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Abstract: This essay uses the material thought advocated by Paul Carter to argue for the materiality of writing. It does this by examining hypertext as an academic material writing practice, using ideas from design and hypertext theory. It specifically argues for a crystalline structure in hypertext as the actualisation of virtual possibilities via links and how this is different and novel in relation to existing academic writing.

Keywords: hypertext, writing, research practice

Virtual Actual: Hypertext as Material Writing

As Nick Rombes[i] has recently identified, much contemporary academic writing is stale. The reasons for this vary between the consequences of academic promotions policies that emphasise publication quantity over quality, the rise of a veritable cornucopia of publishing opportunities (due to the commercial exploitation of niche academic markets, and of course the rise of the Internet as a low cost publishing alternative), the inevitable conservatism of existing institutions in the face of developments bought about by structural changes affecting the institutions themselves, and by the rise of alternative forms of knowledge expression and expertise — for example blogs and other varieties of academic self publishing. Whether taken together or individually we have witnessed and participated in the development of a writing within the humanities that has generally divorced itself from the materialities of the thinking of thinking within language as a material medium. A productive way to instantiate this materiality and to situate it within practice is via the materiality of a genuinely digital writing practice. Such a writing in many ways falls outside of the boundaries of the academy and of academic legitimacy because of its intrinsic interest in form and its affinity with writing as a technological practice. However, as Carter points out:

> As the inventions of creative research are local, it's unlikely that an overarching discourse 'of', rather than 'about', it is either possible or desirable. The discourse of creative research — or material thinking — is likely to be occasional, generically disrespectful and promiscuous, and localised. (Carter, 9.)

Hence, in my practice as a media studies scholar, and in the humanities more broadly, what is, or could be, a materiality of digital academic writing? It would, of course, be a practice based activity where writing would be understood as an embodied activity that has its own particular affordances and possibilities — its own constraints and

local actualisations. Some of these, possibly banal, are literally the product of the specific materialities of writing — its temporary linearity, a historical predilection for serial and paginated presentation, and its very specific history of permanent or semi–permanent textual inscriptions upon receptive surfaces. Such literal materialities, which in the protestant and platonic ideality of academic writing have always tended to be treated as outside of writing proper, have been well documented in the canonical literature on printing, print literacy and hypertext, and ought not to be overlooked.[ii] However, what has also been marginalised in academic writing is the examination of a particular mode of academic knowledge production that is, in fact, the investigation of writing as an experimental practice in itself. Through this examination writing as a heuristic, poetic and iterative 'thinking–within' (not quite the thinking of thinking so much as the thinking of thought–as–writing) aligns itself with design. Writing is no longer the retrospective and teleological reporting of the discovered, realised, or already understood 'had–been–thought', but is the very event of a material thinking in itself. A sketch book, if you like, for a sort of scholarly activity that is primarily situated within the milieu of writing as the site of its practice. From this perspective writing is an expressive medium for thinking, and as with all designerly practices what becomes possible, as well as what is actualised in the event of such a writing–as–thinking, is a conversation between the written, thought, writing (as material system we are subject to), and writing as a local, specific and creative practice of material thought. As Carter argues:

> Creative research deals in matter that signifies. It is a discourse of material signs. To say this is not only to redefine the meaning of 'sign' but to reconceptualise matter. Matter ceases to be solid. Its beau ideal is no longer the marble from which the sculptor excavates an image. Instead, matter becomes mobile. (Carter, 182.)

Hypertext writing, that is a writing that is completely under or within the digital as a specific, local, material practice, offers a vantage point from which to defamiliarise writing and though such a defamiliarisation reconsider academic writing as a mobile material practice. Such writing, which, following Balestri we might describe as a soft writing,[iii] looks past the digital or computational as instrumental end, as merely writing with a computer which is the problem that digital dissemination projects including e–archives, online journals, and simple web publishing still refuses to address. Hypertext, as an exemplary form of soft practice, offers an academic model for such a writing.

