

Multi-path and networked: Possible futures for academic writing

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Abstract

Whether we like it or not, students are using a range of media tools in their daily lives that do not strike the average humanities academic as the sort of tool with which to write a paper to answer assessment requirements. Our challenge is to find ways for students to harness these literacies to compose an essay that contains the necessary rigour for academic purposes. In fact, there are possibilities for enhancing the academic project through use of media tools. To prepare ourselves for the multi-linear multi-media academic paper of the future the first priority is not learning software or gadgets, its rethinking the structures of meaning-making used to write essays so they can bring together and utilise the enhanced capacities of media collection (like cell phones and a cell phone camera). This paper looks at visual meaning-making and discusses, with examples, how to approach 'designing' a multi-lineal essay.

Introduction

The phenomena we observe are rarely straightforward. They are diverse and complex; they spread out in many directions and sometimes they make 'off-the-wall', but crucial connections with other phenomena. This is what makes academic research exciting. We inevitably lose some of that complexity, however, in the process of composing our observations and conclusions into a linear argument using word and diagram for print-based texts. The multi-path networked (web) document offers to address this limitation on linear text by supplementing the directional thrust of narrative or argument with hypertext linking within a networked storage system (eg. Internet). But without effective meaning-making structures, a networked document becomes at best little more than an encyclopaedic experience, each entry unrelated to the next. At worst it degenerates into chaotic meaninglessness. Neither of these scenarios fit the implement of meticulous scholarship that is the current academic research document. The meaning-making structure of text is sequential or hierarchical and these structures have become to seem natural, even the 'only' way to do it. We need to think outside this traditional box of meaning construction because students already inhabit a resolutely multi-lineal, multi-visual, poly-vocal world. They construct sense visually and spatially better than most of us, because they have grown up manipulating electronic media. Traditional notions of order as in grammar and semantics are being upset as a consequence. For example consider the choice of random shuffle when playing music on CD's and Ipod. Maybe taking *Tea For The Tillerman* before *Hard Headed Woman* (1970) does not disturb, but what of *The Song of Joy* before the *Scherzo* in Beethoven's 9th Symphony (1824)? I have been studying these issues in the design of screen content since the introduction of Mosaic (the graphical browser for the Internet) in 1994. In 1997 I began teaching design for Electronic Media at University of the Sunshine Coast. This paper discusses issues of structure and meaning-making and provides provisional guidelines and examples for multi-lineal writing, focusing on structures that can supplement text-based linear meaning-making.

If we take a typical humanities academic document, it comprises title and introduction, which survey the terrain in brief, followed by the body (often called the discussion) in which arguments are developed. These are brought together in a conclusion. A science research paper similarly comprises introduction to the field and hypothesis, an account of methods to gather and analyse data, the results found, followed by a discussion. Both types of paper are built to be read, absorbed and reflected upon. Each style is conversational in that it can be responded to by a further paper; it is like this because, in order to make sense of content using a sequential medium such as text, a strong directional structure is needed to propel the reader along the path of the argument. The aim is efficient flow. Unidirectional flow does not facilitate discussion that is tangential to the main focus but none the less are worth exploring and useful to comprehension of the key point. Tangential discussion increases meaning by providing broader contextual clues. It is in this area of contextual complexity that the multi-path document begins to star. It is very simple to provide an in-place rollover that gives connection to a contextual note, however a screed of text with each word a link is *not* an answer. Within the limitation of text format the research paper has served scholars well enabling impressive achievements, and networked media gives new options for writers to address contextual complexity while driving a steadily argued path.

Multi-lineal media has different limits and these provide opportunities to expand and enhance the academic project. I sit within an Arts and Social Sciences faculty so I am most familiar with the humanities essay, however it is my hope that the principles I am developing will work across the field of academic endeavour and seek opportunity to investigate their application in other disciplines.

Indications that today's students think differently

Multi-lineal assignments may well be the key to re-engaging students into the project of building scholarly papers, because multi-media, not words, is the environment of choice. And it allows them to use their favourite gadgets, such as cell phones and cell phone cameras, Ipods, the web and chat rooms. An average school leaver student of 18 was born in 1987, six years after IBM's first PC, four years after the first commercial cellular phone system, three years after Apple introduced its desktop metaphor and the year *The Legend of Zelda* from Nintendo became the first new generation home video game to exceed sales of one million units. All their lives, these students have been playing games with technologies that challenge their brains to work through the logic of a visual interface that throws movement, sound, image and text together in complex but meaningful relationships. In other words there is accumulating evidence that they think differently to those of us who grew up in a book-dominated environment.

