make it poorly adapted to its environment."  
(HANRAHAN, 1998, *The Biology of Human Understanding*, paragraph 5) [27]

LEMKE (1995), coming from a sociolinguist perspective, similarly explained discourse as practice within a particular "ecosocial" or "meaning" system and stressed the importance of the system having an "epigenetic strategy" (p.160) for

4 Recent development in mapping of the human genome have borne this out, with the surprising finding that human development and all human characteristics were the result of a relatively low number of genes. This suggested that the great differentiation within an organism was not the result of a large number of genes but rather that, for each gene, the variation that resulted was the outcome of the interaction between the unit coded for (such as a particular protein) and the particular environmental conditions (such as the local chemical environment).

the survival of systems in a changing environment. However, like BARTHES he was mainly interested in knowledge at the level of the social system and what happened at the level of a particular body did not concern him as much. Like BARTHES he thought that humans as individual agents had been accorded too much importance in recent centuries. Not only had this led to blindness about the extent to which individual behaviour was socially determined, but also to short-sightedness about the extent to which the welfare of the individual depended on the welfare of larger ecosocial and biophysical systems. [28]

I would argue, however, that the pendulum may now be swinging too far in the opposite direction, and that neglect of knowledge at the level of the individual body-mind is also detrimental, including both the impact it has on learning theory and on the way it may limit research methodology and research writing. A posthumanist position leaves unexamined several assumptions underlying research genres that are based on a body-mind distinction that treats the "goings on" in the body as irrelevant. Besides running the risk of supporting the kind of pedagogy that fails to engage students (see HANRAHAN, 1999, for a discussion of problems in science education that may be due in part to a failure to integrate biological, psychological, and sociological theories of human understanding), such a position also implicitly supports the conventions of academic writing that refuse to acknowledge the role of the individual body and consciousness in research. Nor does it address the paradox involved in individual intellectual activity that acts as though there is no role for individual intellectual activity. Of most significance here is the fact that, as I have suggested in Table 1, it depends on dualistic assumptions of separation of the mind and the material world. [29]

It is interesting to note that some cyberspace writers view the material body as similarly separable from meaning making. WERTHEIM (1999), identifying the spirituality she found in cyber culture, saw it as a reaction against centuries of materialism, a reaction against rejection of the metaphysical by modern science. "The Pearly Gates of Cyberspace" is an argument that Western human beings refuse to accept that reality is limited to the purely physical and seek recognition for a supra-physical dimension of experience (cf. heaven). She was unimpressed with dismissals of human subjectivity, and although she was referring principally to the discourse of science, what she wrote could apply almost equally well to other discourses which refuse to acknowledge individual consciousness as significant in its own right.

"No matter how often reductionists insist that we are nothing but atoms and genes, there is clearly more to us than this. 'I think; therefore I am,' DESCARTES declared; and whether we modify 'think' to 'feel,' or 'suffer,' or 'love,' what remains is the indissoluble 'I,' and deal with it we must. ... Sensing that something crucial has been occluded from the physicalist picture, they are looking elsewhere in the hope of locating this missing ingredient." (WERTHEIM, 1999, p.40) [30]

WERTHEIM saw the omission of a satisfactory role for consciousness in scientific theory as "an important factor in the appeal of cyberspace, for it is this immaterial 'I' that in some sense cyberspace caters to" (WERTHEIM, 1999, p.40). The

Internet once again promises to make possible transcendence of the physical. Crediting William GIBSON with the introduction of the term "cyberspace" into English, she noted that, in his "prescient sci-fi novel", *Neuromancer*, GIBSON (1986, cited in WERTHEIM, 1999) hailed "the bodiless exaltation of cyberspace." Moreover, she went on to show that it was not only in fiction that this belief was growing. Among citations from cyberspace theorists, she quoted the claim of "real-life virtual reality pioneer Jaron Lanier" that "'this technology has the promise of transcending the body'" (WERTHEIM, 1999, p.26). [31]

WERTHEIM (1999) also gave examples of cases where some Internet users became so involved in their fantasy lives as MUDers<sup>5</sup> that the experiences and relationships formed there became more real to them than—or at least as important as—their "real life" relationships and experiences. Another feature of this cyber culture was that individuals could have multiple simultaneous identities in this world and moving between multiple open "Windows" was cited as a good metaphor of how such lives were lived (TURKLE, 1995, cited in WERTHEIM, 1999, p.248), with "RL" (real life) being like just another Window (cf. WERTHEIM, p.250). However WERTHEIM pointed to the differences between the quality of on-line and off-line lives and questioned the reality and independence of these identities. For her, acting out different fantasy lives, while it might serve many useful purposes, was not the same thing as living in a body that experienced physical pain, the consequences of real-world relationships and real mortality. And having a truly split personality (such as that suggested by the "MIT sociologist of cyberspace", Sherry TURKLE, 1995, cited in WERTHEIM, 1999) would, in the end, be most likely to be dysfunctional and reduce rather than expand one's options. [32]