This distinction between soft and hard writing is easily demonstrated by thinking about our use of a word processor. The word processor is obviously digital, and so lets us do things with text that, while taken for granted, are only possible because it is digital. The ability to replace, delete or insert text at any point and have all the content automatically reflow, automatic page numbering and pagination, multiple fonts, automatic foot and end noting, spell and grammar checking, automatic table of contents generation, indexing, and alphanumeric sorting. However, it is a word processor, and so it's aim is to, eventually, get this content onto a page. Hence there is, of course, a print dialog, and its default view is that your screen is the size and shape of some piece of paper. All of these abilities, this mobility of the word and the fluidity of the screen and its text is, by necessity, removed once the work is published in its final form on paper. Yet in a soft environment this is no longer the case and the

affordances of the digital can now be maintained post publication. There has been a considerable body of literature examining the implications of this from a literary and textual point of view, both in terms of the possible forms that texts might now take and the role of reading in understanding such objects, however there has been surprisingly little written about the implications of such environments for writing in general, or what it might mean for academic writing per se.

To regard writing as a soft practice enables writing to approach its own eventfulness as a thinking–in–writing and, as a digital writing, of having specific materialities that require a recasting of the relation of writer to the written and to writing. In other words, there is a way of doing hypertext that helps to align writing as an academic practice with design, while also allowing us to foreground the affordances of writing and the digital as a particular material writing practice. This I describe as writing hypertext 'hypertextually' which can also be thought of as a material hypertext practice.

To write hypertext hypertextually is to regard the link as the performative and enabling connection of parts into mobile wholes. These wholes are constituted not only by the sum of their parts, their content nodes, but also by the variety of possible relations established between them by their link structures. This allows a writing that is not only multisequential and partial for the reader, but also has these affordances for the writer and writing. To write hypertext hypertextually is to be subject to the productive and irruptive imperative of the link as a device of dis and conjunction. This imperative falls on the other side of grammar, syntax and other formal requirements of using a language 'successfully' because the link is not a discursive structure but an event of connection. As an event the link, which is best thought of as isomorphic with the cinematic edit, always produces some force of connection and this force, when writing hypertextually, is experienced as a promiscuous need to connect and create almost labyrinthine series of ideas and possibilities.[iv] In this manner writing becomes a 'studio practice' for an embodied thinking where 'thinking', like designing, is an engagement with the fluidity of material which extends and flows between the instances of writing as a thinking–in–action. The link, as a hypertextual event of the here and now, inserts an interval into thinking as writing and it is this interval that offers the possibility of a mobile, other academic writing. Such intervals encourages the enlargement of the moments, spaces or pathways that lie between statements producing an indeterminacy not only in reading but in the experience of an applied writing. Or, as Carter points out, "[i]nvention, after all, depends on equivocation — the possibility that something might mean something else."[v] Links, in other words, perform and allow for their own form of equivocation within the activity of writing.[vi]

None of this is necessarily new, or even original. The point is not to invent a different writing but to enlarge or expand the range of what 'counts' as academic knowledge through the recognition and validation of the materialities of writing as a mode of doing and making for some forms of humanities research. In such contexts research is able to slide from an activity that is prior to, or somehow anterior to, the act of writing, and into the very fabric of research in itself. When writing hypertextually the multifaceted, porous and heuristic nature of knowledge as a sketching between the constraints of reason and the localised affordances of discursive technologies becomes manifest. By recognising such an economy other objects of knowledge, still

grounded in the rationality of the written, can recognise the materiality of our media as enabling and productive in themselves and not merely the empty carriers of our own ideas.

VIRTUAL AND ACTUAL

This materiality of writing hypertext hypertextually can be productively considered in terms of Lévy's use of the virtual and the actual.[vii] The virtual is the set of all possible events for any given condition or state while the actual is that which comes to be, that which has been actualised of the virtual — it is said to be actualised. For example, before me lies many future possibilities, each more distant the further in the future they may be. As I sit at my desk writing my virtual future for the next few minutes is quite constrained: I may continue to write, one of my children may interrupt, my wife may call, stick her head around the door, or the dog might seek a pat. One year from now I can't be sure what I will actually be doing, let alone where I may be (out for dinner, in a different city, have a different home, and so on), or what major life events may have occurred. In each case we can reasonably say that any of the described events are possible, and as such these constitute my virtual world. Significantly, for Lévy (and Deleuze which is where Lévy derives this from) the virtual and the actual are equally real — the virtual prior to its specific actualisation is as real as the actual. However, as Lévy notes:

> The virtual should, properly speaking, be compared not to the real but the actual. Unlike the possible, which is static and already constituted, the virtual is a kind of problematic complex, the knot of tendencies or forces that accompanies a situation, event, object, or entity, and which invokes a process of resolution: actualization [sic]. This problematic complex belongs to the entity in question and even constitutes one of its primary dimensions.[viii] (24.)