In the 1980s, University of Otago Law professor, James Flynn, published his observations that intelligence quotients, as measured by certain tests, have been steadily growing since the turn of the century and the effect is increasing (Holloway, 1999). While the Flynn effect is widely accepted, its existence baffles cognitive scholars given that intelligence is largely an inherited trait and humans are just not evolving that quickly. Later work shows that heritable traits like IQ can be impacted by environment, but that leaves the question unanswered of what in the environment is causing the increase. In his *Wired* article on the phenomena, Steven Johnson (2005) points to the many new forms of visual media that have emerged over the past 60 years. Media that require users to build logic relationships visually and to find unusual patterns in a field of visual icons, ie puzzle solving, and these capacities are tested in IQ tests. 'The best example of brain-boosting media may be videogames,' writes Johnson. 'Mastering visual puzzles is the whole point of the exercise — whether it's the spatial geometry of Tetris, the engineering riddles of Myst, or the urban mapping of Grand Theft Auto.' The 'fundamental intellectual powers' of students today 'weren't shaped only by coping with words on a page ...' they have an 'intuitive understanding of shapes and environments, all of them laced with patterns that can be detected if you think hard enough' (Johnson, 2005). While Johnson's explanation of Flynn's effect remains provisional, it does fit my observations of students and anecdotal reports from my colleagues, that students' ways of receiving, processing and responding to academic input are very different to what we expect. The possibilities of using multi-media in ways that might leverage the effect are certainly forefront in my mind when I author teaching resources. I suspect that kids really are better at programming the video recorder!

Meaning is contextual; it is composed interactively and is never complete

I use the descriptive term authoring rather than writing as the name for the process of composing content because it better encompasses the concept of writing with networked media as well as text. The term multi-lineal document describes a plenitude of paths (arguments, questions, demonstrations, even open ended forays) rather than a single path. It is important to note that I do not have in mind the scrollable Word documents that are the common fare of web resources today; that is not multi-lineal writing in any shape or form. Nor am I advocating a kind of random, choose-your-own-ending hypertext novel. Multi-lineal authoring is about making visible the boundaries of and relationships between islands of content in order to add value to the content, in other words to assist the making of meaning. Meaning-making is not a systematic process but one in which the reader interacts with the texts and her prior understanding in order to come close to what the author might have meant. None of the systems we have for assisting meaning, like syntax and punctuation in the case of written words, will give us an exact understanding. 'It is guesswork,' says post-process theorist, Thomas Kent (Spinuzzi, 2002). 'We come to a communicative interaction with a prior theory of what a text might mean, and we develop on-the-spot passing theories to constantly adjust or improve our hermeneutic guesses about what the text means ... it relies on continuous interactions or adjustments in the reader's understanding of the text.'

The word design becomes important when talking about authoring a multi-lineal document. Broadly speaking, design is concerned with understanding and expressing, in a concrete form, the boundaries and relationships of and between things in order to preserve and express the pattern or meaning. The arrangement of items in relation to each other (context) enhances or distorts meaning. Though we don't call it design, we are very aware of spatial and visual clues when writing.

For instance:

The black cat sat on the mat.	On the mat the cat sat; black.	Black, the cat, sat on the mat.
On the mat, the black cat sat.	On the mat the cat sat. 'Black?'	On the mat, Black, the cat, sat.
Even ... Cat, black, mat, sat	But ... cat the black sat mat on	Or ...The on sat black cat mat

Visual order and punctuation change the complexities of what we understand when we read words in fixed relationship one to another (composition). Even spelling is a visual process; it is the translation of sound into visuals in a certain order in order to convey meaning. Think sale or sail. If you are listening to those two words, context is what gives meaning. The written sentence, 'this car is for sail', is nonsense, or is it? It makes sense if we assume the word is misspelt, or it may mean the car is an aquatic. Contextualising means to engage the viewer in a discourse that explores circumstances and 'interrelated conditions' of the work in order to 'throw light' into its meanings (Merriam-Webster, 2004). Narrative is a contextualising device in the text-based meaning-making process. Narratives create both boundaries and relationships. They indicate what is inside and what is outside; describe the context of the sense or meaning of the content; what is included and why and what is excluded and why. A narrative establishes the kind of relationship or order each thing has to another thing. Take the words in this list:

Fence	Mirror	Bacon
Bookcase	Kitchen	Video
Kangaroo	TV	Grass
Dictionary	Lounge	Bedroom
Socks	Fridge	

Bookcase and *dictionary* might be closely linked in a narrative about *House and Garden* for the eponymous magazine from Murdoch Press, but in a narrative called 'Size is important: The bigger the better!' these two items would be placed far apart. *Bacon* and *socks* could be in the same cluster if the narrative is about matching words with the same number of letters or if the narrative is 'My Breakfast' but not if the narrative is alphabetically based. In a multi-lineal essay the word environment could usefully replace narrative. Environment is an aggregate of conditions that influence meaning (Merriam-Webster, 2005). Where narrative acts as direction, environment is interconnected, continuous, and pervasive; it surrounds and holds. Environment is a lake rather than a river, where everything is connected in some way with everything else (Deleuze & Guattari, 1987).

