Indigenous Knowledge and Resource Management in Northern Australia

making collective memory with computers



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Software for Educating Aboriginal Children about Place - DRAFT ONLY

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for

Education and Technology: Critical Perspectives and Possible Futures

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INTRODUCTION

In this paper I imagine how a piece of software that is yet to be built might contribute to learning of being in-place by Aboriginal Australian children. Growing out of a project researching how digital technologies might support knowledge management in Aboriginal Australian communities, as yet TAMI exists only as a proof of concept. Imagining TAMI's possible future participation in enriching learning about place by Aboriginal (and other) children, I take up an analytic toolkit that has been emerging from science and technology studies since the late 1980s, of which perhaps the best known expression is actor-network-theory (ANT). This entails struggling with a new way to understand what knowledge is.

I argue that a significant aspect of TAMI's possible contribution lies in the non-coherence it promotes. Using the digital objects stored in TAMI as representations of place requires explicit connecting (and sometimes separating) work. In explaining how this might possibly be beneficial in children's learning in place I make analogy to the benefits bilingual Yoruba children derive from dealing with the non-coherences of Yoruba number and English language number.

TAMI (standing for **T**exts, **A**udio, **M**ovies, **I**mages) is the acronym of a computer program with several unique features. A file-management system, a small database, software for community informatics, local archiving software? Any or all of those general descriptors are applicable. TAMI was designed with and for Aboriginal Australian teachers, parents and grandparents so that they might work with the children of their communities inducting them into the collective life of the various places to which they belong and from which they derive their identity (Verran *et al*, 2006).

We want to build TAMI as open-source software and but since it involves generating novel base code this is not a simple matter. In the context of this paper we can take TAMI as a tool for capturing, storing and using digital objects concerning local collective life and place. It promises new ways of 'doing' Aboriginal Australian place—a new form of enactment or performance, a new way for children to be inducted into their place and become fuller members of their community. In this paper I work towards a more detailed description of TAMI (the final section in the paper) through an extended consideration of a particular way of understanding technology.

DIGITAL TECHNOLOGIES AND ABORIGINAL KNOWLEDGE

In July 2003 I began work as a chief investigator in a research project somewhat unexpectedly funded by the Australian government: 'Indigenous Knowledge and Resource Management in Northern Australia' (IKRMNA; http://www.cdu.edu.au/centres/ik/). Along with colleagues Michael Christie and Waymamba Gaykamangu from Charles Darwin University in Australia's

Northern Territory, I soon found myself working with designers and programmers of software, and a number of Aboriginal individuals and groups who for one reason or another were keen to incorporate digital technologies into their community's or family's collective in-place memory making . In applying for the grant we had summarised the project in this way

> The project responds to increasing demands of Indigenous communities across northern Australia for the digital archiving of threatened Indigenous knowledge (IK) to facilitate conservation and intergenerational transmission. The project aims to develop a series of databases of IK satisfying the requirements of varied stakeholders, including Indigenous communities, resource management agencies and researchers. The project is innovative in giving a dominant voice to Indigenous researchers and consultants in the development of protocols for database structures, protection of intellectual property rights, intergenerational transmission and negotiation of dissemination of information to resource management agencies and academic researchers.

Many elements in IKRMNA research are controversial. Some of the tension revolves around generally perceived incompatibilities between databases and other digital technologies on one hand and Aboriginal knowledge traditions on the other. Other contentious aspects concern widely held worries that using computers and digital technologies in educating Indigenous children about their places will undermine the centrality of embodied in-place experience in Indigenous identity

A significant number of Indigenous and non-Indigenous people respond with horror to the idea of using digital technologies in collective in-place memory making in Indigenous communities. Are digital technologies compatible with Indigenous knowledge? Many insist that Aboriginal knowledge is out on the land, and that people live it by doing things together on country, in-place. Computers and other technologies generating digital objects do more harm than good, they claim. Their concern grows from worries about disenfranchising Aboriginal knowledge authorities, further marginalising legitimate Aboriginal interests, diversion of energy and resources from Aboriginal priorities, backgrounding of Aboriginal sensibilities and sensitivities about valid knowledge practices, and misappropriation of intellectual property.