Now lets try to return this to material thinking. Within material thinking a series of virtualities are created amongst various distinct materialities, where each materiality expresses of itself its own virtualities. For example, on a recent field trip for a research project participants were required to define a constraint as an a priori productive methodology for documenting place. In this case we travelled to the Grampians, a large and rugged national park in western Victoria. Laurene Vaughan, one of the participants on this trip, was using photography and as she began a walk up a local landmark (a large rock incline) she declared her constraint to be lace and that she would photograph lichen and other small patterns on the rock that were lace like. Now, lets see if this can be teased out using the terms just introduced.

There are rocks, and there is lichen. There has been growth, weather, erosion, human intervention, predation, competition and so on. The lichen itself is a complex symbiotic relationship between a fungus and a photosynthetic partner (which in the terms I'm using here can be thought of as two separate or external virtualities that are actualised via their intersection within lichen). These constitute some of the vectors that produce the virtual futures, for the lichen (and rock). The specificity of the individual patterns are those which have been actualised. The actual shapes that the lichens form is contained or expressed by these vectors, is immanent to them, and is the problem of the lichen. However, they only become patterns of lichen–lace because

of the external relation produced by Laurene where they are actualised along an aesthetic vector. The lichen express and are a multiplicity of patterns, lace actualises one vector through this virtual multiplicity, and this actualisation is possible and realised precisely because of its virtualness. It existed as a possibility amongst an infinite array of others, and this pre–existed any particular pattern.[ix] Material thought is about this actualisation of relations between the virtual as multiplicity rather than the explication of the content of what are treated as self evident objects — what lichen is or means. The lichen is lichen, the rock rock, but a value is established via the new relations that exist between the constraint, the camera, the rock and the lichen. The meaning and value is not located within the lichen (what could 'lichen' mean in such a context?), or any of the other objects of this exchange, but is enabled by the exchange itself which produces an actualised vector within a series of virtual relations as a problematic complex.

Within the practice of material thinking we develop new relations between the possible and available affordances (the known and the to be realised as a consequence of material thought) of our ideas, their exteriority and our expressive media. That is we actualise particular relations amongst these yet other virtualities always remain, producing polysemy, ambiguity, and an intellectual miscegenation that ought to be valued. Thought here is not within myself but between, a thought realised as the action of thinking inside and as expressive media. Carter's contribution, for me, is to allow us to expand this 'between' so that it becomes an interval with its own critical language and applicability to the production of knowledge and is not misread as 'only' creative or as the silence of the black box.

In the example of writing hypertext hypertextually this interval is, as we saw, the role of the link where the link is the always available possibility of establishing relation to something else, whether a new idea, article, media object or simply the elaboration, explication or criticism of what is being thought through writing. In this model links produce epistemological architectures where each part of a hypertext (each node or content kernel) has a virtual set of relations to other nodes, including those not yet written or thought. The link (and links can be multiple) actualises this virtual set, and when deeply immersed in such a practice (when writing hypertext as soft writing rather than using the computer as instrumental machine to facilitate our usual modes of writing) academic writing is about possible structures, a multiplicity of connections, and the flights of ideas. This is in contrast to much other digital writing, even for online publication, where the more usual workflow is to write the essay (for example using a word processor) and then 'designing' the essay for online presentation through the considerations of typography, colour and layout. In this hypertextual model design is a part of the doing of writing and is the realisation, in situ, of possible relations actualised through hypertext's ability to keep things near to hand as there is no node further away than any other, unlike the essay where a first paragraph must always precede the last.

