Abstract
The interdisciplinary liberal arts subject, Our Space: Networks, Narratives and the Making of Place, incorporates digital technologies as part of a blended learning and digital literacy strategy. Influenced by network philosophy and theories, this first year subject critically analyses the power of networks across the plateaus of people networks, food networks, nature networks, and networks of things. It simultaneously requires students to engage, and critically analyse, digital social networks.

The subject is taught across a networked university which consists of three tropical campuses, two in the north of Australia and one in Asia. This paper addresses the Singapore campus where students are engaged in networked learning spaces that are designed to encourage peer collaboration both in the class, as well as extend learning beyond the classroom to cyberspace. The subject’s blog assessment is the site of cartographic analysis used in this paper.

The blog site itself forms a network that demonstrates students’ critical engagement with theories, concepts and topics, as well as peer-to-peer engagement through anonymous posts and comments. This paper undertakes a cartographic analysis of the blog. Firstly we employ digital analytics to map the networks of this virtual learning community; secondly we create a word map of blog posts and comments to graphically demonstrate clusters of ideas; and finally, drawing on specific examples from the blog posts we demonstrate how the students themselves engage theories and concepts of the subject to analyse their empowerment and sense of place as they transition into university.

Keywords: network theories, cartographic analysis, digital literacy, Liberal Arts, blogging, tropical Asia, First Year Experience
Introduction: C21 networked education

As the world entered the new millennium we encountered simultaneously the ‘Asian century’ (Robertson & Lundberg, 2013), and the century of globalized, networked societies. In turn, higher education is of central importance in today’s networked and globalised landscape especially as the world moves towards knowledge-based economies (Geerlings & Lundberg, 2014). This economy requires graduates with the creative and innovative ability to be able to draw ideas together, to connect and be connected. The emphasis in education is increasingly moving towards connectivist learning.

At the same time Not only has Asia increasingly become a geographic region for offshore branch campuses of Western (as well as a growing number of Eastern) Universities, learning spaces within higher education are getting connected both in the classroom and through virtual domains (Lundberg, 2013a).

Similarly, as we encounter an increased awareness of the intricate webs of ecological systems philosophers have been turning to images-of-thought inspired by nature; one such image is the rhizome (Lundberg, 2013a, 2013b). In turn, these theories affect the way we understand the dynamics of power.

Network Science Theory

Theorists of networks are not merely distanced observers writing about networks, they are engaged with the new 21st century technological environment. New technologies have both ontological and epistemological affect; they affect our ways of being in the world and of knowing the world. In this regard, the world wide web, wireless technologies and online digital platforms have changed our everyday life as well as influenced theoretical work in network science.

New network science was firmly established at the beginning of the millennium through synchronous work published by Albert-László Barabási (2003) in the field of physics, and Duncan Watts (2003) and Steve Strogatz (2003) in mathematics. Network science elucidates the properties of networks on and across multiple plateaux, including: neural networks, food networks, transport networks, financial networks, telecommunicatons, the world wide web, viral networks (virtual and medical), ecology, and social networks (Buchanan, 2002).

Network science theory has also been engaged with in interdisciplinary projects in humanities and social sciences. It forms the thematic basis of a core first year Bachelor of Arts subject, Our Space: Networks, Narratives and the Making of Place (Lundberg & Kuttainen, 2011-2015), at James Cook University, which appropriately, at the university’s offshore campus in Singapore, is tutored in the new ‘networked’ classrooms (Lundberg, 2013a; Carter, Teoh, Bhati, & Lundberg, 2014).

In turn, the network theories taught in this subject have lead to interdisciplinary research projects. These include, for instance: interpreting experiences of students on exchange through a discourse analysis of their blog posts (Lundberg, Stasiewicz-Bieńkowska, & Enhörning Singhateh, 2012); demonstrating the connections of the TransOceanik research network, a LIA (Laboratoire International Associé) of the
French CNRS (Centre National de la Recherche Scientifique) in association with the Laboratoire d’Anthropologie Sociale of the Collège de France and The Cairns Institute at James Cook University (Lundberg, 2013b; Lundberg & Glowczewski, 2015); critically engaging the design space and connectivity of a networked classroom (Carter, Teoh, Bhati, & Lundberg, 2014; Lundberg, 2013a); and analyzing how networks can be used to empower women’s space (Lundberg, 2015).

Crossing between disciplines is not anathema to Network Science. Indeed, the scientists’ inspiration for their theory came from a social psychology experiment devised by Stanley Milgram in the 1960s. To understand how people are linked in webs of connections, the psychologist used the postal network to demonstrate that people could get a letter from one place and person, to an unknown recipient in another location, in approximately six relay postings. This became known as six degrees of separation. In the late 1990s Watts and Strogatz were profoundly shocked by the idea that over six billion people could be linked through just six connections. The scientists’ aim was to model this phenomenon through a mathematical graph (Buchanan, 2002, pp. 14-15; Hilton and Talas, 2009). The graph revealed that the notion of six degrees of separation is a ‘small-world’ network. Links between people are not spread out evenly; social life clusters. The networks of transportation, internet, economics, biology and ecology likewise present small-world phenomena. In each network, most nodes are linked to only a few other nodes. But some nodes have lots of links. These hubs shorten the paths between all the nodes in the entire network. An important principle of six degrees is that it is not about strong connections; significantly, weak links make the connective leap from one cluster over to a whole new cluster in the network.