Many of those who oppose using computers in Aboriginal children's learning of traditional knowledge practices further claim that as mere representations digital objects actually impede learning of authentic ways of being in-place. And many teachers and parents involved with children's learning in place in other cultural contexts would agree. Such worries are not confined to Aboriginal Australians. It seems the difficulties and the complexities posed by disembodied learning through representations are even more challenging in Aboriginal communities, for at all levels of learning Aboriginal knowing is understood as performative and participatory. And

learning in place for Aboriginal Australian children is of a different ontological and epistemological order than other Australian children. The Aboriginal notion of being in the world has human existence as an outcome or an expression of place. As the judge in Australia's first landrights case argued in an early jurisprudential effort to do a metaphysics of difference, while perversely finding *against* the Aboriginal group's claim to own their land,

> ...it seems easier on the evidence, to say that the clan belongs to the land than that the land belongs the clan. (*Millpirrum and others Vs Nabalco Pty Ltd and the Commonwealth of Australia* 1979: 271)

Incorporating digital technologies in 'doing place' in Aboriginal Australian communities and in intergenerational transmission of place based knowledge is certainly the hardest case for local archiving software.

While recognising those legitimate concerns, I argue that there is a case to be made for using computers and digital technologies in collective memory making in Aboriginal communities and in enriching Aboriginal children's learning in place. At a practical level involvement in endeavours to assemble digital collections often actually expands Aboriginal children's opportunities for visiting places, for hearing the stories of place and how it is represented in song, dance, and painting. And secondly, and more controversially I suggest that there is a possibility that becoming skilled in using digital technologies could lead to enhancement of capacities in traditional arenas of learning in place. Thirdly, as we found early on in the project, Aboriginal people are already in their own places and their own ways, beginning to explore the knowledge management possibilities of these technologies for themselves.

Traditional forms of passing knowledge from an older generation to a younger one usually involves young and old being in the same place at the same time doing things together, talking about it. It involves a process of re-imagining place together, finding new forms in which to express understandings in sharing them. Indigenous communities value this collective performative means of learning in place perhaps even more than other Australian communities (Marika-Mununggiritj, 1990), but this does not necessarily rule out using digital technologies.

We find that Indigenous communities usually want to assemble collections of digital items for specific reasons, often to be able to intervene in a specific context in a particular way. The process of assembling collections of digital objects in these projects often actually create opportunities for sharing, times when young and old, with their varying competencies work together. Using digital technologies in place can become an impetus for young and old to work together in ways that can empower and educate the young while recognising older people as

knowledge authorities. In a rather trivial sense we could say that computers equipped with the right sort of software seem to have a form of agency here—they become the excuse for people to do things together in-place.

But there remains the question of whether encouraging young Aboriginal people to use computers in 'doing place' somehow undermines their learning traditional knowledge practices and alienates them from their culture. In all communities that have access to information communication technologies there are some children who get a ‘kick’ out of using them and others who find them boring. Some children can for a time get fixated. Children in Indigenous communities are no exception. Aboriginal children drawn to using computers and digital media will, like all children use them to express their feelings and culture. We often find Aboriginal children doing this in highly original ways. We also find Aboriginal children and adults resisting such engagement. .

So is learning through using computers a problem with respect to the work of gradually taking on the embodied dispositions which children need to assimilate as their own, practice for authentic experiential understanding of place? In other words could computers actually diminish children's capacities to engage in embodied learning in place? Or contra this negative formulation, is it possible that it might work the other way, and children's capacities might be enhanced? This is asking about agency of software designed for local 'doing of place' in another and more interesting sense. This is the sense of agency I focus on here.

In investigating such agency TAMI might grow to have, my starting point is to pose the above question in its positive form. Just as we know that proficiency in two distinct languages can lead to a form of cognitive enhancement for children, it seems possible that becoming skilled in using digital technologies could lead to enhancement of capacities in traditional arenas of learning in place. What leads me to make such a claim? It is rather a long story and relates to research I carried out some twenty years ago in Nigeria in West Africa (Verran, 2001: 123-142; Verran, 1999; Watson, 1987).