More significantly for the purposes of my argument, she also drew the reader's attention to some of the futuristic writing involving computers, in which it was envisaged that human beings would eventually transcend the material world, achieving a complete separation of mind and body, and in the process, possible consciousness even after death of the body. Describing the scenario proposed by a world-renowned robotics expert, Hans MORAVEC (from Carnegie Mellon), of downloading the brain into a computer, WERTHEIM (1999) explained, "Gradually, as your brain is destroyed, your 'real' self—that is, your mind—would be transformed into a digital construct" (p.264). WERTHEIM had previously written in *Pythagoras' Trousers* (WERTHEIM, 1997) about the inseparability, from earliest times, of the development of Western science and religion, with the abstractions created by science and mathematics being seen as transcending mere physical existence and therefore as evidence of the mind of God. In *The Pearly Gates of Cyberspace*, she interpreted what she was finding in cyber culture as evidence of a continued human longing for the transcendent, and a continuing belief in dualism, in the body and soul being separable.

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5 MUDs are role-playing Multiuser Domains, originally Multiuser Dungeons and Dragons.

"Once again, then, we see in the discourse about cyberspace a return to dualism, a return to a belief that man is a bipolar being consisting of a mortal material body and an immaterial 'essence' that is potentially immortal. This posited immortal self, this thing that can supposedly live on in the digital domain after our bodies die, this I dub the 'cyber-soul'." (WERTHEIM, 1999, p.268) [33]

By contrast, the point I want to make and have been arguing in this section is that the live body functioning within a particular environment is integral to the workings of the mind, of the intellect. Knowledge and understanding from the perspective I have argued for is practice within a biosocial system, with the body participating as an agent as well as a reagent. Knowledge not only depends on the workings of the body (e.g., conscious thinking processes, perceptions, emotions, intuitions, automatic associations, the "back of the mind" phenomenon, and acting automatically on tacit knowledge) but is diminished to the extent that it ignores information from any of these process systems. The following section looks at the implications of this perspective (of knowledge as practice within a biosocial system) for thesis-writing, and, in particular, for the representation of knowledge resulting from doctoral research from such an epistemological perspective. I will use my own Ph.D. experience to illustrate the point I wish to make. [34]

### **3. A Case Study of Biosocial System Analysis**

#### **3.1 An investigation of conceptual change**

In my Ph.D. research, I demonstrated the significant part played in the construction of my knowledge by my body, claiming in fact that the workings of my "mind" were in fact the workings of my particular body, much of it outside my awareness. In one sense, this was simply one "instance" (cf. BARTHES, 1977) of the surrounding culture, the coming together at one time and place of various cultural traditions. However, consistent with my argument above, my particular learning was also the result of what I'm comfortable with calling "the laws of nature", evidence of how human body-minds work in general and how mine worked in particular. [35]

I was researching the kinds of change involved in learning, initially by focusing on "conceptual change" in science students, but later broadening the focus to explore teacher change, and finally including learning in my own context as a research student. In the process, I came to the conclusion that in all but the most trivial cases, learning was a difficult process that involved issues of interpersonal relationships and identity as well as changes in deeply held beliefs, which might be resisted to some extent. Hence it involved the body-mind in much more than logical processing. It required conscious assent and effort as well as involving subconscious processes and the feelings which alerted us to them, in the ways described above. Consequently I argued for this in my thesis both directly and indirectly, the latter by explicitly presenting myself as the (personal) author of the thesis. [36]

### 3.2 Adapting the thesis genre to practice a new epistemology

This embodied view of knowledge, developed empirically during my Ph.D., was the one I wished to represent in my thesis. There were three main ways I wanted to present this view of knowledge.

