
Smoothness and Striation in Digital Learning Spaces

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ABSTRACT It is Deleuze & Guattari's description of smooth and striated cultural spaces (Deleuze & Guattari, 1988) which informs this exploration of pedagogical alternatives within the learning environments of cyberspace. Digital spaces work to constitute subject and text in ways which are distinct, and it is awareness of this distinctiveness which must inform our engagement with the internet as a space for learning and teaching. By using Deleuze & Guattari's conceptualisation of the smooth and the striated, the author works towards a way of understanding how a theorisation of internet 'topography' can inform pedagogical choice within online learning contexts. The author begins with a summary of the relation between the striated and the smooth as defined by Deleuze & Guattari, and moves on to consider how this distinction can be extended into the environments of cyberspace. She then explores how a pedagogical approach might be developed which attempts to inhabit 'smooth' internet spaces, and ends with a consideration of the virtual learning environment or 'e-learning system' which, in defining itself as a space of containment, regulation and efficient progression, functions as a strongly striating element within pedagogical web space.

The Striated and the Smooth

I locate my discussion of digital pedagogy within the terms provided by Deleuze & Guattari in their description of smooth and striated cultural spaces (Deleuze & Guattari, 1988). Smooth space is open space, what Deleuze & Guattari call 'nomadic', in opposition to the striated which is space of closure – 'sedentary', bordered 'State' space:

The space of nomad thought is qualitatively different from State space. Air against earth. State space is 'striated', or gridded. Movement in it is confined as by gravity to a horizontal plane, and limited by the order of that plane to preset paths between fixed and identifiable points. Nomad

space is 'smooth', or open-ended. One can rise up at any point and move to any other. Its mode of distribution is the *nomos*: arraying oneself in an open space (hold the street), as opposed to the *logos* of entrenching oneself in a closed space (hold the fort). (Massumi, 1988, p. xiii)

The certainty and stability of *logos* which inhabits striated space – the Word, law, the 'metaphysical signified', the 'word of the citadel, the fort, the court, the boss, the suits' – is opposed here to the wandering, metamorphosing *nomos*, the 'word of the street' (Mahoney, 2002). Where smooth space is informal and amorphous, striated space is formal and structured. Striated space is associated with arboreal, hierarchical thought, which Deleuze & Guattari oppose to rhizomatic thought – non-hierarchical, underground, multiply-connected.

Movement happens differently within each of these spaces. Smooth space is a space of becoming, of wandering (nomad space), where the movement is more important than the arrival. In striated space, what is most important is arrival at the point towards which one is oriented: 'In striated space, lines or trajectories tend to be subordinated to points: one goes from one point to another. In the smooth, it is the opposite: the points are subordinated to the trajectory' (Deleuze & Guattari, 1988, p. 478).

The technological model Deleuze & Guattari provide as illustrative of these two types of space is one of textiles. Here, woven fabric is necessarily a striated space, with its gridlike form consisting of intersecting warp and weft. It is a space of closure: 'the fabric can be infinite in length but not in width, which is determined by the frame of the warp; the necessity of a back and forth motion implies a closed space' (p. 475). It bears within itself a hierarchy, a top and a bottom. By comparison, felt (the fabric of the nomads) is an 'anti-fabric' representing smooth space, 'it is in principle infinite, open, and unlimited in every direction; it has neither top nor bottom nor center; it does not assign fixed and mobile elements but rather distributes a continuous variation' (pp. 475-476).

Within the musical model, the striating functions of warp and weft are replaced by harmony and melody, and while the desert, steppe, or ice (unpossessed, metamorphosing, open) are representative of smooth spaces, the sea is 'smooth space par excellence', subject to striation within the maritime model by the principles of navigation – meridians and parallels, longitude and latitude. If the sea is the ultimate figure of smooth space, the extreme of striation is the city (p. 481).