INTERFERENCE CAN ENHANCE CHILDREN'S LEARNING

The research involved conversations with around two hundred and fifty children. Using cups of water, beam balances and peanuts the children I interviewed showed me with gestures and words whether they could generalise about changes in the appearances of matter in valid ways; whether of not they had developed 'habits of looking' at the ways matter presents that would support number use. For example I questioned and watched children as they commented on whether and

how amount of water was changed when the contents of one of a pair of glasses that the children had agreed contained the same amount was poured from into two separate containers.

Around half of these children were Yoruba speaking children living in Nigeria where I was at that time working as a lecturer in science education. The other half were English speaking Australian children I interviewed during a family holiday back home in Victoria, Australia. It is what some of the Yoruba speaking children told and showed me during those conversations I am remembering here in suggesting that with programs of the right kind and managed in careful ways, using digital technologies in learning in place might actually enrich Aboriginal children's experiences of traditional learning.

The hundred or so Yoruba children I spoke to fell into two groups: monolingual Yoruba speaking village children, and bilingual children who attended the campus school of the university where I lectured. Not surprisingly, the privileged bilingual children belonging to an emerging Yoruba middle class, were far ahead of their village compatriots in terms of their cognitive development concerning quantitative generalising. This was demonstrated irrespective of whether the bilingual children were speaking Yoruba or English. The group of bilingual children I spoke to in Yoruba were also ahead of their English speaking age cohort in Australia. In development of their capacities in quantitative generalisation bilingual children speaking Yoruba were the most advanced.

This painstaking study had showed what others before me had noted, that profound bilingualism often brings cognitive enhancement. But what had not been previously noted or commented on by comparative psychologists were two rather surprising revelations that also emerged from the study. First the logical basis of generalising about amount of matter in Yoruba is profoundly different than in English, and second at least some of the children commented on this in detail. Matter is construed in quite different ways when one is speaking Yoruba than when one is speaking English. The types of entities these groups take for granted as being in the world differ. I had stumbled across difference in the ontics Yoruba speakers and English speakers routinely operate within.

'Ontics' is a term that will baffle almost all of my readers. However to be able to make my argument about agency the software TAMI might come to have, I need to introduce it. In the remainder of this section I try to show it before introducing it formally in my next section. I recognise that the next few paragraphs are not easy reading, but I hope that what I mean by 'ontics' will become a little clearer in what follows. As an initial explanation I ask you to remember the ways counting and measuring are done with repetitions of small bodily gestures involving matter arrayed in particular ways. These gestures include ways of looking at matter, as

well as the uttering of particular words—like number names, at particular points in the routine. Ontics are conjured up in such repetitious bodily gestures and acts of speaking.

Continuing my story of stumbling across a domain I call ontics by taking seriously what English speaking and Yoruba speaking children were telling me, let me remind you of something you must already know about using numbers. In English the logic of generalising begins with spatio-temporal particulars that are taken either as separate 'things' like oranges, or like pounds or spoonsful of sugar, as a continuum. Quantifying sugar we often recognise it as having the attribute of mass and we use 'pounds'; sometimes we take it as having the attribute of volume and we use 'spoonfuls'. From there generalising proceeds by constituting in acts and words accepted units by which those qualities like thingness (single objects) or volume (cupfuls or litres) might be managed. Use of number names when you carry out certain small bodily acts effects quantification. You are using a particular generalising logic through using particular ontics.

Ontics embedded in the ways Yoruba speakers do quantitative generalising is profoundly different to the ontics that underlie number use in English. In Yoruba the logic of generalising begins by noting what sort of matter we are dealing with. It starts with sortal particulars: 'water-matter', ‘peanut-matter' and the like. The process of generalising then proceeds to articulation of a unit appropriate for that sort of matter here-and-now as a basis for quantification. On this basis number names are introduced and value established.

For many people recognising that a profound difference exists at the level of the logical basis of generalising is a struggle. One of the reasons it is so difficult to make sense of the previous two paragraphs is that we are so used to the story that there is a single universal ontic domain—the one Kant described some two hundred years ago, and of course that is an ontics that goes along with the grammars of Indo-European languages.