- Firstly I saw it as a *finding* from my research (I found evidence of it both in my science education research and in my research on my own research process). This could be presented using a straightforward analytic process typical of academic writing and hence would be endorsed by most academic readers.
- Secondly, I saw it as part of my *methodology*, which I dubbed *ecobiosocial system analysis*. Rather than pretending that I used systematic logical processes only, I saw all the embodied processes referred to above as contributing to my knowledge (practice) in significant ways and wanted to acknowledge this *biosocial* system perspective (see footnote 3). Besides being a more accurate representation of the research process, not doing so would have undermined my research findings about the importance of the (personal and particular) body in learning. Including this approach to knowledge in my methodology, however, was somewhat problematic, given the apparently unsystematic and personal nature of the journal writing that provided most of the evidence. It included not only unstructured (or at least not consciously structured) reflections, but also letters, poems, and innumerable unconnected memos, with the only apparent order being a chronological one.
- Finally, given such a belief about knowledge, I wanted my thesis to *demonstrate or represent the process satisfactorily*, that is, I wanted to continue, in my writing, to practice research in a way which would be consistent with my ontological and epistemological beliefs. This included firstly the way my knowledge developed differently in my different discourse communities contemporaneously, and hence the way knowledge produced/practiced by a single individual could be discontinuous and at times, even incommensurable. (For example, I had included in one of my thesis chapters several papers written for different discourse communities which I found could not then be rendered in some neutral or common discourse for the thesis.) Secondly, it included the way knowledge could be represented as a dialogue between such texts rather than as a progression of a single argument (though of course I do not wish to imply that knowledge is *only* a dialogue between texts). It also included the way knowledge was produced by me with my particular history and body (with its particular memories, associations, relationships, physiology, biochemistry, affect, etc.) rather than emanating from an abstract and disembodied authority. (There were two narrative chapters, one a first person narrative [i.e., using "I"] and one in the third person [i.e., using "she" in place of "I".]) In terms of negatives, this meant *not* presenting an unbroken linear argument within a single paradigm, *not* having a "final" conclusion, *not* trying to communicate meaning through argument alone, and finally *definitely not* demonstrating "death of the Author". [37]

This demonstration of personal agency for a particular body-mind was problematic in a postmodern discourse environment. Even though two examiners recommended that the thesis be accepted without any changes, two readers with strong associations with poststructuralism, including the third examiner, expressed reservations which revolved around the notion of [author]ity in writing, one critic commenting that "there must be 'death of the Author'". It appeared that considering action at the level of the individual was problematic in a context where there has been a rejection of the individual as a significant unit of agency in favour of culture as the active agent. [38]

I would accept that we are socialised into particular practices including our language practice, which means holding particular beliefs and developing particular aspects of our identity. However, I would not accept that individuals/authors function as passive and malleable objects, with consciousness, personal agency, and decision-making merely being part of the "inscribed" body's resultant "performance". Such a view seems to make little allowance for the struggle involved in the practice of a particular individual author. Similarly, it overlooks the distinctiveness and creativity of authors who participate in the emergence of new meanings. It also fails to serve as an adequate model for learning (including learning from research) since it explains little about the underlying tacit processes teachers or supervisors might need to know about to engage students in the "thinking" processes generally required of them. These processes, as I have argued, require embodied mental activity involving emotions, feelings, intuitions, and associative thinking. [39]

To be consistent, my research methodology had to include such evidence and present it. In fact, in contrast to concerns about Author-ity, I had done my best to undermine my authority in the text in several ways. I had encouraged the reader to "choose [his or her] own adventure" through my chapters rather than expect to read them as a sequence. I had generally used a personal rather than an impersonal tone, but had written one chapter as a kind of sociological narrative in the third person. I had pointed out how my perspective was ever changing rather than moving towards a definitive version. And, finally, I had declined to provide an authoritative conclusion. I can only deduce that the use of the first person pronoun, "I", particularly when it was used in a way that implied a particular person as author rather than collective wisdom, implied for some readers that I saw myself as the Author-ity. And it was precisely this knowing-as-an-individual-body or knowing-as-practice which they objected to, using BARTHES's (1977) "Death of the Author" as their referent. [40]

The main point BARTHES (1977) seemed (to me) to be making in the book chapter entitled *The Death of the Author* was that critics were misguided in using the biography of the novelist to interpret meaning in a *novel*, and I would agree with this. However, he also implied that texts were only "instances" of cultural meanings being quoted—"Linguistically, the author is never more than the instance writing, just as I is never more than the instance saying I" (p.145). He also wrote that

"[W]riting is the destruction of every voice, of every point of origin. Writing is that neutral, composite, oblique space where our subject slips away, the negative where all identity is lost, starting with the very identity of the body writing." (p.142) [41]

This can be read as implying that writing is never more than a passive representation of culture—with the author as a *person* not being relevant in this process, which is seen as purely social, purely intellectual. As I have mentioned in footnote 2, it is telling that in other chapters of the same book, BARTHES (1977) shows his obvious distaste for any reference to the fleshly body, with its emotions, its particular voice, its expressivity (which he could not abide, even in drama). [42]