What is important about this conceptualisation of space is not so much the way the two types of space are opposed to each other as their tendency to *pervade* each other – for striation to appropriate the smooth, and for the smooth to emerge from the striated (p. 500). In the following sections I consider internet learning spaces as arenas in which smoothness and striation interact. If I talk of the web as a space where the smooth has a tendency to emerge and be nurtured, it is not with the view that such space is necessarily freer or truer, but that it is a location where *things are different*. Such difference is as likely to make the task of online learners and teachers more problematic, or problematic in

unfamiliar ways, as it is to offer the welcoming possibility of freedom from logocentric constraint. Thus the closing passage of Deleuze & Guattari's essay offers the key point:

Of course, smooth spaces are not in themselves liberatory. But the struggle is changed or displaced in them, and life reconstitutes its stakes, confronts new obstacles, invents new paces, switches adversaries. Never believe that a smooth space will suffice to save us. (p. 500)

Cyberspace: smooth or striated?

According to Herman & Sloop there was, in the early days of the internet, a tendency among theorists to take a utopic view in which cyberspace is seen as 'a 'smooth' space of interstitial nomadic movement and fluid subjectivity, in contrast to the 'striated' space of logocentric constraint and embodied stability of the so-called 'meatscape' reality on this side of the screen' (Herman & Sloop, 2000b, p. 81).

Later theorists are more circumspect. Nunes, for example, identifies two articulations of cyberspace – one striated, one smooth – as expressed in the two popular metaphors, 'surfing the net' and (the even now archaic) 'cruising the information superhighway'. The 'topographies' revealed by these metaphors are very different. The former suggests one that is 'fluid, plan-oriented, and unbounded', while the latter is 'linear, point-oriented, and Cartesian' (Nunes, 1999, p. 62).

Nunes makes the point that such metaphors do not simply describe cyberspace – as topographies they function as 'performative speech acts that simultaneously map and create a territory' (Miller, 1995, quoted in Nunes, 1999, p. 61). Thus, 'a striated 'highway' topography determines cyberspace as a system of regulated connections between determined points on dedicated lines; conversely, a smooth 'plane' topography writes a cyberspace of fluid transit and continual passage' (Nunes, 1999, p. 61). The metaphors we use in our conception of internet spaces are more important to us as users than the material configuration of the network.

For Nunes, striated cyberspace is that which functions instrumentally, organising functionality into productive modes which have an efficiency beyond that of 'real space' (p. 63). The primary example he uses is the MOO – the virtual-textual collaboratively produced online 'world' – though he also sees email, telnet and ftp (file transfer protocol) as striating functionalities within cyberspace. Such applications open up a cyberspace of stable location and communication between fixed locii, where 'arrival' at a destination is followed by 'logging in' to a closed, delimited space (p. 70). Likewise, the online chatroom constructs an arboreal or hierarchical environment in which striated architectural space – 'the image of the walled-in city' – functions as a metaphor for our inhabitation of a system which, because it is closed, may also be regulated.

By contrast the web, for Nunes, works as a smooth space in which:

the 'unfolding' of each page onto another both creates and reveals a smooth topography. The interface encourages users to navigate this space primarily by way of drift: 'browsing' from link to link, rather than moving from destination to destination. (Nunes, 1999, p. 70)

These characteristics of movement within hypertextual space resonate with Deleuze & Guattari's description of movement within smooth space, '... a local integration moving from part to part and constituting smooth space in an infinite succession of linkages and changes in direction. It is an absolute that is one with becoming itself, with process. It is the absolute of passage' (Deleuze & Guattari, 1988, p. 494).

Though he might have mentioned that to 'navigate' a space is, for Deleuze & Guattari, to begin the process of striation, Nunes offers the image of the old Netscape ship-wheel as a representation of the possibility of smooth movement over a nomadic or oceanic cyberspace. (The admittedly evocative 'navigation' image of the old logo has now, oddly, been replaced by the confidently striding, spiky, serifed N which straddles the open landscape [desert, steppe?] like Shakespeare's colossus.)