The suggestion that many children who are bilingual in radically different languages must appropriate and deal with different ontics in their learning, is at first quite shocking. But as we do gradually learn to recognise ontics we become aware that children who are bilingual in radically different languages must learn to work with, and learn to manage the interruptions and non-coherences between two profoundly different conceptual constructs when they learn to do things like routinely quantifying in Yoruba and in English. This learning to deal with interruption and dissonance is probably the basis of the cognitive enhancement that for some children comes along with profound radical bilingualism.

In introducing my study of twenty years ago I said that two surprising things emerged from listening to what bilingual Yoruba children told me about quantifying. The existence of profound

difference at the ontic level was the first surprise. The second surprising thing that emerged from my study was that I found around fifteen percent of these bilingual children were very keen to explain the sorts of connections they were making in managing this ontic interference. They clearly found it interesting and challenging and seemed to enjoy talking of it.

Here is Folake, aged nine. She is doing a form of practical or empirical ontology—studying ontics. The mutual interruption, the non-coherence of the conceptually disparate logics of generalising in English and Yoruba that she works with has challenged Folake and she has come up with an insightful comparative description. She is explaining in Yoruba why the coca cola in a bottle is the same as that contained in a plastic mug filled with the contents of a second bottle of coke. *"Ara kan nàà ní wôn tórí pé inú ìgò kékéré nàà ni won fi si, o si jê kí o jô èyìí sùgbôn àpapö èyìí àti èyìí jê ökan nàà."* (They are the same because they put this there in this little bottle and that made them look like this. But the aggregate of this one [indicating the difference in width of the two containers] and this one [indicating the difference in the two heights of the liquid] is the same one.) Folake is prepared to comment on the nature of the unitary feature that contingently here and now forms the basis of quantification. She indicates that it is a unit of 'spacefillingness', but she still talks of it as a ‘mode of one’ (*kan)*. In indicating that the 'mode of one' (*kan)* that the implied 'coca-cola matter' appears in is 'spacefilling', Folake is connecting across language domains, transferring images in working Yoruba ontics alongside English ontics.

How might teachers work with this phenomenon and support children who are connecting (and separating) along such 'ontic gaps'? It would require recognising and being open and explicit about the possibility and nature of interruptions at a level of cognition that very few people are aware of. Here learners and teachers are working at the level of entities' existence or being—ontics. It is about learning to manage knowing along with doubt about reality. Weaning oneself from certainty. It implies recognising that reality can be done in this way or that, through this series of gestures, words, and material arrangements, or an alternative set.

I have told a story about Yoruba speaking Nigerian children's learning to use numbers embedding profoundly different generalising logics and managing the dissonance that accompanies that. I have explained them as working knowing along with doubt rather than clinging to certainty. How is this relevant to questions around Aboriginal Australian children using a particular software to learn about their places? It is, as I said in beginning rather a long story by which I am show the existence of ontics as a realm of activity we can become aware of and learn to work with.

What I want to foreground here is the explicit setting side-by-side of non-cohering categories of generalising that many bilingual Yoruba children learn to do, and of which some would readily

talk. I want to bring into focus questions of how we can make such insights routine, how we can bring them to the surface and manage them explicitly. Recognising that ontic interruptions can be useful in promoting learning, my feeling is that learning about place using digital technologies and computers loaded with particular software can and should introduce similar dissonance. That interrupting can help children recognise the importance of doubt, and support their learning to manage uncertainty in generative ways

When they begin to use computers to do place, the categories native to computers' operating systems: word files and jpeg files, hardware and software and so on, fail to connect with the categories native to being an in place Aboriginal Australian learner: *gurruṯu* (kin) *yirralka* (ancestral sites), *djalkiri* (footsteps of the Ancestors) and so on. Introducing computers' categories in doing places introduces the need to think about ontics, the configurations of various representations routinely employed in doing places, and how those configurations might be justified. The point is *not* to make a seamless translation between digital objects and the places they represent, but rather to manage the juxtaposition and to recognise interruption as a virtue.

