

The Resonating World of the Regional Mind+Brain

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Abstract

The 2008 Bradley Review of Higher Education in Australia painted a disconcerting picture for tertiary-level learning and teaching in our country's regional and remote areas. This diagnosis is in line with a range of other predictions for these same jurisdictions, regardless of whether they range over environmental, social, cultural, economic, governmental or Indigenous rationales. Clearly, across a range of criteria the situation is not good in Australia's backblocks. Rather than employing the usual coterie of analyses (sociological, political, cultural or economic, for instance) might it be helpful to posit an alternative model for delineating regional knowledge, that is, a psycho-physiological approach? In particular, a cognitive model that Susan Leigh Star refers to as "regions of the mind" could be chosen. Might learning and teaching itself find it useful to pay closer attention to this widespread understanding of the brain's workings? The university is after all an institution that *trains brains*, which alerts us to another important issue in cognitive science: brain plasticity. Herein, brain regionalism and plasticity have more than a passing *resonance* with a geographically arraigned regionalism.

Recognising that a primarily socio-economic or a governmental/structural solution to these problems is nowhere near enough, "The Resonating World of the Regional Mind+Brain" draws together these two divergent threads as a possible linking together of the regionality of cognition with its geographic namesake. It is through this umbilical linkage that a renewed prognosis of learning and teaching regionally might be conceived. This is a possible model for the rejuvenation of learning and teaching that centres on the ancient and universal notions of thought, memory and embeddedness, not as singular and separate individual occurrences but as a holistic and always resonating manifestation of collective knowledge, now largely conceived, produced, distributed and interpreted electronically.

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So a man's genitals are naturally disobedient and self-willed, like a creature that will not listen to reason, and will do anything in their mad lust for possession. Much the same is true of the matrix or womb in women, which is a living creature within them which longs to bear children.

Plato (1973, [91], 122–123)

“Irrationally” Regional

In the Australian vernacular idiom it is sometimes said, mostly by women, that “men think with their dicks.” There does not seem to be an equivalent expression used by men, that is, “women think with their pussies”, or more politely, “think with their wombs.” As the above citation from Plato's *Timaeus* suggests, though, the idea that human genitalia is a region of “irrational thought” has a long pedigree in Western culture. As much as we might argue against such a notion (or politely ignore it), Plato is inevitably right to suggest that both male and female genitalia are bodily regions through which “thought”, both rational and irrational, or an admixture of both and more besides, proceeds. Furthermore, it is important to remember that copulation (the coming together of these two sites of genital “irrationality”) is sometimes considered an instance of the animal within. This is sex understood as the lowest common denominator of human thought, feeling and action.

The sexualisation of knowledge leads us to the idea that “lower” animals do not have the elevated forms of rational thought to which *Homo sapiens* have access. It might just be this refusal of rational thought and action to the genital region of the human body and its supposed total absence in the animal that provoked George Bataille (1992, p. 20) to write: “Nothing, as matter of fact, is more closed to us than this animal life from which we are descended.” It is this idea that there is a “penis instinct”, or a “vagina instinct” in the production of both rational and irrational, conscious and unconscious knowledge that, in part, inspired the whole psychoanalytic project, and even more broadly, the “psy-disciplines” (Rose, 1998). The collective project of the “psy-disciplines” has not only examined the human subject from this sexual/ancestral perspective but has also produced an overarching understanding of the “power of personhood” as each differing subjective instance is examined in the situated complexity of its own embedded actuality.

Through a differing lens, and possibly because of this close relationship between sex and knowledge, John Berger (1984, p. 41) places “the sexual animal” in a wholly “impersonal”, almost a transcendent realm:

The sexual animal — like a grain of corn — is a conduit of the past into the future. The scale of that span over millennia, and the distance covered by that temporal short circuit which is fertilization, are such that sexuality — even for women and men — is impersonal. The message dwarfs the messenger. The impersonal force of sexuality opposes the impersonal passing of time and is antithetical to it.

If thinking and acting through our genitalia is a means of succumbing to and/or celebrating the feared animal within, possibly even giving it free rein, or that we *Homo sapiens* are deluded by our supposed sovereignty and that in reality are merely genetic messengers of the past, it is imperative to remember that under all the above conditions (and more) even sweet reason is just another manifestation of “... thought [that] is necessarily an addiction from which we never get free” (Readings 1996, p. 128). Among its many attributes, reason is a deeply relativistic logical operation as well as a conjurer of singularly absolute obsessions. As we proceed through the following thought experiment, it is important to keep in mind

that both rational *and* irrational, conscious *and* unconscious knowledge are all intermediated by the whole physical and mental body, or more pertinently, the wide-ranging corpus of its various regions, not merely the genitalia or brain regions per se.