CONES

This can be visualised, quite separately from the interface of any particular hypertext system, through the following illustrations. Figure One is a simple sketch showing the common experience of writing an essay (or designing[x]). The horizontal axis

represents time, and the end can be thought of as a deadline — perhaps when the work needs to be finished or simply when a required number of pages or words have been achieved.
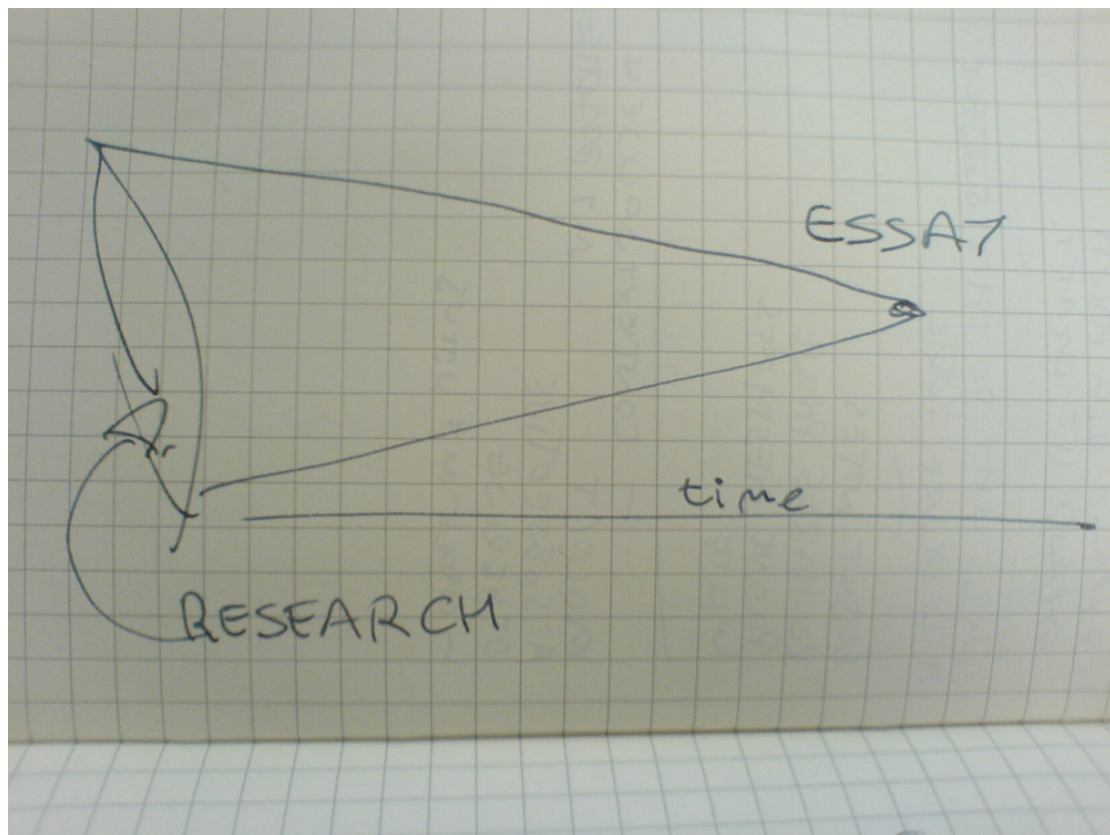
It can also be thought of as an illustration of what it might mean for the work to be completed, when something has been sufficiently explicated so that what falls outside of the cone is not perceived, or otherwise made minor courtesy of our normative 'good enough' argument which has been realised through the materialisation of thought as writing. This suggests that what is outside of the cone becomes not relevant or otherwise accounted for and so the end is sufficient in relation to its beginning — whether this be a concluding paragraph or a realised design. In this illustration research and the practice of writing is an activity of collecting material and then filtering and concentrating it down, distilling it if you like, towards and into an argument. The point at the tip of the cone (labelled "essay") is this end point and it is represented in this way because in the normative model of the good essay all that falls before this point ought to teleologically lead us to it. In other words to the left of the end of the essay we can imagine the contents of this research and writing cone to include those references and other material that are deemed relevant to this conclusion, and all of the arguments and clauses contained within its paragraphs that are to help move us, inevitably, towards this conclusion. Like any good narrative it will all make sense in light of this ending, and anything that falls outside of this, that is outside of the cone, needs to be excluded since it disrupts, interferes with and otherwise problematises the inevitable trajectory of the argument and the writing of the essay.

If we then treat the horizontal axis as time and the tip of the cone as representing a deadline then this situation is exacerbated as the closer you get to the deadline the

more disruptive anything new becomes and so the more likely it is to be ignored or at best acknowledged via a footnote. This form is highly teleological, and encourages an emphasis on finding material that 'matches' and in disregarding that which disrupts or otherwise problematises this end. This is clearly the case in much essay writing, whether undergraduate or professional, which historically and institutionally has valued clarity, certainty and concise causality of argument over thinking per se.