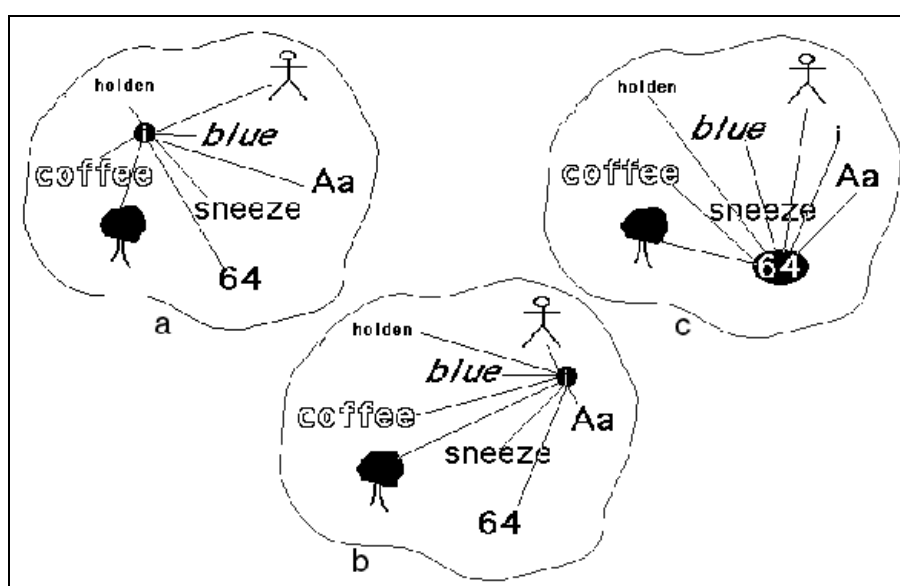


Figure 1: In a lake, all things remain in relationship, but the narrative changes depending on focus

Multi-linear Inter-networked writing

A distributed network characterises the Internet's rhetorical structure and the multi-linear document is authored to take advantage of a network's capacity to provide instantaneous links to stored data in one or numerous digital repositories. The Internet is a distributed network; a PC is too. Maps, brainstorming, chatterboxes and concept mapping (see Figure 3) are ways to visually represent a distributed network. The inter-network represents a virtual three dimensional space (cyberspace) within which discrete islands of (stored) content, text, image, video and/or sound, can be brought together in various ways to focus on different aspects of that content. Authoring a multi-linear document is the process of directing that gaze, deciding which bits from the islands are brought together in relationship to make which connections (Turner, 2001). From the core repository of data, there can be numerous 'front-ends' each with a different purpose (see Figure 2). For example Electronic Media students at USC keep an electronic journal into which goes all their preparatory research and idea development, textual and visual. From this data at assessment times, they produce a 'front-end' client presentation and another that is an exegesis of their design process. Both documents access the same repository, but the discursive structures will be very different. Such a repository can be both private and interfaced with public and shared repositories, and it grows over time both as data is added and as the connecting relationships proliferate. Media of all types including text would be stored and each would be labelled with a Metadata description to aid the author in making relevant links.