Equally pertinent to this opening salvo is the widespread use of the term “balkanise”, meaning “to divide into small states hostile to one another” (*Macquarie Dictionary*, 2010). In stereotypical discussions of all things regional, the epithet balkanise is another version of this irrationalising tactic, this time directed at geographic regions and their sometimes ethnic, religious or linguistic insularity, or their occasionally dogmatic insistence on being nations. As Slavoj Žižek (1997, p. 38) reminds us this branding of the Balkans’ propensity for “irrational” violence is a projection: “the Balkans [is a] timeless space onto which the West projects its phantasmatic content.” Subsequently, almost any branding of irrationality is a mask for its accuser’s own hyper-rationality, a momentary delusion, or even a perpetually inscribed neurosis. It is this exclusive characterisation of regions, of either the geographic and sometimes even of the cognitive/corporeal kind, as sites of irrationality that continues to limit our capacity to materialise a sense of regionality: that is, to think, feel, act, even learn and teach through a regional/global mien, rather than the now more limited, some may say obsolete, national framework (on this point, see “The Decline of the Nation-State”, *Readings*, 1996, pp. 44–53). This latter national limitation is also one that self-evidently afflicts the Bradley Report (2008) on the state of higher education in early 21st century Australia, a closer critique of which is forthcoming.

Plastic Knowledge

If this animal sensuality and irrationality as thought and acted out by humans in local/regional contexts has an epistemological component (and is therefore critical to any pedagogical understanding) it is also in congruence with Robyn Barnacle’s (2009) point that the body’s “gut instinct” is another of those bodily regions through which learning and teaching might be intermediated. Also, given the rise of mobile telephony, small gaming consoles like Nintendo and personal digital assistants (PDAs), there is also a debate to be had that elevates the opposing thumb and finger as another possible regional focus in the production of electronic knowledge. This idea of the opposing thumb and finger is a point that André Leroi-Gourhan (1993, pp. 24–60) traces the long evolutionary trajectory of in a section of *Gesture and Speech* entitled “Brain and Hand.” Perhaps the most sophisticated variation on this theme of the body’s regional specificity is Didier Anzieu’s (1989) *The Skin Ego*, where thought and thus the production of knowledge is mediated by the highly porous haptic sense. Invoking the skin in this way suggests a “haptic aesthetic” in knowledge-making (Fisher, 1997; also, see Marks, 2002, for a nuanced discussion on “touch” in electronic media). The ears and tongue, and the eyes have, naturally enough, always been considered important regions for the intermediation of knowledge in oral and literate cultures respectively. Another variation on this theme is the learning styles debate, one in which learners are categorised into a “head”, “hands” and “heart” means of pedagogical differentiation (Brown et al., 2005; Kolb & Kolb, 2005) and is an idea that arises out of the influential Bloom’s taxonomy. There is also some affinity here with Howard Gardner’s theory of “multiple intelligences” (Gardner, 2006).

In citing these various ideas about the pertinence of particular regions of the body and their various pedagogical particularities I have not yet explicitly mentioned the brain, the region par excellence vis-à-vis intelligence. Without in any way

dismissing the previous introductory overview as unimportant — every region of the body has a significant and variably intermediating role to play in electronically configured, open structured and multimodal forms of knowledge — the heart of the present investigation is the possible relationship between the “regions of the mind” idea (Star, 1989, p.) and a geographical understanding of regions. This debate has been given extra bounce by the now widely accepted process of brain plasticity, which François Ansermet and Pierre Magistretti (2007, p. 10) say, “entails moving on to a new paradigm and enables us to effect a scientific revolution in the Kuhnian sense.” In the terms set by Thomas Kuhn’s well-known thesis, brain plasticity is a high order paradigm shift.

It now seems apparent there is a First Law of Neurobiology: “Neurons that fire together wire together” (Edelman & Tononi, quoted in the frontispiece of Connolly 2002), a maxim repeated in nearly every work on the subject. The emergence of brain plasticity may well prove that our cognitive capacity is indeed musculature in the sense that the more mental exercise the neural network gets the more robust and adaptively capable it becomes over the course of our lives. It matters less that these psycho-neurological, adaptively plastic capabilities are largely lost at death: a vast, even if a still largely incomplete record is left behind in a variety of traces, traces that are now primarily electronic in character and structure. During the life-course, though, cognitive plasticity and local/regional embeddedness appear to go hand-in-hand:

Plasticity entails the obvious fact that, through the sum of lived experiences, each individual is seen to be unique and unpredictable beyond the determinations of his genetic background. The universal laws defined by neurobiology thus inevitably end in the production of the unique. (Ansermet & Magistretti, 2007, p. 6)

Every person’s individual experiential circumstances, in all their multitudinous complexity, constitute the possibility of their cognitive plasticity, a point that applies not simply to personal experience but also to our educational experience. Now it is even widely recognised that the newly born human infant is “far from being a freely instructable *tabula rasa*”, there is “an immense knowledge base about the properties of the world” embedded in their “genetically determined functional architecture” (Singer 2007, pp. 99–100, original italics). There is a discernable degree of suppleness in the brain that continues across and through the life-course that does not simply stop at puberty. While adding further weight to David A. Kolb’s (1984) already influential notion of “experiential learning”, cognitive plasticity must then be understood as the primary setting for recording, physiologically and psychologically, this self-same and always motile subjective experience of life’s embedded actuality. It is unquestionably at the local/regional scale that this life-experience is most profoundly inculcated in humans; this is the scale where each and every one of us comes into the most intimate contact with the embedded reality of the world while simultaneously providing the primary mental data through which we re/create both our individual and possibly even our collective understanding of that world.