Yet if it is possible to see the hypertextual environment of the web as a manifestation of smooth space, we might also see the very architecture of the network as inclining web space toward striation. This is the perspective taken by Rosenberg (Rosenberg, 1994), who contends that hypertext in both art and pedagogy, however liberatory the intentions of its creator-user, can only ever function to re-enact logocentrism in the sense that hypertext itself depends upon routinised, rule-driven systems.

Having designed a pedagogical hypertext tool – RHIZOME – with the at least partial aim of empowering students through enabling them to engage in new modes of critical thought, Rosenberg is left with the conviction that such strategies do no more than reinforce the logocentrism they attempt to subvert. Hypertext structures are in the end in support of the *logos* rather than the *nomos*. Inherently striated, they are 'always edifices, never autonomous zones; they are structures that do not allow for deterritorialization. No technologically mediated link can ever constitute a genuine line of flight' (Moulthrop, 1994, p. 310). The network depends on centralised structures of control in order for it to function (Myers, 1995).

The web – nomadic, open, rhizomatic for some – is cast here as a closed and hierarchical space of striation, destined by its very structure to undermine any attempt to use its spaces for anti-logocentric thought. I would hold that there is a determinism at work in both views which goes against Deleuze & Guattari's original conceptualisation. The web is, like the printed book, neither inherently striated nor inherently smooth, and even if it *were* an open steppe of pure smoothness, that would not make it inherently liberatory.

What is most powerful in the description given by Deleuze & Guattari is not the opposition of the two terms but the ways in which they describe the two spaces as appropriating and emerging from one another. Thus I would hold that the discussion about the striated nature of the network is of limited

relevance. Even if web architecture is pure striation, this does anything but place a limit on the possibility of smooth space emerging from within it. There are elements in the way we use and conceive of the web which construct it as smooth space. This smoothness consists in its openness, its instability and tendency to metamorphosis, its resistance to regulation, its governing logic of access rather than possession, the unknowability inherent to its vastness, its un-mappability, and the tendency to engage with it as a space of surfaces, to skim and glide over it, for our reading of it to be a question of our movement over its spaces with the sense that, wherever we choose to pause, arrival at a final destination is always postponed. At the same time, however, there are strongly striating elements within the web, of which the virtual learning environment – discussed below – is one example.

Before examining the virtual learning environment, however, I would like to consider the possibility of pedagogy which, working with the fluidity and openness of the medium, attempts to position itself within a digital space which might be described as ‘smooth’.

Pedagogies for Smooth Internet Spaces

What would characterise an approach to teaching which attempted to engage with a ‘smooth’ cyberspace? Such an approach would perhaps attempt to work with the capacity of internet spaces to reconstitute both text and subject, conceiving of the academic task as something which is altered by its association with digital media, and attempting to use digital space as an arena in which pedagogies alternative to those defined by print and face to face norms may be created. It might also engage in an anti-logocentric stance, and at least nod toward the possibility of a shift, through digital mediation, in the traditional balance of power embedded in the teacher-student hierarchy. I offer here two examples of pedagogical approach which might be described in such terms. I suggest that they offer – in rather different ways – glimpses of how teachers might begin to approach ‘smooth’ digital space for the purposes of education; they also provide a counterpoint to the description of the striation of web space by the ‘e-learning system’ which follows.

For Greg Ulmer at the University of Florida (Ulmer, 1989, 1994, 2003a), linkage, collage and juxtaposition are key strategies in the project of engagement with the internet as a ‘medium of learning [that] puts us in a new relation to writing’ (Ulmer, 2003a, p.1). Digital space demands that we confront the possibility of a new type of literacy, a relation to the symbolic representation of knowledge which Ulmer calls ‘electracy’. Ulmer’s work, strongly influenced by poststructuralist theory, emerges from an earlier concern with the modes of thought enabled through the analogue video form. The focus of his most recent text, *Internet Invention: from literacy to electracy* (Ulmer, 2003a), however, is on the forging of a new writing pedagogy which works with the specificities of digital media. It is a complex approach which

attempts to provide an alternative to the forms of rationality associated with print literacy.