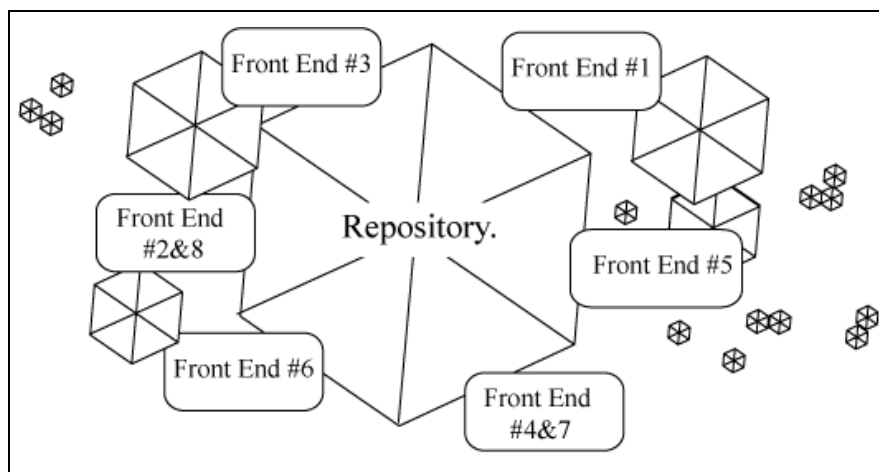


Figure 2: Visualising multi-linear authoring from repositories

A key to working in this way is to author in a tool that lends itself to distributed thinking, *not* to a word processor unless it's the table function. It need not be expensive multimedia software; spreadsheets, flow charts (in PowerPoint where you can drag boxes round and the connecting arrows stay attached), or a table in Word to draw the Lotus Blossom diagram. But yellow stickies and scattergun-concept maps on a whiteboard will serve the purpose too; just capture them with a cell phone camera and email.

Writing for the web is a topic all of its own, but in brief, use topics and dot points and get directly to the point. Especially cut out all the words that do not drive the point forward. In this, web authoring is quite unlike the writing of an essay. Its telegraphic style fits ideally with the current observation and collecting devices like mobile phones with their emerging versatility. For instance students researching in the library speak their notes and thoughts generated by their study into their mobile phone that turns voice into text (available now on Palms). They photograph the cover of the book and its publishing details, attach the lot to an email containing a brief metadata description tag, and send to their repository. A linguist in the field can video the way a face moves when the native speaker talks, then video themselves demonstrating how a change of facial expression can help to make a similar sound. Together they make an enriched resource for language learning. Pod casts could go academic and be included in a multi-linear document; perhaps the document is distributed by Pod casting. The possibilities of use require only our imagination answering the demands of our discipline.

While I use terms like designer and director, web authoring is not primarily about aesthetics; be reassured that I am not advocating academics shoehorn art and design classes into their packed schedules. However, just as mathematicians prize the elegance of a proof, so too academics will find that the consideration they give to designing content both visually and spatially will yield forms that are aesthetically pleasing, even 'natural', in the way a book seems 'natural'. An engineer knows that it is the inherent qualities and constraints of a medium that give shape to the object, so too do its unique characteristics give multi-linear

authoring a shape distinctive from other forms of presentation. The best shape will be determined by the qualities of inter-networked space itself. Mostly today what we know about electronic media comes from the shape of the machines or the software we use to access it, but these are not cyberspace and they are poor tools with which to conceptualise the way cyberspace is different from other presentation media.

So what might such a document look like?

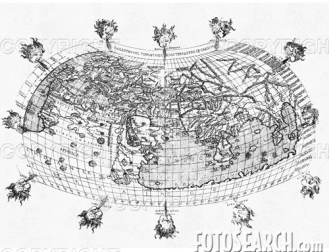


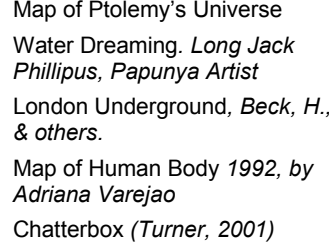


As an example visualising content to assist meaning-making, Brenda Dervin (1999) famously cites the Washington DC Vietnam Veterans War Memorial designed by Maya Ying Lin. In order to pull out of the data a set of meaningful relationships, the artist listed the names of the soldiers who were of disparate age, gender, and ethnic grouping by the thing that brought them together, the day they died for the war effort. The resultant triangular shape reveals the momentum, intensity and dispersal of that war over the 16 years. Its shape reveals a meaning greater than just the names of those who died.

“Suppose the names were organized by alphabet (which was actually proposed once the design was accepted). While it might be easier to find a particular person, the search (as the names themselves) would be reduced to a mechanical list, a granite White Pages. Lost would be the individuality of each name and life. In a list of seventeen John Smiths, which one is yours?”.

(Dervin, 1999)

Dervin talks of mapping as a useful metaphor for visualising content, Janet Murray (1997) talks of stages and holodecks, Sherry Turkle (1995) of simulation and matrix. It is most important that any contextualising structure informs in ways that give the reader/participant enough knowledge to make decisions about the choices on offer; that can allow the reader independence from the author.

There is not yet a definitive model for multi-linear authoring but I can share useful guidelines and starting points extracted from trial and error exploration of this territory over the 11 years since the web browser arrived. Illustrations in the following section have variously been authored in tables in Word and using web software such as HTML, Dreamweaver and Flash. The first images (Figure 3, 1–7) demonstrate variety in ways of visualising content to contextualise relationships in what is commonly called a mapping. You will note that *map* is itself an infinitely interpretable term.