I am speaking of Aboriginal children's place learning here because recognising and working with the different ontics of knowing place in Aboriginal communities in designing software is what our IKRMNA project was set up to do. However it is clear that this approach to understanding relations between software and its human users can in principle be extended to learning in place in non-Aboriginal communities. It is also relevant to other forms of learning. The approach embeds the general notion that recognising and respecting the ontics implicit in local collective action is important in designing software. Such recognition implies rendering explicit the making of ontic connections (and separations) by users of the software. This is just what TAMI is designed to do.

In contrast to most database software, in using TAMI the question which digital objects might be assembled to make a true representation of a place is actively problematised. Separating processes of the deploying digital objects from questions of true representations is useful for learners. In engaging the computer's ontics (differing file types) and actively selecting a particular group of digital objects to represent a place, users are routinely challenged to articulate a justification for that particular selection. Not only do they learn to know, they also become aware *that* they know, and *how* they know. In assembling a representation of place they learn about that place, about methods of knowing, and methods of justifying that knowing—epistemology.

'ONTICS'?

I have described stumbling across children explicitly making connections where previously I had not imagined separations as existing. Twenty years ago I found the idea that links could be made, and made in better and worse ways was both startling and difficult to articulate. Previously I had gone along accepting the Kantian compromise and assumed the existence of a singular given noumena—necessary things that are thought. Or rather I went along with one particular version of what Kant's compromise had become near the end of the twentieth century. In this section I make a diversion to explain the nature of this compromise, where the term 'ontics' comes from, and why I use this unfamiliar term that interrupts, and perhaps 'puts off' my readers.

Kant (1724-1804) credited David Hume (1711-76) with bringing him to his senses. Hume's analysis of the notion of cause and effect cut the ground from the idealist (Leibnizian) metaphysics Kant had previously accepted. A philosopher at the centre of the Scottish Enlightenment, Hume was at pains to show the limitations of a notion of reason based on ideals, and explained how we make the judgements we do on the basis of the human experience of being in the world. In taking up Hume's challenge Kant agreed that his critique left no alternative but to look to the senses. But Kant went beyond Hume and invested his empiricism with a new form of metaphysics, in claiming that senses represent not only the empirical 'out-there' but also the mind 'in-here'. This makes it possible for the mind itself to generate a priori concepts.

Kant's solution to Hume's puzzle is offered as a radically transformed "critical" metaphysics. According to Kant the world's most general features—such as its empty spacetime framing of matter, and causation understood within this spacetime/matter frame are imposed on it by 'us'. Consequently those features which we can know a priori and are the contents of a respectable metaphysics, belong merely to the world as we experience it and not to the world as it really is in itself independently of human cognition. Thus the 'thing in itself,' the noumena, is known by not being knowable. By definition it transcends all experience.

Some philosophers call this realm 'the ontic'. Most philosophers understand 'the ontic' as complete and static and with given distinct separations. Yet being tricky and paradoxical (being known by being unknowable) it is difficult to characterise. Some like Kant, Husserl and Heidegger understand it as depending in large measure on what humans contribute. Heidegger differs from Kant and Husserl in that his 'we' who know 'the ontic', are concrete existing beings as distinct from (a Kantian) pure consciousness seeing from nowhere and everywhere. Some twentieth century philosophers reject Kant's compromise for dealing with the paradox in which the ontic is embedded. For Quine an American logical positivist philosopher, the ontic, existing on the other side of a stimulus gap is ineffable and inscrutable, merely its existence is attested by

the senses. As Quine sees things the best we can do is struggle to be clear about the ontic commitments entailed in knowing.

Conventionally ontology is the term given to study of 'the ontic'. Not surprisingly relations between 'the ontic' and its study 'ontology', is cause for much discussion. Husserl and Heidegger try to describe the ontic without the help of theories and preconceptions, which Heidegger maintains can only be achieved by totally re-thinking the language of philosophy. For Quine in contrast ontology can merely be asking about the validity of ontic commitments.