While his work is primarily within the disciplinary areas of film, composition studies and the teaching of hypermedia, Ulmer stresses that his pedagogical approach, with its novel positioning of the personal towards the public, can be applied across multiple subject areas. It is no less than an exploration of how we, as learners and teachers, might use internet spaces to work towards a new social and epistemological formation which belongs to the digital age.

For Ulmer, the analytic, logically developing, linear model of the research paper and print essay has an uneasy relationship to the digital, much as the medieval practice of dictation made little sense pedagogically after the invention of print. His approach represents an attempt to foster a new, non-instrumental mode of reasoning particular to our inhabitation of cyberspace, a mode which Ulmer calls 'image reasoning'. It involves a shift of focus from text to image, from the objective to the expressive, from empiricism to aestheticism, and from analysis to affect – 'if literacy focused on universally valid methodologies of knowledge, electracy focuses on the individual state of mind within which knowing takes place' (Ulmer, 2003b).

Ulmer's stated pedagogical principles and goals seem at first glance quite conventional – to foster active learning, collaborative learning and independent learning within a context of problem based learning (Ulmer, 2003b). It is only on further investigation that his approach, as one reviewer put it, 'all seems, well, radical' (Dickson, 2003). The problem Ulmer poses to his students is the issue of their own identity and its modes of formation. The reason for this focus appears to be partly metaphorical – 'the problem of one's own identity is a simulacrum of the unknowns of any field of knowledge' – and partly pedagogical – 'it is difficult to remain indifferent or disengaged when the heart of the inquiry is a vision of one's own being' (Ulmer, 2003b).

Working from the assumption that identity is constituted via a series of dominant discourses and ideological interpellations, Ulmer asks students to explore four discourses/institutions which work to entrench us within particular subject positions – family, entertainment, career and history-community. This exploration takes the form of a 'mystory', a neologism coined by Ulmer after history and herstory. Mystory takes the form of a short series of web pages in which students make hypertextual compositions consisting of combinations of personal narrative, exposition, theoretical and literary fragments and – most importantly perhaps – image and linkage. Each mystory represents a personal attempt on the part of the student to record the factors organising their experience of the world through a form of self-portrait.

For Ulmer, the mystory represents a digital alternative to the print essay or research paper. He likens the act of composing online to that of curating an exhibition, in which largely 'readymade' or pre-existing elements are arranged together through an intellectual act which consists less in exposition or argumentation than in the appropriate and meaningful use of linkage and

collage. The internet, particularly the web, operates as a kind of digital beach upon which the student gathers the flotsam and jetsam – the image and text fragments – which they need to organise this vision of the self.

In composing the mystory the intention is not only that students engage with a new form of literacy appropriate to the digital (electracy), but also that they learn the basic web authoring skills to enable them to become active subjects within digital space. Having composed four mystories around the four discourse areas, the student then undertakes a task of filtering in which he or she extracts the key themes and images which repeat across the four mystories. These are then formed into a single ‘wide image’ which encapsulates the overarching pattern revealed by the student’s investigation into their constituted selfhood.

The aim of researching the personal wide image does not appear to be for its confessional, therapeutic value, nor does it seem to be intended as a merely solipsistic exercise in self-discovery. Firstly there is a strong emphasis on collaborative work in students’ devising of their method for mystory construction. Secondly, and more fundamentally, through students’ documentation of their relations to dominant discourses and institutions, the pedagogy aims to constitute them as rhetorical agents (‘egents’) capable of orienting themselves to issues of public policy and community in a move which places the personal, the expressive and the visual back into academic discourse.