Please Explain the Word “Region”?

Before exploring the “regions of the mind” debate and its relation to a geographical understanding of regions, though, it is essential to once again remind ourselves of the evolutionary meaning of the word “region” and how it is understood linguistically in historical and geographical debates rather than simply neurological ones. If “thought is necessarily an addiction from which we never get free” (Readings, 1996, p. 128), we are also never entirely free of the past uses and

meanings of any given word that feed our thoughts mostly because, as Robert Pogue Harrison (2003, p. 72) says, “Regardless of our dialect, we speak with the words of the dead.” The word “region” is instructive in this sense. Etymology is the discipline that bequeaths us this understanding of the historical and sometimes even the spatial development of words. In Raymond Williams’ *Keywords* (1983, p. 264) there is a useful etymological analysis of the word region, whose arrival in English in the early 14th century from the Latin word “regionem – direction, boundary, district” and “regere – to direct or to rule” identifies an important linguistic framing of the term that remains pertinent to this day: “There is an evident tension within the word, as between a distinct area and a definite part. Each sense has survived, but it is the latter which carries an important history. Everything depends, in the latter sense, on the term of relation: a part of what?” The etymological inheritance of the word region as a “distinct area” though remains significant given that sovereignty-producing borders are still a relatively fixed phenomenon, not only for legal, but also for migratory, ownership and control reasons. For Michel Foucault (1980, 68, original italics), the “*Region* is a fiscal, administrative, military notion.” As Williams implies, though, the term “region”, both in the evolutionary form of its meaning and in practice, has a long history of “relationality” about it: it can be both “a distinct area and a definite part”, a point that doesn’t discount its “fiscal, administrative or military” meaning but enhances all the above distinctions and more.

Marie-Claude Smouts (1998, p. 30) provides a lingering etymological back-beat to this relational rendering: “It is a characteristic of the region to have neither a definition nor an outline. The empirical criteria which allow the socio-economic entity to be recognised as sufficiently homogeneous and distinct, are vague and mixed.” This relative ambiguity at the heart of the word “region” also materialises in economic structures, an idea very much underscored by Neil Smith’s (1993, p. 109) comment that,

Much as it is internally constructed, the social economy of the region is also fashioned in the swirl of national and international economic processes, events and developments; and in so far as regions specialize in specific types and conditions of production, making commodities or selling services for a wider market, regional borders are highly porous and changeable.

As a category form then (be it a linguistic, bio-natural, political, economic, social, cultural, psychological, and maybe even a neurological differentiation), the region as idea and actuality is neither a precursor to, nor does it inherit in any deterministic way, the baggage of sovereignty and selfhood that has so characterised literate/national attachments to space and mind+brain operations. Rather than being in-bred and parochial, knowledge-making in a regional framework is constituted in and mediated through what Allen J. Scott (1998, p. 152) calls a global polity characterised by “a mosaic of regions”, a systemic (but hardly systematic) arrangement of semi-autonomous but always intermediating geo-political spatial arrangements. Globalisation is enveloped here in a wide range of variously scaleable regionating structures manifested through domestic, local, sub-national, national, supra-national, continental and even oceanic formations. This post Bretton Woods global/regional geo-political orientation of the current world order (Storper & Scott, 1995) is one where the more virtualised forms of instantaneous electronic communication are augmented in reality by easy access (at least for particular portions of the population) to a network of jet travel entraining the planet. Transformations in the geo-political world order are often accompanied by transformations in both transport and communicative infrastructure. There can be little doubt we are in the middle of just such a long-term conceptual and material political/structural transformation at the current juncture.

This posited relationship between the twinned ideas of the region as it is understood in a political, historical and geographical sense and how it is configured in a neurological sense might seem to be an entirely arbitrary one but the human head and the image of the planet have long had an analogous relationship. Plato makes a direct comparison between the head and the cosmos in the *Timaeus*. The obvious analogical relationship between the bicameral parliament in national politics and the bicameral, left/right hemispherical splitting of the mind+brain is an obvious example of the above point in political theory. (Ironically, while the left/right split in political discourse actually has an inverse relationship to left brain/right brain characteristics, it is highly probable that this dualistic hemispherical splitting of the brain is also the source of the increasingly discredited idea of binary oppositions which has produced the now familiar enough trope: “There are two sides to every story”). Also, we often think of a particular frame of mind or an ideology as a “world view.” Both the “global mosaic of regions” and the “regions of the mind” debates suggest we are evolving away from understanding the world in a left/right, either/or fashion, both cognitively and politically. These transformations suggest a more dynamic, multi-perspectival, spatially configured view of the world that is, variously and simultaneously, egocentric *and* allocentric.