Doing ontics as I understand it could hardly be more different from the ways these twentieth century philosophers imagined it. Mine is not a quest to describe how things are. For me ontics recognises itself as emergent, partial and performative. In this I see myself as following the philosopher A.N. Whitehead. Ontics does not aspire to completeness and accepts and values vagueness. Ontics is a politics of rendering our ontic commitments visible, often by telling stories, but also in other sorts of embodied performance. Doing ontics is doing a politics that is continually straining towards doing another sort of politics — ontological politics where we discuss if and how we might make explicit our ontic commitments and so interrupt and create possibilities for considering doing things differently. Ontics depends to some extent on what we humans contribute in our embodied participation with the non-human in collective acting (including doing ontics). Ontics recognises that ontic commitments emerge in collective action and hence are not given once and for all.

Let me illustrate briefly by telling a story of space that will help us in beginning to see an ontic politics inherent in Kant's critical metaphysics. Empty universal space and time are a significant element in 'the ontic' of many twentieth century philosophers. It is for example central to Kant's noumena. When we have ontics as *enacted,* space is recognised as an outcome of collective acting. And further, we recognise that space emerges and exists as multiple entities, which connect in various ways, but sometimes might also interrupt and clash. The increasing predominance of tracked and self-tracking position as space, can sometimes be connected up ontically with space as empty extension (as Kant imagined it) but not always, or often (Thrift, 2002).

The space Kant assumed was the outcome of collective activities of doing space in the late eighteenth century when he was writing—sailing off into the unknown with only sextant and compass and their associated cartographic traditions to render the bits of the continents you came across, re-locatable in a world imagined as a grid.

Many geographers now insist on recognising a new twenty first century way of doing space. Nigel Thrift suggests space as practices of doing positionality is becoming dominant in many places today. This space is the outcome of working in alternative ways, with different materialities, different institutions, differing ways of textualising and imagining collective action. In involves different alternative bodily movements, and sets of words and linguistic conventions. In the emergence of space as positionality, a reality of the twenty first century, the carefully arranged materialities of today's information communication technologies are important, but only one element.

In this new way of understanding the multiple realities of space we recognise that many sorts of space being 'done' in the also in the eighteenth century. In accounting what he saw as an absolute space Kant attended to a particular set of collective activities—those valued by the emerging imperialist states of Europe. But at the same time as that sort of space was being done by agents of the state, other sorts of space were being done by agents involved in different projects. For example officers of the East India Company did space by plying a route. They used familiar landmarks in developing complicated route maps (Barrow, 2002). Recognising this brings with it the need for a new imaginary by which we understand knowledge. We need to go beyond Kant's singular world.

IMAGINING THE ONTIC AS ENACTED

In trying to understand and explain what a group of Nigerian children had shown me, I found that a new imaginary, a new account of realness and how it is known was needed to understand the workings of multiple generalising logics. I needed a notion of knowledge that had realness as emergent in collective action. I saw that if I was to do analysis that recognised as real the difference that Yoruba and English speaking children had revealed to me, I had to abandon my old working image of knowledge.

I had to jettison an account of knowledge which up to that point I had never doubted, indeed had never imagined could be doubted. The Yoruba and English speaking children I listened to had shown and in some cases eloquently explained difference in generalising logics. But the image of there being a single given foundation for knowledge to be about, an image central to many Western theories of knowledge (epistemologies), was getting in the way of my being able to work with this difference as real, as part of collective life in the here and now.

The new imaginary that I espouse conjures up multiple enacted realities. The singularity of the sciences' reality is seen as a special sub-set of the prevailing multiplicity effected in collective action. Entities—both objects and subjects, materialise or 'clot' as configured in particular ways

in the here-and-now. This can be understood as a partial account of the ontic commitments of those working in an arena that is often vaguely standardised (in the sense of gathering behind a standard bearer) as actor-network-theory (ANT).

In this new imaginary realness is achieved in the emergence of webs of gradually clotting, and eventually routinized, sets of actions that connect as nodes. These nodes are established sets of embodied acts and mostly banal, but sometimes innovatory. Acts performed and re-performed in a repetitious, ritual-like way. The repetitions pre-script times-places to both promote and limit creativity. In some cases like numbers, we are so familiar with these routines that they are often invisible. In other cases like using computers loaded with software like TAMI, they are so unfamiliar as to be thoroughly irritating and often alienating.