By contrast, an ecological or biosocial system perspective (cf. DAMASIO, 1994; HANRAHAN, 1999; LEMKE, 1995; MATURANA & VARELA, 1992) would imply that writing is a dynamic interaction between a human being and culture, and as such would require a particular body to initiate and carry it through in a meaningful and thought-ful way, particularly for a sustained work such as a doctoral thesis. Consequently, I would challenge the assumption that the use of the personal and particular "I" in the thesis was an improper move in the presentation of the knowledge resulting from my research. In fact, in being a claim to a particular (well-informed but nevertheless personal) perspective, it was a way of demonstrating that knowledge exists only in relation to practice and is not an objective entity to be represented as purely intellectual. [43]

#### 4. Conclusion

This article is written from the point of view of someone who inhabits a world somewhere between post-structuralism and neuroscience, between social constructivism and individual psychology, between sociological theory and the medical model, someone who finds herself unable to deny the advantages of either perspective in each of the pairs. While I acknowledge our dependence on language and culture for higher order meaning-making, I want to claim that that such meaning-making is in turn dependent on the physiology and biochemistry of the human body which has, in its turn, developed in accordance with the parameters of its environment, both genotypically and phenotypically. [44]

I have been arguing that in Western culture there is a strong tradition of dualism, insisting on a clear separation of the body and mind, and that this way of thinking has persisted and is manifest in university culture even when it believes itself to be post-materialist and post-humanist. Even though explicit reference to religion, Heaven or spirits, is largely taboo in such a space, the idealist side of such dualism manifests itself in a desire to remove all evidence of influence of the physical body on products of the mind, so that transcendence can be achieved through the pure means of disembodied language. This seems to be true even for paradigms that problematise such dualisms as the "mind-body" binary where writing seems still to be based on a mediaeval belief in the body as "lower" and needing to be suppressed or removed to achieve "higher" thought. [45]

I have argued that, given what has been presented in research and writing in neuroscience, cognitive science, sociolinguistics and biosocial system theories, it makes more sense to see the body and mind as a single inseparable unit, with neither effectively existing apart from the other. To be consistent with such a view, I believe that research methodology should embrace rather than rule out the personal. Seen in this light, the personal author is evidence of the contextualised nature of knowledge, a sign that research knowledge is human practice within a system that is both sociocultural and biophysical, rather than something that can exist above and beyond such systems, in a pure abstract form. I believe researchers who wish to promote awareness of such a perspective need to refuse a clear separation between the personal and the social, between the body and the mind, and even to acknowledge automatic psychophysiological processes as part of their methodology and to reflect this in their writing about research. [46]

My concern is that too great an emphasis on the cultural constructedness of meaning and performance—at the expense of the contribution of the internal body systems—may limit research and writing in the social sciences, including education. It may deny the possible significance of individual consciousness and activity that are the result of physiological functioning, or the significance of interpersonal interactions that may operate outside awareness and outside language. Seeking greater awareness of the system as a whole can only enhance our ability as social science researchers to tackle complex human problems and find creative solutions that take into account both the material and social parameters of human existence. While a poststructural or constructivist perspective may empower many by denying the "naturalness" of much of human behaviour and language, it may disempower others by refusing to recognise what may, in fact, have a physiological basis. It may discourage the implementation of theories of human learning and development that would enable teachers across the curriculum to engage their students' tacit knowledge and creativity along with logico-deductive processes to create rich learning experiences for all their students in all areas of the curriculum. [47]

In contrast to KNIGHT (1995, p.33) who believed there was reason to fear the outcomes of "a new synthesis of biology, psychology, sociology", I welcome it. I believe that a more comprehensive recognition of what it means to be human may empower the communities of learning in which "new humanist critiques" may flourish. Theory which includes neuroscience, ecology and sociology need not support a new posthuman, "totalizing framework", as he fears. I am more optimistic than he appears to be about the possible answers to the question he poses:

"The question is, not whether schooling will change, but what forms that change will take, what ethical considerations underwrite it, what constructions of humanness are disabled and enabled, what values are affirmed or denied." (p.32) [48]

The "new and effective technology of behaviour, a posthuman constructing" (KNIGHT, 1995, p.33) he envisages would seem to me to be much more likely to result from the vestiges of dualist enlightenment beliefs—that disembodied

intellects should rule human affairs—than from a system of beliefs that integrates body and soul, intuition and reason, arts and sciences, and which recognises both human dignity and the importance of larger systems. [49]

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