Cybernetic-Style Cognition

It is with the arrival of cybernetic knowledge (and its principal technology of the computer) that the brain-and-analogous-regional-world juxtaposition moves beyond a speculatively interesting idea. Although the brain-as-computer metaphor is often called into question (Penrose, 1998; Searle, 1983), this does not mean that cybernetics is not a fruitful way to think about how the mind+brain and geographic region ideas are intermediated. In this vein, Brian Massumi (2002, p. 34), puts an illuminating cybernetic spin on this ambiguous b/ordering of regional space, one that could be at once political *and/or* historical, geographical *and/or* neurological, fixed *and/or* malleable:

A germinal or “implicit” form cannot be understood as a shape or structure. It is more a bundle of potential functions localized, as a differentiated region, within a larger field of potential. In each region a shape or structure begins to form, but no sooner dissolves as its region shifts in relation to the others with which it is in tension. There is a kind of bubbling of structuration in a turbulent soup of regions of swirling potential. The regions are separated from each other by dynamic thresholds rather than by boundaries.

Undoubtedly, Massumi is channelling Deleuze and Guattari but this ambiguousness vis-à-vis a region’s dominion and/or legal and/or constitutional and/or military and/or neurological and/or spatial and/or disciplinary status is both a positive and a negative given that the sometimes bloody history of demarcation associated with bordering and sovereignty in the nation-state has become so ingrained as to be naturalised and up until recently largely unquestioned. As we slowly move away from the supposed sovereign stability of the nation-state form (for further discussions on this theme see Amin, Massey, & Thrift 2003; Cheah & Robbins 1998; Hudson & Brown 2004), it now seems the right moment to state more clearly the nucleated centre of this discussion: a planetary polity framed by the “global/regional mosaic”, or rather, a matrix-like geo-political global configuration, in conjunction with the “regions of the mind” debate, provide a useful dialogical mapping exercise, or thought experiment, that might help us better understand the way knowledge is produced and disseminated at the current moment. And because regional universities are already ideally *placed* in this global/regional geo-political matrix, a “cognitive mapping” exercise of this kind

might also help us to re-imagine our future beyond the narrow procedural and structural limitations of the Bradley Review (2008).

The Bradley Review is undoubtedly a key document in the Australian tertiary sector, one particularly pertinent to its pedagogical responsibilities. Its pragmatic orientation covers important issues like voucher systems, international students, the low socio-economic status of some Australian born students, tertiary education's relationship to vocational education and training (VET), public and private contributions to higher education, staff-student ratios, retention rates, accreditation, the quality audit process, governance arrangements, HECS fees and, among other things, the variously interlocking bureaucratic arrangements in which Australian tertiary education is cast. By definition, the Bradley Review successfully sets out to do what its generic specificity allows it to do, no more, no less. Its analysis of the information and communication technology (ICT) r/evolution, though, is limited at best. Unlike the interrelating insights between leadership and elearning found in Scott, Coates, and Anderson (2008), where the changing circumstances of higher education take centre stage on the crucial question of academic management and leadership, the Bradley Review is especially limited on discussion of the regional question; it accepts without apparent questioning its own internal contradiction that while acknowledging that regional issues are the most difficult the sector faces it devotes only a few pages to analysing them and proposing possible solutions. Clearly, a nationally defined agenda cannot even hope to cope with a regionally specific one.

Already one Bradley Report recommendation to encourage the national amalgamation of a number of regional universities has fallen off the radar with Charles Sturt University and Southern Cross University pulling out of initial discussions on the proposal. Furthermore, higher education policy analyst, Gavin Moodie, and others (Hare 2010; Moodie, 2010), have criticised the inadequate government response to the question of regional loadings, a special pot of money allocated to many regional universities to prop up a number of small, mostly unviable campuses they are responsible for. According to Moodie (2010), this regional loadings paper from the Department of Education, Employment and Workplace Relations “conflates the entire agenda around regional and rural provision to increasing enrolments”, ignoring crucial issues like “decentralisation” and “[e]conomic, social and cultural inputs” (Moodie, quoted in Hare, 2010, p. 3). After questioning whether regional universities have any substantive effect on local student participation, Moodie concludes by saying that, “In the end the level of support a nation commits to its regions and their campuses is a value judgment: how much does the nation want its educational, social and economic wellbeing determined by the big capital cities?” (Moodie, 2010, p. 38). The hyper-politicised empirical pragmatism of the Bradley Report (with its pseudo-scientific and apolitical appearance) neatly avoids making a case for these value judgments, particularly apparent on the issue of regional universities and decentralisation where a persuasive argument on the long-term sustainability of both city and country could easily be made by connecting with broader debates on overpopulated cities and underpopulated regions.