 <p>1. Map of Ptolemy's Universe</p>	 <p>2. Water Dreaming. Long Jack Phillipus, Papunya Artist</p>	 <p>3. London Underground, Beck, H., & others.</p>
 <p>4. Map of Human Body 1992, by Adriana Varejao</p>	 <p>5. Chatterbox (Turner, 2001)</p>	 <p>6. Concept Map. Lanzing (1997)</p>

7. Lotus Blossom diagram

This exercise involves starting with a central theme or problem and working outward, using ever-widening circles or “petals.” Central themes lead to ideas that then become central themes, and so forth. The unfolding themes trigger new ideas and new themes.

Michalko (1994)

See Figure 4 below for example of translation of a lotus diagram to screen

7.

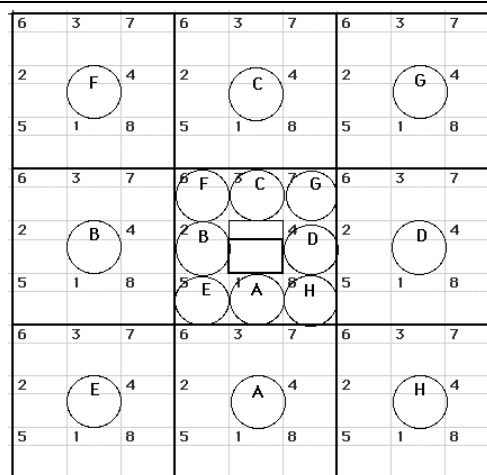


Figure 3: Visualising content to contextualise relationships

Translation of the lotus blossom diagram (above) into the structure of a multi-linear document is demonstrated in Figure 4. The ‘front-end’ of this multi-linear document, rather like a web site, has a main ‘door’ (a term more evocative than ‘page’ for the node of the Internet’s non-linear structure) whose task is to present a map of complex information in ways that indicate the relationships between the parts. In other words it is the introduction. This front door is designed to give the reader a big picture overview of the topic to be discussed. Visually, the use of a lotus diagram in Figure 4 signifies that the territory is multifarious and ramifies out in several directions which indicates there are major threads of conversation leading from the key theme and that the author considers them of equal importance.

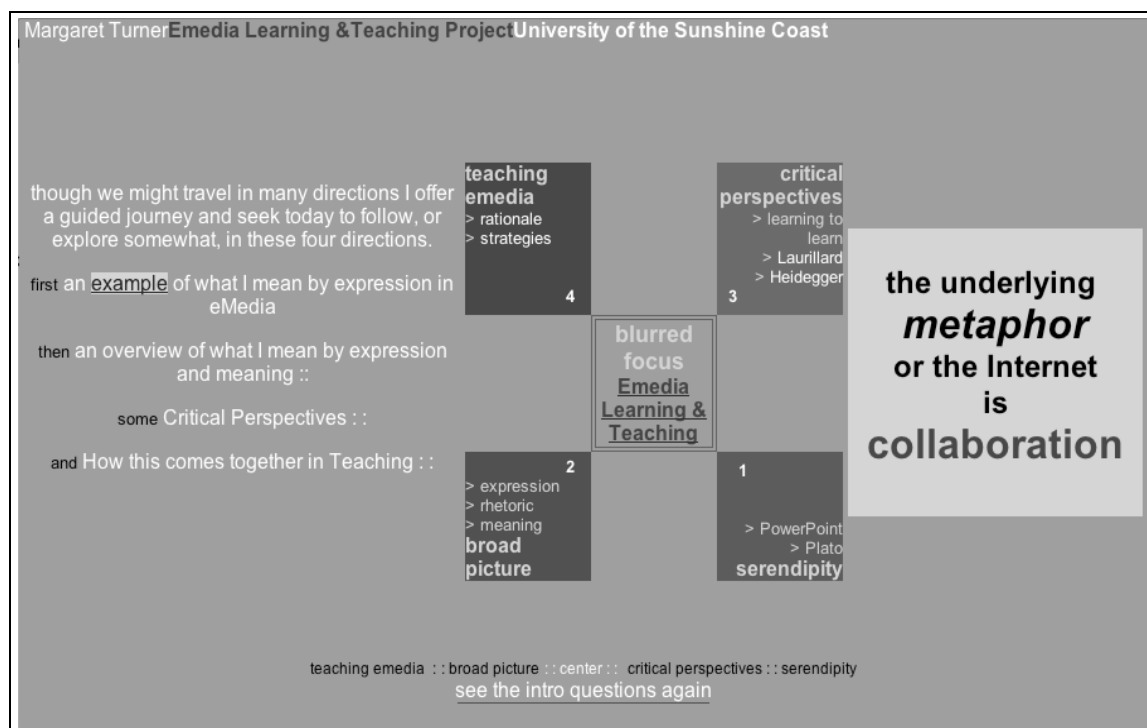


Figure 4: Multi-linear web essay introduction

This page is designed to set the user at ease and invite participation. It sets out expectations and provides sufficient information to confer independence of use. A guided path is offered so that a student/reader can follow a lead, and there are multiple other points of entry to cater to reader/participants who have differing levels of prior knowledge and purposes. Some of the items are rollovers that do not move the student/reader/participant from place to place, but provide more (and contextualising) information, other items ‘react’ to a click by sending the reader to a new node within the paper. This main door is not a once