Furthermore, links from different plateau can leap one to another. For instance, while our evolutionary and taxonomic science tells us that chickens, viruses and humans are separate categories; bird flu demonstrates that viruses link birds and humans, they cross species. In turn airlines become carriers of avian flu, airport hubs are potential nodes in epidemics. The same features are likewise at play in cyber viruses.

**Cartography – a principle of Rhizomatics**

Network science theory, in turn, resonates with the network philosophy of rhizomatics developed by the philosopher Gilles Deleuze and psychoanalyst Félix Guattari in their introductory chapter to *A Thousand Plateaus* (1987 [1980]). It is an image of thought based on the botanic rhizome. In the tropical setting of James Cook University’s Singapore campus, the theory evokes images of ginger, bamboo and sympodial orchids.

Rhizomatic theory and research allows for multiple, non-hierarchical entry and exit points in analysis and presentation of artefacts and thought. It necessitates connection and heterogeneity where any node of the rhizome can connect to any other (Deleuze and Guattari, 1987, p. 8). The underground root of the ginger is transversal with nodes connecting to other nodes in all directions, like labyrinths with multiple entry and exit points.
Rhizomatics argues for multiplicity. There is no origin to be divided into binary hierarchies. “A multiplicity has neither subject nor object, only determinations, magnitudes, and dimensions…” (Deleuze and Guattari, 1987, p. 8).

Rhizomes rupture. Shattered at a particular point only to start up again on an old line, or form a new one. If we break off a node of ginger and shove it in the ground elsewhere, it forms a new network. Creating another labyrinth.

The rhizome saps the pervasive Western botanical-philosophical image of the tree: evolutionary trees, genealogical trees, the tree of knowledge — biblical and educational. The aboreal image of knowledge conjures up notions of original oneness (tap roots); linear growth (trunks); and bifurcating disciplines (branches). While an arborescent model works with linear development, rhizomes indicate horizons and connections. Knowledge in this scenario is like the world wide web where links lead to links, to broken links, to be taken up in new links within links.

As Brian Massumi notes, Deleuze and Guattari create an image of “a rhizome network strangling the roots of the infamous tree” (1987, p.ix). However, the theorists are not simply anti-tree; in fact, the banyan tree of the tropics, also known as the strangler fig, is a spectacular example of rhizomatic imagery (Lundberg, 2008, pp. 9-10).

Deleuze and Guattari’s principle of cartography allows for open-ended mappings of the blog posts and comments. Cartography is a characteristic of the image-based philosophy of rhizomatics, which demonstrates multiplicity and non-linearity. In this philosophy, de- and reterritorialisation are processes of intrinsic change that, like rhizomes, push and pull in multiple directions – potentially rupturing into lines of flight.

Map the blog posts and comments through the principle of cartography.

The principle of cartographic does not aim to trace a linear progression – of one thing leading to another; rather, mappings demonstrate and ecology of blogs and comments and thinking which is immanently open to change. Philosophy of rhizomatics and its principle of cartography suggest theoretical and empirical angles through which the blog posts and comments can be entered into and studied.

**Blog Assessment**

In weekly posts students reflect upon the six key concepts of the subject: power, space-place, reality-virtuality, communication, self-community, and exchange. These concepts are mapped through case studies of: people networks ranging from diasporas to slavery to protest movements; food networks including trade routes, foodways and changes in cuisine; nature networks, for instance ecosystems, pollutions and viruses; and the network of things as they relate to the movements of markets and post-fordist manufacture, for instance. Throughout the subject there is an emphasis on how power operates through networks and also an emphasis on thinking how they operate in both virtual and reality domains.
Over a period of six weeks each student makes a weekly blog post and comments on another student’s post. For each blog post they apply concepts from the week’s lecture and the theory or case study reading to an analysis of a social network (either real or virtual) that they encounter in everyday life. They must also include in their blog post at least one relevant image and one hyperlink to a relevant online site. All images and references to other works need to be referenced.

Students are also required to make a short comment on at least one other student’s post to demonstrate their academic peer engagement with other students’ ideas. Blog comments are expected to engage at a scholarly level, and contribute to the other student’s ideas by offering further analysis by connecting back to the subject lectures, theories, content, concepts or any of the set readings. At least one reference to a lecture or set reading is required for each comment. Over a designated period of 6 weeks, students make six blog posts and six comments on another post creating a web of networked ideas that involves them in scholarly practice and creates a shared resource for their future assessments in the subject.

Blogs are anonymous, each student creates their own blog avatar. Avatars not only offer anonymity through a different face; they can offer empowerment to first year students learning to find their scholarly voice.
Conclusion

Cartography of a blog

Figure 2: Map of comments on posts.

Figure 3: Map of comments on posts – numbered
Figure 4: Map of directions of network posts

Figure 5: Map of directions of network posts
Figure 6: Map of individuals (avatars) and concept networks

Figure 7: Word graph for all six concepts (Wordle)
References


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