The aims of and claims for mystory are exciting, yet its complexity must place it outside the realms of possibility for teachers working within extreme time constraints and unsympathetic institutional contexts. Yet such pragmatic concerns do not of course render an emergent pedagogy like mystory useless. On the contrary, they emphasise the need for such pedagogies to be embedded within a context of a shift in the notion of what constitutes legitimate academic discourse. Such a shift would also, however, have to consider the issue of assessment, something on which Ulmer is almost silent, saying only that assessment of the wide image should take place on the basis of ‘its formal adherence to the principles and relays developed throughout the course’ (Ulmer 2003a, p. 203). The point of the mystory is that it is personally meaningful, that the wide image should prompt the ‘Eureka of recognition’ (Ulmer, 2003b) in the student who has constructed it. As Dickson stresses in his review of *Internet Invention*:

The ‘audience’ for electronic composition ... is not the audience for print compositions. The audience is less an Other that one researches and then manipulates than the (internal) Other that one excavates and then monumentalizes online. (Dickson, 2003)

Such a perspective makes the prospect of assessing the electronic composition from any position not that of the ‘internal Other’ rather compromising.

The breadth of scope of Ulmer’s approach – its ultimate aim being the formation of a global network of electrated ‘egents’, critical thinkers with ‘a new

approach to community problem solving and public policy formation' (Ulmer 2003a, p. 174) – is matched by the complexity of his pedagogy. By contrast the pedagogy of Donna LeCourt, as described in her paper 'Writing (without) the body: gender and power in networked discussion groups' (LeCourt, 1999) is simple in its approach while remaining ambitious in its aim.

Where Ulmer works primarily with hypertext and hypermedia, LeCourt's focus is on digital textuality as it emerges in asynchronous online discussion groups. She works from the perspective that subjectivity is constituted through language, and that online classrooms are spaces where the invisibility of the body and the lack of the discursive norms of face to face contact offer new possibilities for the voicing of discourses particular to the feminine. Her pedagogy is particular to the digital environment – and, in the terms of this paper, attempts to inhabit its 'smooth' spaces – in that it uses the communicational features of the network in order to enable her (both male and female) students to begin to articulate alternative modes of subjectivity. For the biologically female students, this will be a mode in which the 'body of the biological woman' is not the prime 'organizational principle through which all her discourse is interpreted' (p. 160).

Employing Irigaray's post-structuralist feminism, LeCourt aligns the possibilities for multivocality within online discussion spaces with the ability to speak 'difference' – to take up multiple subject positions in a way which disrupts the univocality which, for Irigaray, is the mode of signification belonging to the patriarchy. The taking up of multiple subject positions in the online classroom is thus a form of resistance for LeCourt. She sees the medium as enabling 'a form of textuality in which multiplicity might be spoken more easily than in other discursive realms' (LeCourt, 1999, p. 159).

LeCourt outlines her approach through the description of a 'Writing Theories' course taught to first semester Masters students. She aims to provide a learning environment in which, to as large an extent as possible, 'many of the 'givens' of both oral and written discourse are disturbed' in order that students are 'much less likely [to] invoke the already constituted subject positions usually created within other discursive realms, particularly those of educational discourse' (p. 160). She provides a discussion board environment for her students with a minimum requirement that they post once a week. The students are given minimum instructions as to what they should discuss – only that they should respond to class readings or 'bring up issues related to the reading from your teaching, life, or other reading' (p. 161). The aim of providing minimum specific purpose in the discussion is in order that:

there is no 'exigence', to use Bitzer's (Bitzer, 1968) term, created by a rhetorical context through which students can order their discourse, except the more localized contexts, which change from posting to posting. (p. 160)

Most powerfully perhaps, LeCourt allows her students to choose whether or not to remain anonymous – in the class she describes, every student chose to take up a pseudonym. She does not monitor the class discussion as it is

progressing, and allows her students to decide whether or not she should take part in the discussion herself. In the case she presents, the class allowed her to take part but only as long as she herself used a pseudonym.

The analysis LeCourt provides of the exchanges which take place in this discussion group revolve around her examination of them for examples of the enunciation of a feminised discourse. In her analysis of her discussion board transcripts, therefore, LeCourt reveals the ways in which they demonstrate this 'otherness' through the Irigarayan concepts of *parler femme* ('speaking (as) woman') and mimicry.