What is an important value judgment to argue for is that not only are regional universities but the entire higher education system in Australia (not to mention the health care system and almost every facet of national life to a greater or lesser degree) are caught up in the nation's dysfunctional and outdated federal system of governance, the latter a point forcefully advanced by A. J. Brown (2005) among others. By being commissioned in the first instance through a national and a

narrowly conceived empirical framework the Bradley Report is unable to tackle the deeper structural issues of federal/state governance that plague many of our educational problems. The issue of governance itself is a starting point for us here, followed by the deep structural changes wrought by the ICT r/evolution and the significant advances made by the cognitive sciences, all of which are now wrapped up in a cybernetic epistemology. Until a fuller acknowledgement that these multiple structural changes are having a substantive affect on higher learning there is little likelihood of the government and the sector agreeing let alone acting on an adequate response. This thought experiment (or cognitive mapping exercise) is designed to address just one aspect of these longer-term changes: delineating a possible relationship between geographic regions and brain regions in the hope of developing a deeper understanding of both the cognitive and political/cultural/psychic possibilities inherent in the practice of elearning as the latter is entwined in this already mentioned global/regional geopolitical dynamic.

It is no coincidence that at the very heart of “cognitive mapping” is a spatial emphasis, a quality it shares with many electronic techniques especially computer gaming (Aarseth, 2001; McClurg & Chaillé, 1987); and it is an idea that helps us to juxtapose geographic regions with brain regions. Articulated in the work of Kevin Lynch (1960) in *The Image of the City*, but also harking back to Edward C. Tolman’s (1948) work on “Cognitive Maps in Rats and Men”, cognitive mapping arises out of our “sense of the whole” and allows us to “build an image” of our multidimensional environment from the “paths”, “edges”, “districts”, “nodes” and “landmarks” (Lynch, 1960), indeed a shifting matrix of forms, ideas and structures that are both singularly embedded in particular locations and form a component of that “sense of the whole.” Frederic Jameson (1988, p, 353) up-scales this idea to the global arena by saying, “the mental map of city space explored by Lynch can be extrapolated to that mental map of the social and global totality we all carry around in our heads in variously garbled forms.” Here it is useful to invoke the other meaning of “global”, and that is of the totality of a situation or object: the totality of the self-same human (the egocentric view) is now very much infused by our particular place in the totality of our planetary habitat (the allocentric view). With the advent of globalisation, every self is now well and truly mapped to both its immediate local/regional context and to its planetary habitat.

It is now but a short step to locating cognitive mapping within a cybernetic conception of electronic pedagogy, or as Gregory Ulmer (2003) calls it “electracy.” In *Understanding and Learning Virtual Spaces*, Patrick Péruch and colleagues (2000, p. 108) write that,

... cognitive mapping refers to the process of forming internal spatial representations of the environment that can be subsequently and flexibly used in navigating and in communicating with others, as opposed to the more rigid representations that make up pure route knowledge.

“Route knowledge” is more akin to the serial form that knowledge takes in both literate forms and alphabetic consciousness while cognitive mapping is more appropriate to the already mentioned spatial propensity of electronic forms of knowledge. The more mosaic-like structure of the “the resonating world of the regional mind+brain”, constituted in and through the act of cognitive mapping, is a better fit for the computationally mediated parallel epistemologies of high-speed electrated knowledge, being applicable to both real and virtual worlds and their intermediation. Brian Rotman (2008, p. 83) provides a useful account of “the serial/parallel duo”, saying of it that

the opposition appears and reappears in many familiar places: music (melody versus harmony), symbolic forms (text versus image), arithmetic (ordinal

versus cardinal numbers), film editing (Eisenstein versus intercut montage), electrical circuits (series versus parallel), and, of particular interest here, serial as opposed to parallel computing.

This is not simply digitally configured cognitive augmentation as it is “socially constructed” by the “personal computer” (Jensen, 1993, p.) because the latter designation largely seems to be economically fixated rather than socially focussed, a means to sell more computers. Rather, our understanding of the dynamic nature of both this “regional world” and of “regional cognition” is on a scale not clearly understood before. As Péruch et al. (2000) reiterate throughout the course of their discussion, neuronal digital imaging tools like Event Related Potentials (ERPs), Magnetic Electroencephalography (MEG), Positron Emission Tomography (PET) and functional Magnetic Resonance Imagery (fMRI), particularly the latter, offer a technical means via which brain regions quite literally light up in the act of thinking, that is, of course, only when cognitive activity is being recorded by some electronic device. There is, then, in this connection a possible match between cognitive mapping as a technique of thinking and acting in the world and brain imaging as a digital informatic technology. Anne Beaulieu (2001, pp. 661–665) goes so far as to say that the depiction of voxels by brain imaging technologies posit a form of “digital objectivity” as a crucial attribute of e-science. Our computers might be social and personal, are even able to be personalised for economic reasons, but it now seems that the mind+brain can have its regionating capacities digitally “objectified” across its network like operations.