The image of a web here is not one that is spun or regular in any way. It is more like the web of that would emerge were a piece of felt to be pulled out to a flopping filmy gossamer, folding and wrinkling where irregular connections and breakages between the wool fibres emerge. Another image sees one of the new sorts of colloid materials marketed to children as 'play goo' stretched to a film. The irregular nodes amongst the strands that form are the relationalities within which entities emerge.

Numbers, can be and are accounted in many and varied ways. Recognising the ontic in a new way, I added a further account: numbers, both Yoruba and scientific as having political life. To understand numbers' agency in this ontic sense we can imagine them, like all agential entities as inhabiting the spaces or intervals between collective enactments. Numbers seem to lie there mostly just out of focus in collective life, always ready to actively re-exist when we do the right actions and say the right words. I imagine numbers pulsating and quivering there in these intervals, always in potentia, apart from their brilliant, ephemeral realisation or clotting in enactment, time and time again.

But it is not only numbers that exist in this oscillating way, forever ready, awaiting their cue in the wings. If we do get money to build TAMI, this piece of social software too will exist in this sense as an arrangement people and computers, places and times. Like all entities this is where/how TAMI might come to be as agential in this ontics sense, suspended between enactments of its possibilities. Entities lurk or loom in the interstices between the repetitions by which they are done. The relationalities through which they exist are external to their being 'clotted' entities. That's how all entities express relationalities; how entities (actors or actants) are networks; and how networks of relations are entities.

I have introduced a new analytic imaginary: taking worlds as ontics already collectively enacted yet always emergent ontics. Worlds become in occasional and sometimes unexpected 'clottings' of actual, embodied routines. This new analytic imaginary suggests that we would do well to enquire about, puzzle about, the rituals and routines through which we 'do' our worlds (including the methods by which we claim to know) if we are concerned about the character of these emergent realities.

For example those of us struggling to design software need to take heed; we need to take care in summoning-up new sets of routines—as we have in coming up with a proof of concept for TAMI. If TAMI does come to life it would participate in making realities. Maybe not too many realities would be impinged on by TAMI, but those realities that might be re-made in some way through TAMI's existence matter a great deal to those humans who would be sharing in realities TAMI could participate in generating. As a tool for managing collections of digital objects, TAMI is a partial method for generating partial realities. So too are analytic articles like this one I am writing and you are reading.

What I characterise as ontics can be understood as a contribution to a collection of sensibilities about method (Law, 2006). This 'toolkit' of method ideas remains emergent and internally divergent, recognising several origins that are to some extent distinct, but also overlapping. Practitioners range from those who like Latour and the other initiators of actor-network-theory (ANT), Michel Callon and John Law, cite the work of Michel Serres as inspiration along with a dissatisfaction with historical and sociological studies of science that predominated up to the 1980s. They were dissatisfied with the clear distinction that these studies drew between the 'inside' of science which it was assumed progressed through a unitary scientific method, and an outside of science—society, where anything goes. They saw this as both descriptively wrong and analytically paralysing. Among other moves, these initiators of ANT made a profound shift in adopting a semiotic stance by looking at the *roles* entities played in the collective action. They refused to differentiate these roles on the basis of whether these entities were human or non-human. (The literature around ANT is huge. Perhaps the best way to begin to explore this is to visit a marvellous website maintained by John Law: http://www.lancs.ac.uk/fass/centres/css/ant/index.htm).

Recently, in understanding himself as producing an introductory travel guide, Bruno Latour announces that he would like to call the method I am both exemplifying and presenting here, 'associology'—a sociology of associations, but he recognises that term as so incomprehensible as to be out of the question so

> ...what is it to be called? Alas, the historical name is 'actor-network-theory', a name that is so awkward, so confusing, so meaningless that it deserves to be kept...after all the origin of the word 'America' is even more awkward. I was ready to drop this label for more elaborate ones like 'sociology of translation', 'actant-rhyzome ontology', sociology of innovation', and so on until someone [actually Donna Haraway, in 1997] pointed out to me that the acronym A.N.T. was a perfect fit for a blind, myopic, workaholic, trail-sniffing, and collective traveller. (Latour, 2005:9)

Donna Haraway's feminist critiques of the realities that the sciences generate paint a striking picture of emergent worlds constituted in the practices of biology. Her work clearly demonstrates an ontic politics. She insists that making explicit *why* one wants to make something explicit is intimately tied to *what* one makes explicit (Haraway, 1997). Also coming with a sensitivity to partialities engendered by feminism, Annemarie Mol relates how she stumbled across ontics in her second year of medical school, when she was also a first year philosophy student.