Figure Two, on the other hand, is how I represent writing hypertext hypertextually, and in this case also how a material digital practice in the domain of writing (as thinking) can be illustrated. Clearly this illustration is schematic and simplifies matters (but in this case isn't that it's value?) by its reversal of Figure One. Here we begin from an idea or a problem which we take to be a complex knot that is to be investigated. This model is promiscuous and the sorts of objects that are produced are not teleological in the manner of a 'good' essay. They may have no conclusion, many, or one that while offering itself as a good enough place to finish will also contain links back into the writing so that other passages and ideas can be found or explored. In this model the intent is to include what might ordinarily be regarded as 'outside' so that those ideas or things that would disrupt and problematise an argument can be included. This is achieved through the use of the link as a performative and connective event so that when writing in this manner the link is no longer instrumental (in the sense in which they are most commonly treated as navigational or interface elements) but generative, associative, metaphorical and inclusive.[xi] In this model, which is of course as normative in its own way as the 'good' essay, it is possible to include that which disrupts what you are doing, that may have arrived at the eleventh hour, but which is valuable and indeed may even suggest new directions. In other words links are part of the very materiality of such a writing and become a part of a particular mode of thinking within the activity of writing where these links produce an architecture of argument that lies between the affordances of writing–as–thinking and a thinking–through–writing.

This is not intended to be an idealist argument, nor to suggest that such writing systems erase the problem of what can and cannot (or should and should not) be included, or of relevance. Arguments still need to be conducted, claims explored and justified, and all of the usual procedures of academic and intellectual conduct apply[xii], however, it does indicates how the digital is able to produce and construct a particular practice that complements and is a mode of material thought, and to situate material thinking within quite specific terms to help sketch what in fact a materiality of thought as a realised practice might be.

While each of the figures suggest something single or unitary as the point of each cone, within Figure Two this point is not singular but can be more productively conceived of as having a crystalline structure.
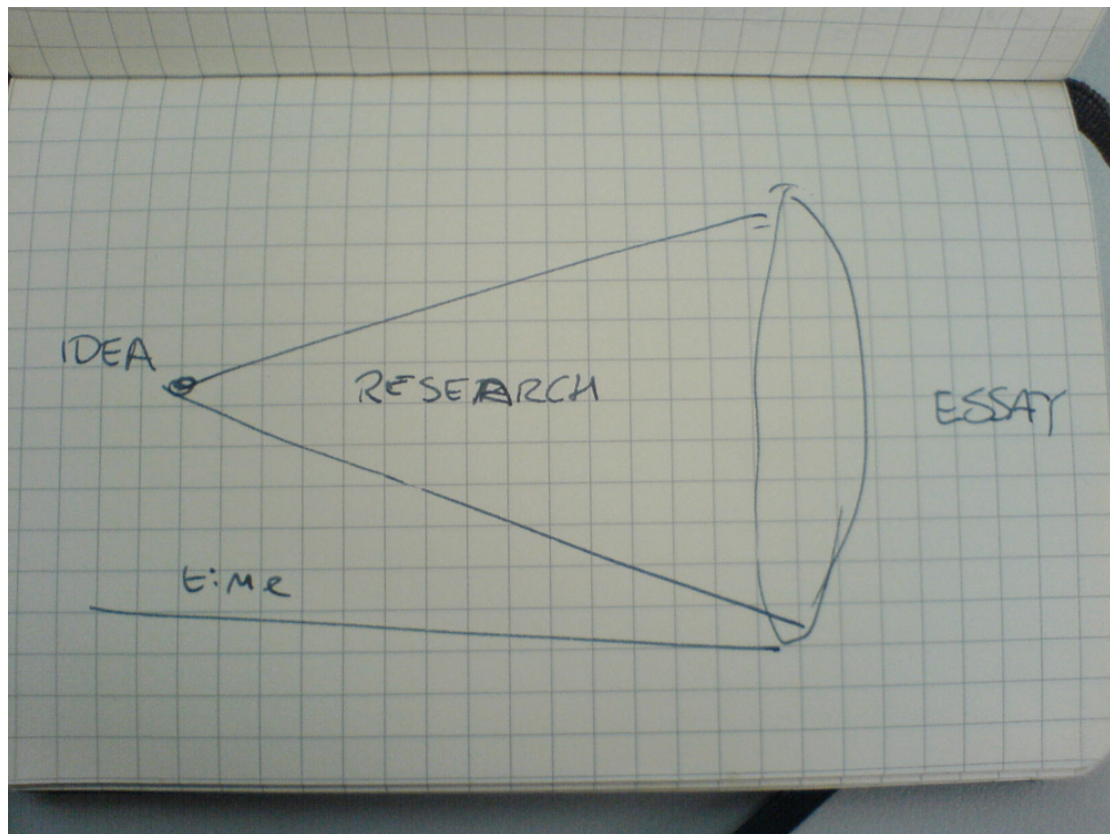
Figure Two: Idea as Expanding Problem