The Regional Mind+Brain

As both Barbara Tizard (1959) and Susan Leigh Star (1989) reiterate, the study of brain function has mostly oscillated between “localization theories, which hold that specific functions are controlled by specific parts of the brain, and field [or diffusionist] theories, which hold that the brain acts as a single functional unit,” and further, “that historically, a swing of the pendulum tends to occur between these two positions” (Tizard, 1959, p. 132). Combined, both positions are a classic example of the “either/or” mentality attendant to a great deal of scientific and humanities thought, especially of the literate variety. That both positions could operate together, or that brain function could operate otherwise, via some technological or somatic prosthesis for example, possibly even via some of the many highly variable accounts of synaesthesia (see Mulvenna, 2007, for one such account) does not seem to enter into the traditional “either/or” equation of the localization/diffusion debate. The learning brain is, after all, the very model of a complex system (Van Geert & Steenbeck, 2007); indeed, it could rightly be the model for the emergence of complexity theory itself, the latter a point Richard E. Lee (2003, pp. 197–200) analyses in connection with “the politics and transformation of the structures of knowledge” in a post-1968 world. If the brain is considered in light of complexity theory then a bottom-up functionality (equivalent to the “localization” view) and a top-down functionality (equivalent to the “field theory” view) are simultaneously, even if variably plausible. Further, the various regions of the brain might sometimes work simultaneously, sometimes autonomously, sometimes interactively, may be even antagonistically on the operational plane.

This limited conceptual framing of the “localization/field theory” dichotomy has a resonance with what John Agnew (1999, pp. 92–93) sees as the “realism versus constructionism” opposition that plagues discussion on the region in “contemporary geography”: “realists” argue that regions are “out there” in reality, while constructionists “regard all regions as mere inventions of an observer.” As

Agnew further observes of this oversimplification: “Human behavior [even human cognition?], therefore, cannot be reduced to one or the other but is constituted by both [and more besides?]. Regions both reflect differences in the world and ideas about differences.” Contra to Agnew’s essay title though – “Regions on the Mind Does Not Equal Regions of the Mind” – I am now able to say with a little more certainty (could it be a belief?) that there might actually be some associative correlation between the “regions of the mind” debate and Scott’s already mentioned “global mosaic of regions” debate, a connection both abstract and actual, one brought about by my own cognitive mapping exercise and itself a self-reflexive thought experiment. While the connection remains speculative, it is nonetheless a useful way to rethink the essence of elearning *and* eteaching at the current moment.

Even though Star (1989) entitles her work “regions of the mind” and labels the proponents of the relevant brain function movement as “localization theory”, there is no semantic distinction made between these two closely related terms. If we are to take both terms — “local” and “regional” — as they are used in the cognitive sciences to mean that the various parts of the brain are mainly autonomous in their function, the use of the latter term in this context remains imprecise if we keep in mind the earlier discussed etymology of the word “region.” Kevin Lynch’s (1976, p. 10) point that “Our senses are local, while our experience is regional” is worth keeping in mind when reflecting on this semantic distinction in brain function. In cognitive terms, our sensate capacities are limited to the immediate bodily context of our localised existence while our experiential capacities are brought into being by the regional context within which we operate on a day-to-day, week-by-week, even year-by-year basis. Both our senses and our experience contribute to the semantic content unique to each individual mind+brain combination, a point John Searle (1983, p. 32) uses to introduce his well known Chinese symbols “thought-experiment.” “The reason that no computer program can ever be a mind is simply that a computer program is only syntactical, and minds are more than syntactical. Minds are semantical, in the sense that they have more than a formal structure, they have a content.” As our neurons fire and wire together in response to our sensate and experiential life-course in a particular environment (Blakemore 1998) we are also in the perennial process of reprogramming the plastic capacity of the inherited biological entity that is our mind+brain, through acting in, reacting to, and being embedded in our phenomenal life-world. This is the cognitive intermediation of the nature/nurture connection, and in high-speed, always dynamic knowledge contexts, stable boundaries may be more hindrance than help. Of course, a particular environment can also include the various pedagogical contexts in which we operate and the kind of mental “realities” produced therein. Regardless of the worth, ambiguity and/or falsity of this connection between regions of the mind and the geographical understanding of regions, it is imperative that both educationalists and their associated policy makers incorporate an understanding of “neuroeducation” (on this topic see the essays collected in Battro et al. 2007) into their deliberations, something keenly lacking in the Bradley Report. Teaching and learning, then, have both a physiological *and* a psychological base that is highly malleable, an obvious point but one that is sometimes forgotten in the ideologically loaded debates over education.

Computer Augmented Associational Reasoning

In light of the earlier mentioned antagonism of both Roger Penrose and John Searle (and others) to the brain as computer model, there is ample scope to be sceptical about Ray Kurzweil's (1999, p. 105) claim that "... it is reasonable to estimate that a \$1,000 personal computer will match the computing speed and capacity of the human brain by around the year 2020 ...", and further that "Supercomputers will reach the 20 million billion calculations per second capacity of the human brain around 2010, a decade earlier than personal computers." Kurzweil's structural/functional interpretation ignores the epigenetic factors that each brain is heir to in its phenomenal life-course, and in a Lamarckian world-view these factors can be incorporated back into the physiology of the subsequent genome of any potential offspring. Kurzweil (1999, p. 92) does, however, recognise the brain as a complex intersection of regions; for instance, "the hippocampus, with capacities for storing memories of sensory experiences and events" and "the amygdala, with circuits for translating fear into a series of alarms to trigger other regions of the brain." It is the amygdala that is one region of the brain worth investigating further in this global/regional world intermediated by electronic communication, or electracry.