In concrete terms, LeCourt shows how, within the discussion board, there are many examples of individual students taking up multiple subject positions – expressing multivocality – not only across postings but within single contributions to the discussion space. She also demonstrates how women in her group subvert the roles allotted to them by patriarchal discourse, turning 'subordination into affirmation' through their responses to the postings of other students and to the 'norms' of academic discourse. In summary, LeCourt describes how the online classroom has the potential to become a 'feminized textual space'. Within her classroom, '[students'] voices were heard, their discourse resisted reincorporation and silencing within already constituted discourses, and 'new' subject positions were momentarily created that granted students power over how others had positioned them' (p. 172).

LeCourt attempts to employ the specificities of the digital medium in devising a pedagogy which works with the modes of subjectivity enabled in electronic space. To this extent she describes a valuable emergent digital pedagogy. In the end, however, her attempt to create a pedagogy specific to the digital classroom is compromised by her emancipatory agenda, in that she expresses an explicit desire and expectation that the resistant discourses she describes will cross over into the face to face classroom where they will have true liberatory power. An alternative, and more compelling, view would be to see the combination of pedagogical approach and technological environment as working to constitute the learning subject in a way that makes such articulation of the multiple possible. By contrast, LeCourt appears to expect that the modes of discourse emerging online might simply be translated into other (face to face) discursive contexts. Unsurprisingly, she finds that this is not the case – the resistant subject positions her students take up online do not translate into a more 'liberated' face to face classroom.

LeCourt's perspective suggests that the enunciation of 'difference' is a worthy liberatory aim, as long as it is expressed consistently. Such a position both contradicts itself and privileges the face to face mode, relegating the online environment to the status of a training ground for 'real' emancipation. Students are safely returned to their 'true' identities at the end of the programme, 'unmasked' for the purposes of assessment (LeCourt – like Ulmer – is vague about her criteria for this), and placed securely back in the realm of the real.

Such compromise is perhaps indicative of the fact that teachers attempting to devise pedagogies for smooth web spaces may be working with the grain of some of the medium's most distinctive features, but they are likely to be working against the grain of their institutions and the broader social contexts within which higher education is embedded. As Moulthrop has pointed out (Moulthrop, 1994), the university – hierarchical, contained – is itself a striated space (though of course that does not mean that there cannot be smooth spaces within it). If Rosenberg's concern with the striated architectures of hypertext is over-stated, he does powerfully reveal the paradox inherent in all attempts to teach according to the *nomos* rather than the *logos*:

no matter how self-conscious I may be in critiquing the social costs of logocentric thinking..., as a teacher I recognize that logocentric thought is precisely what my students need to master as a discourse that empowers them in the world. (Rosenberg, 1994, p. 293)

The pedagogies discussed here can be described as attempting to inhabit smooth space, yet ultimately each is embedded within a context of striation. The compromises involved in this appear perhaps most noticeably in the way Ulmer and LeCourt deal with the issue of assessment which, in each case, is skipped over with minimal comment and little analysis. This tendency to evade the implications of the hierarchies and formalities inherent to assessment procedures is, according to Reynolds and Trehan, common to many critical approaches (Reynolds & Trehan, 2000). If smooth pedagogy works to enable students to take a nomadic line of flight, to experience the pure joy of passage, assessment – in its summative form at least – will always be one of the factors working to constitute an end point or *telos*, a place of arrival.

However I do not believe that despair such as Rosenberg's is an appropriate response. As Deleuze & Guattari reveal, to move within smooth spaces is not necessarily to move with ease – 'Voyaging smoothly is a becoming, and a difficult, uncertain becoming at that' (Deleuze & Guattari, 1988, p. 482). The complications of this becoming demand a response neither despairing nor nostalgic:

It is not a question of returning to preastronomical navigation, nor to the ancient nomads. The confrontation between the smooth and the striated, the passages, alternations and superpositions, are under way today, running in the most varied directions. (p. 482)

To be aware of these contemporary 'confrontations' and 'superpositions' is to begin to work with them positively. Within the context of learning and teaching in cyberspace, perhaps the most significant confrontation between the two spaces is taking place at the locus of the virtual learning environment, where the smooth spaces of the web are resisted in favour of a striation which meshes closely with the university as a striated institution. I move now to consider the virtual learning environment – or 'e-learning system' – as a striating element within web space.