CRYSTALLINE FACETS

The idea as a problematic complex has many facets where each facet is an aspect of the problem that the idea poses. These are plural, multiple, literal, concrete and metaphoric. Each facet in turn has its own set of virtualities, of possible actualisations, and of course may intersect or share particular qualities with other facets. As problems these facets are those aspects of the idea that pose a question of us, that perhaps fall beyond common sense and require us to not so much answer them (which tends to assume that the task is to answer what we already know) but to hear them in such a way that as we struggle to answer what they ask new things emerge – knowledge, other questions, new problems. These are, of course, the material resistances of writing.

The crystalline structure allows us to see that there are as many facets as there are tendencies or vectors of the problem — they are as multiplicitious as they wish to be made. This concept of the crystalline, in its virtuality, encompasses or expresses all the ways in which the idea addresses and is addressed by everything else. This might include theoretical connections and precedents, other writers, and also such prosaic things as what I am seeing as I write, what I have recently read, the music I am writing to, the humid stickiness of my fingers on the keyboard, the scratch of fountain pen on paper, as well as just what it is I think I am doing in the dance between word, thought, line, link and argument. In a crystalline structure any of these facets might be actualised, and while several will be, most, will not and will remain virtual (and so present) as a consequence. Of course not all facets are ever realised, however in a 'good' hypertext many more can be acknowledged and incorporated than in the linear

form of traditional academic writing and to this extent it offers a model that is deeply digital and also expands upon the immanent materiality of writing as a particular practice of material thought.

It is the ability to undertake writing within such a crystalline structure that is the key contribution of hypertext to academic practice. This is a deeply material mode of thought where one becomes subject to the affordances of the technologies of thought and representation that are available. The strength and relevance of Carter's contribution to this is, I believe, not in the specificity of his own terms and practice, but in providing a blue print for the translation of a deeply poetic mode of thought into the registers of writing and argument. In this process both the legitimacy of other modes of thought, of vernacular ways of thinking in and with material other than words, is demonstrated and situated within writing as a specific way of translating the epiphenomena of material practice into a language for the academy. This reminds us that writing is a doing, and that simple observation provides the interval necessary to demonstrate the relevance of material thought to a writing in itself.

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[i] Rombes, 2005.

[ii] See Bolter, Landow, and Lanham for example.

[iii] Softcopy is broadly understood in hypertext theory to refer to a mode of writing where the computer is used not only as the medium of authoring (for example using a word processor) but also as the primary or only means of publication and distribution. The affordances of the computer are then maintained in the completed work — for example multiple windows, random access, variable window size, readers who can add or edit content, and so on.

[iv] This essay is not the place to develop this, however see Tosca (1999, 2000) and Miles (1999, 2001a, 2001b).

[v] Carter, p. 10.

[vi] Hypertext scholar Nancy Kaplan elegantly likes to describe hypertext nodes as just particularly "slow links" (pers comm.).

[vii] Much of what follows is indebted to the opening chapter of Lévy's appropriation of Deleuze.

[viii] This distinction between the possible and the virtual is important as it expresses the qualitative difference between the production of the already known (the possible) versus the creation of the new (the virtual).

[ix] For instance a deer, botanist, mycologist, sandstone and water all have quite different actualisations of the lichen's virtuality.

[x] What follows is indebted to the example of Grocott and Marshall and also to the illustrations of poetic research provided by Rosenberg.

[xi] A very simple exercise I provide students is to write a simple hypertext where every link from text must be from a verb or an adjective, rather than a noun. In a hypertext authoring system – where you are not 'designing' the look of the text

but actually writing complex linked structures, this exercise produces a qualitative change in what is written and how.

[xii] See for example Kolb, 1994.