only, seen-that-won't-look-at-it-again, door. A reader/participant can access and reuse it many times as they circulate within the content. The author may also continually update it. (Networked documents can be closed and final, or they can remain open to ongoing additions both by author and margin scrawlers.) In this way a document can be authored for various audiences. The example in Figure 4 is not actually the highest level; it is the introduction to the guided journey, although the multiple entry points are still available.

Navigation is a crucial meaning-making structure in a multi-lineal environment. Navigation points to the relationships to be drawn within the document. The task of the navigation is to add-value to the content. Eisenstein invented montage in filmmaking. Montage is a rapid series of image used to present complex ideas. So too does a navigations structure present the connections (relationships) between the bits. An alphabetical list is rarely as useful as it could be because its contextual order does not *add value* to the understanding of the meaning of content. It is efficient if you know what you want but does not assist with making choices where the search is more general. Clustering like with like is a more informative option; it has more *meaning* than an alphabetical directory.

A similar approach to the organization of electronic content will yield more meaningful navigation. Navigation is not only for making meaning but also for creating comfort and safety. Navigation needs to be positioned to give the user consistent and constant access to the top level of discussion from every node and each of the secondary/tertiary doors require a further layer of consistent access to every node in that area of discussion (see Figure 5).

'Breadcrumbs', a term for the record of a path taken through a site, is another useful device in assisting the meaning-making process because it reminds us of the context — where the statement under discussion fits into the greater whole. Intermediary or secondary doors (Figure 5), one for each area of content, are an extension of the introduction and again provide an overview or survey, this time of their particular subsection and probably with reference to the whole. They can provide a continuance of the guided path together with multiple points of entry for the explorers.