As Gregory Ulmer (1994, p. 36) sees it, in the shift from a literate mode of thought (with its "linear indexical" reasoning) to electronic logic (with its "network associational" reasoning) there is a more substantial cognitive emphasis on associational reasoning via "conduction" as the logical/cognitive interpolator (Ulmer, 1989, pp. 44–81). In the wake of the increasing importance of conductive logic in electronic realms, the mind+brain's vast storehouse of memories become the database on which the multitudinous elements of associational connection by conduction rest. This techno-cognitive shift might also help explain the rise of the database as a significant electronic form (Manovich, 2001, pp. 212–243). More pertinently, it is a widespread understanding in the neurosciences that the "amygdala complex ... is important for associative learning" (Gallagher, 2006, p. 311). Further, the amygdala is itself a small region in the more ancient limbic system of the brain and one that also intermediates our fear responses, among other autonomic functions. If there is a symbiotic connection between electracry and the amygdala's propensity for associative reasoning, then the "advances" made by electronic knowledge are also in a direct but nevertheless a "regressive" relationship to more ancient forms of cognitive engagement, allowing a possible return of the animal, at least in communicational terms. This progressive/regressive connection (which now stands as a testable hypothesis of this discussion), if true, is one that we should be aware of because it adds another layer of complexity to new media education both as a discipline and a medium, as well as reiterating electronic pedagogy's ability to cross a multitude of boundaries.

If, as John Searle (1983, p. 38) suggests, in the short term "Technological progress is always grossly exaggerated ..."; however, it is in the long term that its cognitive and thus pedagogical consequences are mostly underestimated. Both Marshall McLuhan (1962) and Walter Ong (1988) insisted that various forms of knowledge restructure consciousness over the long term. As meaning-making with a wide variety of electronic forms of knowledge continues to expand exponentially, variously incorporating, transforming and transcending oral and literate forms, might it be that there is also a long-term transformation going on both memorially (in content terms) and neurologically (in structural/functional terms) in our learning capacities? An affirmative response is the most likely answer. The infinite

juxtapositional complexity of associational reasoning rests on the brain's architectonics: a 100 billion each of neuronal and glial cells interconnected chemically and electrically by over 100 trillion synapses (Parnavelas, 1998). It is this unimaginable intermediating complexity that most likely propelled David Porush (1998, p. 46) to remark that,

The brain is intrinsically a sur-rational machine for bringing worlds into collision, a metaphor devise, a translation circuit for closing and opening the loop between incommensurate and mutually incomprehensible universes. In my view, it is already meta-physical.

As the mind+brain inside us intermediates what is out there with an internally located biological/feeling place in here, a self-reflexive disposition is the inevitable result. Rather than a subject/object relation there is, in this entwining of meta/physicality, an "I-I" relation (Ulmer, 2003, p. 57), my body entrained with my mind+brain continuously meets and interacts with the flow of data in a specific time and place. No matter where I am on the planet the various regions of my mind+brain work in conjunction with the actual region of my habitation *and* the global/regional geo-political matrix in and through which all these entities are infused.

As yet another instance of new media, brain imaging technology offers up a unique reversal: "In one sense, modern medicine has always tried to make the body legible; if Biblical hermeneutics recalls the incarnation of God's word in text, or the Word made flesh, then medical hermeneutics reverses this equation to give us the flesh made word" (Curtis, 2004, p. 223). This reversal entails less an examination of what is "out there" and more epistemological attention to what's "in here", particularly to the internal workings of the mind+brain, less so as "word", as Curtis says, but as a constantly shifting but synaesthetic amalgamation of graphic visualisation, auditory messages and textual information, or as Gunther Kress and Theo van Leeuwen (2001) call it "multimodality". Inevitably, these developments entail a closer examination of meta-learning (a self-reflexive "I-I" activity), in contrast to the more straightforward and largely assumed forms of content learning (a subject/object activity). The very essence of meta-learning is re/learning how to learn, that is, examining how it is that we learn under these transformed political/cultural arrangements with the knowledge provided by both the electronic and the cognitive r/evolutions.

The Electronic Resonance Machine

A highly significant feature of meta-learning in electronically mediated contexts is *resonance*. If the brain, like the Internet, is electrically charged then this capacity of both intra-cognitive and intra-global communication sets up a distinctive means of causality. Historically, linear causality is often associated with alphabetic forms of reason. Resonant forms of reasoning, though, have an unambiguous connection to nearly every instance of electronic knowledge, and this is a situation ably described in a political sense by William Connolly (2005, p. 870, original italics):

Rather, in politics diverse elements infiltrate into the others, metabolizing into a moving complex—Causation as resonance between elements that become fused together to a considerable degree. Here causality, as relations of dependence between separate factors, morphs into energized complexities of mutual imbrication and interinvolvement, in which heretofore unconnected or loosely associated elements fold, blend, emulsify and dissolve into each other, forging a qualitative assemblage resistant to classical models of explanation.