**A City on the Steppe:
the virtual learning environment as striated space**

If there is constructive debate to be had over the extent to which the web in general describes smooth or striated space, few doubts can exist in relation to that element of the web which consists of the virtual learning environment – it is a space of pure striation.

Deleuze & Guattari's account of the technological model of striated space includes four elements, applied in their case to woven textiles, which characterise such spaces. First, they are 'constituted by two kinds of parallel elements' which – point two – 'have different functions; one is fixed, the other mobile' (Deleuze & Guattari, 1988, p. 475). In textile production these two elements are the warp and the weft; in the 'e-learning system' they are the intertwining, intersecting elements of a fixed software architecture and the mobile, 'customisable' learning space which is woven in and around it.

Third, 'a striated space of this kind is necessarily delimited, closed on at least one side' (p. 475) – that is, points of entry and exit delimit the structure of the virtual learning environment much as the frame of the warp delimits the width of the fabric. The point of entry is the password logon, what Nunes calls the 'passage through the cybercity gates' (Nunes, 1999, p. 71). Movement within the striated space of the virtual learning environment is thus constrained to a back and forth motion within a closed space, much as the shuttle moves through the growing fabric.

Finally, 'a space of this kind seems necessarily to have a top and a bottom' (Deleuze & Guattari, 1988, p. 475); in other words, it bears within itself a series of formal hierarchical principles. We see these articulated throughout the interface of the virtual learning environment, from the way it structures text (assuming a hierarchical organisation of sections identical to that found in print books), to its discussion fora and the way it organises its users. Where the MOO, Nunes' prime example of striated cyberspace, organises users into a hierarchy of 'builder, programmer and wizard', in WebCT – the software to which I limit my discussion here – we have the administrator, course designer, teaching assistant and student (in that order).

As Deleuze & Guattari state, 'one is never 'in front of', any more than one is 'in' smooth space – rather, one is 'on' it (p. 493). Likewise, though we describe ourselves as being 'on' the web, we are always 'in' the virtual learning environment. It builds a city on the steppe, a 'safe' space of enclosure or containment. 'E-learning systems' promise 'seamlessness' of integration with other university information systems – the elimination of gaps into the unregulated unknown and the delimiting of space is their very purpose. Regardless of whether or not there are pedagogical advantages to be gained from delimiting web space in this way, it undoubtedly defines a domain in which control can be exercised in the form of regulation and surveillance (Kitto, 2003; Land & Bayne, 2004). Here, as Nunes puts it, functionalities are organised into productive modes and efficiency becomes a key term:

Striated cyberspace sets out to function as a simulated world that overcomes real space by providing more direct (point to point) contact and therefore greater efficiency... A determined striated topography, then, is 'efficient' in capturing smooth space and transforming it into a mode within its regime. (Nunes, 1999, pp. 63-67)

WebCT, for example, has shifted from a position in which it might have claimed to 'enhance' or 'support' learning, to one in which it promises a 'transformation' of the 'educational experience' (WebCT, 2002). Yet such 'transformation', far from promising an engagement with what might be called 'smooth' cyberspace, promises to take place purely in terms of enhanced efficiency and productivity:

students [now] require educational programs offered at convenient times and in modes that maximize learner efficiency ...

Increasing demands on faculty and student time, together with decreasing funds (particularly for capital projects), require institutions to provide Internet-based alternatives to classroom learning and collaboration ...

students [now] bring an increasingly consumerist attitude to their education. They demand a return on their educational investment and are more likely to measure the value and success of a course or program based on how it contributes to their career advancement ...