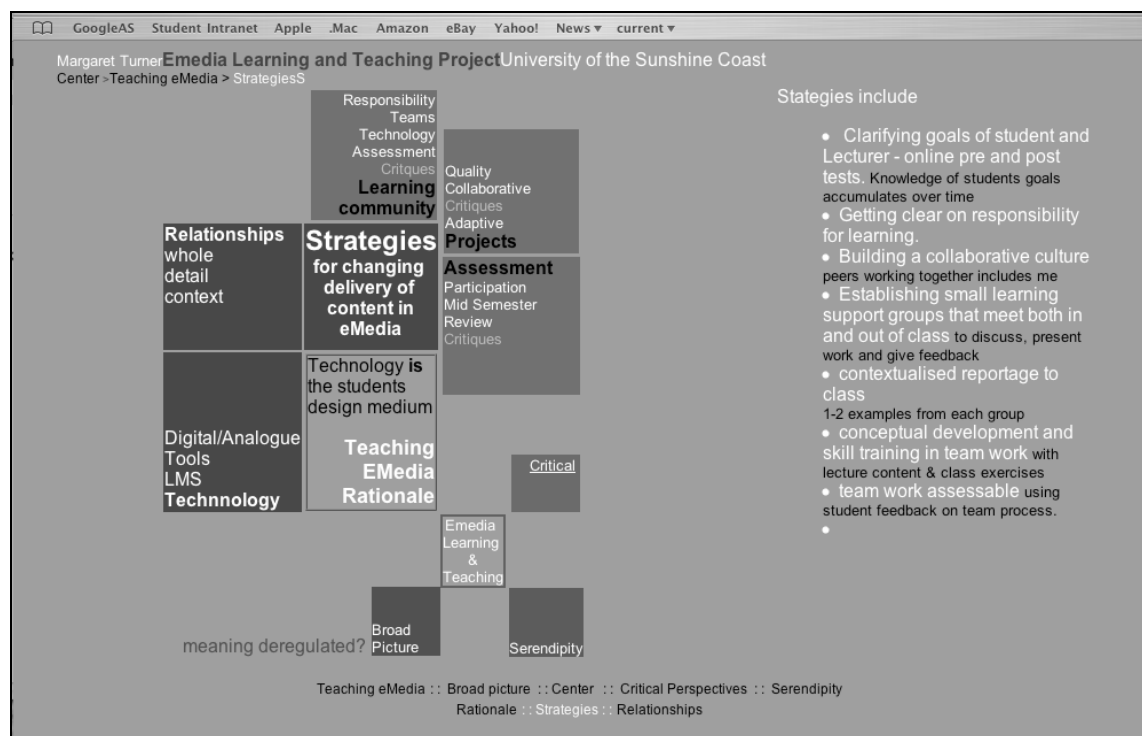


Figure 5: Tertiary door for unfolding subsections of content in more detail

This is *Strategy*, in the domain of *Teaching Emedia*. Strategies are further categorised in three areas, *Learning Community*, *Projects* and *Assessment* and further unfold from there. There is a great deal of information on this interface. It may suit the experienced reader participant, but lose the student/reader. More work to be done!

Depending on the complexity of your subject matter there maybe further levels of sifting in tertiary doors. Note how the unfolding lotus diagram persists in Figures 4, 5 and 6 and provides more contextualisation of place in the network of the document.

The content body of the document

A reader goes in and out of the argument/discussion or body of a thesis, moving through and sideways, back and forth, accumulating knowledge at each level (Figure 6). Even at level of the body, we are not providing screeds of text to read. The idea is to encourage research within the guided path. Links at this node demonstrate how change, time and conversation form interaction. The task is to invite the reader to go further, to guide the reader to supported conclusions and hypotheses, and to supply evidence, paths of exploration and playfulness, together with concepts and conversation. A question that sparks investigation may be all that is needed. (The idea of 'invitations' to learn and 'playfulness' in the learning process are aspects of a multi-lineal document that are addressed more fully elsewhere (Turner, 2005)). Notice that at this content level the branding, if you will, reduces to a minimum as the content takes over; compare Figures 4 and 6.

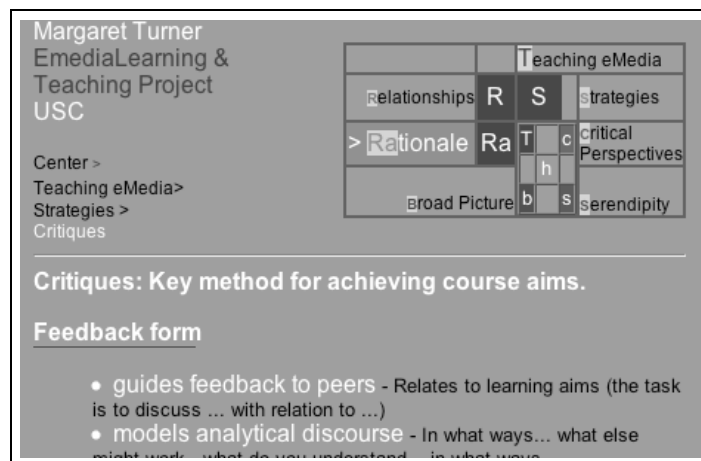


Figure 6: At the content level of the multi-lineal essay

The type of visual structure that suits a particular content is actually in that content. To reveal this pattern, assemble data, draw the relationships, observe what structure emerges and make this visual with mapping. I try to avoid imposing a pre-existing structure, as this will reduce the value of the structure as a meaning-making device through overuse. Figures 7 and 8 present two different ideas in visual structure.

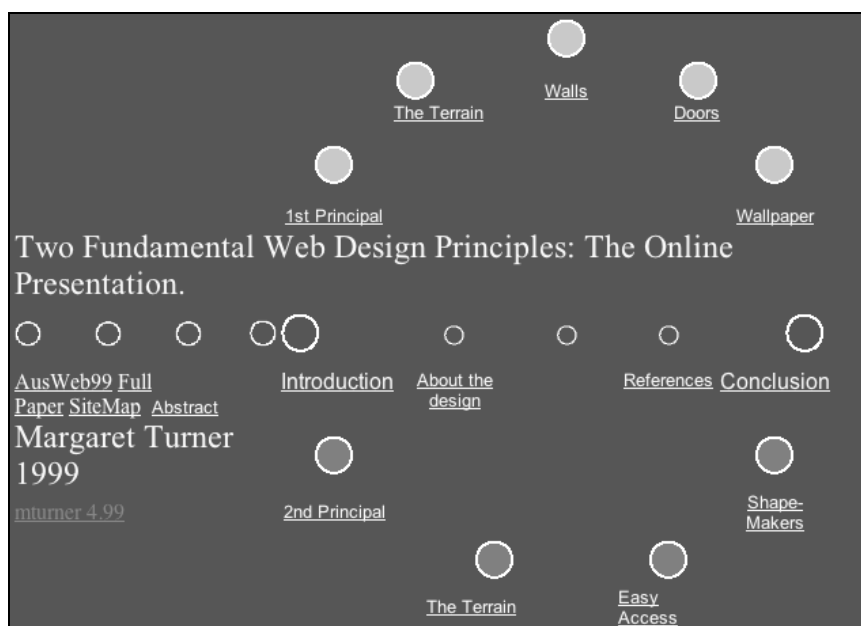


Figure 7: Visual model to structure a multi-lineal document that has two main segments of argument