Certainly, from a both political and a communicative perspective Connolly seems to have a dim view of this “resonance machine” while only making an indirect connection to the potentialities of electronic knowledge. Even in Connolly’s (2002) earlier *Neuropolitics*, there seems to be no explicit connection or extended discussion on the relationship between electronic techniques and technologies per se and resonant causality. On the other hand, he advocates a kind of resonant political program carried on across a wide range of fronts to deal with this situation. Undoubtedly though, the term “resonance machine” could apply equally to the brain as to the communicative practices of the American polity that Connolly describes. (Although Connolly mainly references the American polity, there is a substantial application of this idea of resonant causality to the rest of the planet, especially in those areas where electronic knowledge proliferates.) Resonance, from both an associational logic point of view as well as being a significant attribute of electronic techniques and technologies (or “electracy”), compounds the seemingly illogical juxtaposition of an infinite array of elements from a wide range of sources and meanings. The resources available to resonant reasoning are the vast number of databases of “everything miscellaneous” (Weinberger, 2007) that are now on offer in an electro-energised global skein. This phalanx of digitised data now stands in an analogous relationship to the database we refer to as human memory, both of which provide the raw material for the continuously vibratory potential of resonant reasoning along with the multitudinous “rational” and “irrational” causal associations it foregrounds. It may not be any specific personal computer that will eventually match the human intellect but quite possibly the interconnection, via the Internet, of *all* the personal and super computers on the planet. In any event, causality as resonance, and inversely, resonant causality as a pre-eminent feature of electracy learning environments is likely to be increasingly pervasive and persuasive.

The World’s Brainiest T-Shirt

We know from Roland Barthes’ (1973) analysis of “the brain of Einstein” how easy it is to mythologise the cognitive realm of a “genius.” Indeed, the story of Einstein’s brain after his death (stored in a colleague’s office for a number of years then transported across America to eventually become an object of intense and ongoing scientific interest) might serve as a precursive indicator of just how “mythic” even the “ordinary” brain has now become after the Decade of the Brain in the 1990s. Not only is cognition regionally distributed within corporeal boundaries, the brain is now an electronically arbitrated and a globally distributed entity as much as a sovereign artefact existing inside our own heads (Clark, 2003; Rotman, 2008). The arrival of a digital, electronically mediated global/regional world order has contributed significantly to this state of affairs. It is to the Bradley Report’s detriment that there is hardly any substantive discussion of these cognitive, epistemological and geopolitical shifts and their influence on electronically mediated learning and teaching.

Equally important to the above-mentioned matrix of changes is the additive nature of the brain’s evolutionary capacities, a point André Leroi-Gourhan (1993, p. 402) explains as follows:

All psychomotor evolution since the first vertebrates has been achieved through the addition of new territories that did not eliminate the functional importance of the preceding ones but preserved their role, increasingly overlaid by higher functions.

This is the evolutionary overlaying and interplay between the hindbrain, midbrain and forebrain. The whole mind+brain, then, is synchronically and diachronically plastic, additive and adaptive, and for the learner (a tag that applies to all of us) this is simultaneously and differentially a neuro-physiological fact and part and parcel of our psychological experience of learning. A pedagogy that incorporates these twin-intersecting pillars provides for a more fully rounded understanding of “experiential learning” (Kolb, 1984). This holistic understanding of neural and psychic plasticity as a dynamic conception of human knowledge-making is a case put cogently in François Ansermet and Pierre Magistretti’s *Biology of Freedom* (2007), a text written by both a psychoanalyst and a neuroscientist. That we have made little headway in articulating this regionally dynamic take on our learning arrangements (synthesising both a geographic and neurological understanding) works against our knowledge-making potential.

It may now fall to an elegantly simple introductory text to convert sceptics to this transformed framework: *How the Brain Learns* (Souza, 2006) is an excellent beginning for those educators willing to dance the intermediating tango between the physiology and the psychology of learning. “The Resonating World of the Regional Mind+Brain”, then, is really just another prolegomena to such an understanding. This end is just the beginning of a much larger need to understand how learning and teaching regionally and globally via an electronic epistemology might be configured. It might also be a new dawning for regional universities to rethink their own regionality in light of these geo-political realignments (so obvious in the global education market) and the advances in human learning capacities brought about by developments in both the “psy-disciplines” and the neurosciences. There can be little doubt there is now a slow meltdown of the Berlin Wall that has separated these two disciplinary silos in the past. The endgame of this meltdown may be the point at which all manner of sovereign borders turn into permeable membranes, which would encourage the estimated 5000 “ethno-national groups” scattered across the globe to continue eating away at the legitimacy of the 200 or so bounded nation-states (Paasi, 2003, p. 467), a select group that humanity’s collective planetary polity is currently constrained by.

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