The market for higher education is seeing a rush of new competitors that target learners with degree programs designed specifically to meet their immediate need for convenience and career advancement. (WebCT, 2002, p. 2)

In this 'regime' the student moves with maximum efficiency between the point of entry to the system to the point of completion – a point-to-point progression characteristic of movement within striated space. Yet the containment of the student within the closed space of the system does not end with completion of the programme of study. WebCT promises to:

Encourage students to leave 'tracks' in the system – notes, papers, projects, etc. – that help the institution to maintain an ongoing, dynamic relationship with the student, and make the institution the most logical choice for further education ...

Each student has a single point of entry to every institutional offering that's most important to him or her, a point of entry that reflects what the system learns about the student over time and serves as a lifetime learning resource ...

the more personalized the online learning experience becomes – the more entrenched the student becomes in the institution. ((WebCT, 2002, pp. 2-3)

Using the language of choice, convenience, and personalisation, the promise is made of a new generation of students constituted by 'advanced e-learning systems' as their 'natural', *lifelong* inhabitants. Where one topography of cyberspace constructs the student as a nomad, as a wanderer over the digital steppe, the image here is of the student 'caught', insect-like, in the web of the 'e-learning system'.

Conclusions

My discussion of Ulmer and LeCourt's approaches to teaching in cyberspace described their attempt to work with the distinctive features of internet text and subject. I suggested that – while these teachers may not state it as an explicit aim – it is possible to see these pedagogies as attempting to inhabit the smooth spaces provided by the internet. In contrasting such movements over smooth space with the striated pedagogical spaces offered by the virtual learning environment, the latter is revealed as constructing a space of closure, of regulation – a formal, structured domain of control where hierarchies are re-asserted and internet functionality is appropriated by a regime of productivity and efficiency.

In highlighting Rosenberg's paradox, I described how the smooth spaces of digital pedagogy are, inevitably, appropriated by the forces of striation and logocentrism in the form of – among other things – assessment. According to Deleuze & Guattari it is equally inevitable that the striated space of the 'e-learning system' give way to areas of smoothness. Much as 'it is possible to live striated on the deserts, steppes, or seas; it is possible to live smooth even in the cities, to be an urban nomad' (Deleuze & Guattari, 1988, p. 482).

Yet it is rather hard to see where the virtual shanty-town might emerge among the regulated avenues of the 'e-learning system'. At a practical level, the simple strategies of hypertext and hypermedia creation employed by Ulmer are not available within the strictly defined functionalities of the virtual learning environment, while LeCourt's strategy of anonymised discussion, though it is technically possible in WebCT, is scarcely viable in a system dedicated to the tracking, management and containment of individualised users. The conclusion might be drawn that – unless they are unfortunate enough to be working within an institution in which use of the virtual learning environment is compulsory – teachers and students interested in inhabiting and nurturing smooth online pedagogical spaces will not bother to engage with the constraints offered by such systems. However, as 'fully integrated learning systems' become increasingly widely used, and increasingly 'seamless' in their closure, nomadic spaces will no doubt emerge within them – even if these are not inherently liberatory, the nurturing of them is likely to represent a true challenge to learners and teachers.

It is my wish not to succumb to the temptation to cast striated space as 'bad' space and smooth space as purely 'good', nor to be lured into the deterministic stance which holds that regulation and striation represent the

strangulation of the somehow 'natural' free-flow of information within cyberspace (Nunes, 1999, p. 65). Pedagogical cyberspaces consist, like other spaces, in the play of the two topographies, and occupation of a formal, regulated space is likely sometimes to be pedagogically desirable. However I do hold that smooth cyberspaces offer the promise of a textual, subjective and epistemological openness which presents new possibilities for teaching and learning – possibilities which are likely to be as disturbing as they are engaging. If our social and institutional contexts require us to undertake the regulated movement from point to point, the back and forth of the shuttle within the warp and weft, we may still, where we can, look toward the smooth line of flight within open territory, toward the nurturing of spaces where we might undergo the 'absolute of passage' (Deleuze & Guattari, 1988, p. 494).

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