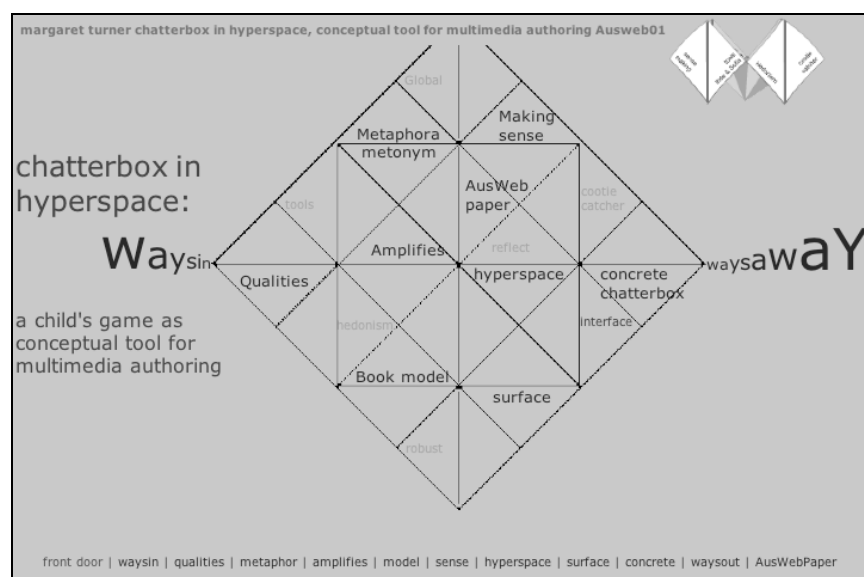



Figure 8: Visualising the ramifying structure of a multi-lineal document

So what are the limitations of this seemingly magical medium?

The limitations of the medium are different to those of linear text, but they are not absent. Complexity is the major one. So much is possible. The sidetracks and proliferation of multi-lineal documents do not lend themselves to public lecture format; they are definitely best as an interactive model where a student/reader/participant pursues their own path. (Given that lectures are not the best way to impart learning, maybe this limitation is a boon.) Dealing with the ramifying complexity of multi-lineal documents is the job of the design. The underlying structure needs to be simple and robust (Figures 4, 7 and 8) so that it is easily learned.

Another issue is the temptation to flood our writing with images and animations simply because we can. If not contained within an appropriate contextualising structure, these add-ons are just eye candy. Animation is probably today's biggest waste of energy, talent, time and bandwidth; for all that productivity, most web animations provide little if anything, in the way of useful interactive learning conversations. Text remains the most direct way to provide information. A word (in English) is relatively explicit, whereas icons are notoriously open to interpretation. One person's  is not necessarily another's. Resist the urge to place images unless they are highly relevant. Not only do they occupy visual space and bandwidth, they add extraneous visual data and can distract rather than enhance learning. The famous saying, 'images speak a thousand words' begs the question, 'but which thousand?' The examples shown how the visualised dialectic structure on screen becomes a contextualising image of that structure in a way no photo could.

Conclusion

In summary, the multi-lineal networked environment of the World Wide Web and Internet opens opportunities for us to expand scholarly endeavours. Students already flirt playfully with technologies that enable a fluid and spontaneous informal communication between people close and distant. While it may seem to some just another manifestation of popular culture and fashion, potentially these same playful technologies can enhance the academic project. It does mean rethinking the way we structure out writing and develop argument, and there are many paths before us. Reducing complexity is the task of the essay. The task is the same in multi-lineal authoring but the result will be different. Authors become path-makers, defining routes of interest and/or polemics and in the process making the structures that affect the meaning of what is argued. The medium is not all wonderful — it has its limitations; too much complexity is one of them — but the attempt must be made if we are to harness the excitement of new technologies for our own purposes. Again, I stress that there is no need for academics to scramble to take art and design classes. Design is simply a matter of organising content visually and spatially and then translating that mapping into a networked structure using tools that suit the medium, not word processors. When we write a paper in its current form we already do design, it's simply a matter of expanding our skills by thinking outside the linear 'square'.

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