> Thursdays were the best. In the mornings I had a philosophy class about the body and in the afternoon an anatomy class where we dissected corpses. Barthes gave way to a large, white room that stank of formalin. Merleau-Ponty was followed by corpses wrapped in orange towels and green plastic. In the mornings I would learn to unravel Foucault's writings and in the afternoon I was supposed to explore the pelvic cavity of a female body without cutting through nerves and blood vessels...(Mol, 2002: x)

The disconcertment of those Thursdays, "the remarkable materiality of it all: sentences in difficult French, strange smells, … clumsiness in cutting" (page xi) re-emerged more cogently some twenty years later when she was writing about following medical practitioners around a Dutch hospital. She found many methods are involved in doing what most people think of as a single entity—atherosclerosis. As a series of entities, atherosclerosis is made real as multiple and quite heterogeneous. In clinical work atherosclerosis is both a single entity and also bewilderingly multiple in the ways it is done.

Mol wanted to be able to ask how these multiple real entities embodied various 'goods'—like politics, aesthetics, and justice, and how these might be made evident. She wanted to study the ontological politics of (Western, cosmopolitan, allopathic) medicine (Mol, 2002, page viii).

And as I have just described, worrying about why my relativist academic study of differences between logics that characterise some African systems of thought and the logic of science inevitably ended up explaining away those differences, as a biological and/or social inadequacies of Africans and their societies similarly led me to articulate a politics around ontics (Verran, 2001: 124). How could I come to terms with the disruptions wrought by taking seriously what

my experiences amongst Yoruba speaking Nigerians were revealing? How could I tell responsible stories? (Verran, 1999).

METHODS IN REPRESENTING MULTIPLE REALITIES

John Law recently described the approach I am introducing here as recognising

> ... heterogeneity and variation. It is about following Lewis Carroll's queen and cultivating and playing with the capacity to think six impossible things before breakfast...pointing to and articulating a sense of the world as an unformed but generative flux of forces and relations that work to produce particular realities (Law, 2004: 6).

But how to tell of the indefinite and non-coherent flux of forces and relations? How to do our problematised methods without becoming the Red Queen? While clearly we cannot know and tell of the indefinite without limit or with certainty since it ramifies on for ever and is infinitely slippery, there are nevertheless styles and genres of telling that do achieve just that. Allegory is one of them, "a method for non-coherent representation" (Law, 2004: 6).

For example, challengingly, Law argues that the horrors of train collision can be understood as a performative allegory for the disorganised and dilapidated British rail system that usually holds together "as much by inconsistency as by consistency—that is by the ubiquitous practice of the allegorical" (Law, 2004; 14), but sometimes the inconsistency—a train travelling fast on defective rails, expresses itself in ghastly ways. A train crash is also, Law notes, a performative allegory of pain and suffering.

'Performative allegory': an elaborated metaphor to represent (or present) something—an object, a state of affairs, where it is clear that transfer and juxtaposition is involved. Saying the train crash is a metaphor for pain and suffering is to draw attention to, to make obvious a *juxtaposition* between a material expression—bangs and screeches as metal sheers, and carriages are demolished, and people's screams and moans and groans, and desperate cries for help. It refuses to rush immediately to claim a singular and definitive causal relation, and allows for the possibility that other sorts of relations have a place. A definitive story of causal relation while not ignoring the pain and suffering, actually explains them away. Other sorts of 'stories' might keep them present, which might be a good thing.

In this paper I point to places as, like railway systems, multiple realities, diffuse, and non-coherent, held together as much by inconsistency as consistency—the ubiquitous practice of the allegorical. This is as true of Aboriginal place, as of science's place. Yet there is a significant difference between science and Aboriginal knowledge traditions in the ways they do place. I discovered this when I found myself in a translating capacity at workshops designed to introduce

scientists to Yolngu Aboriginal methods of using fire as a land management tool (Verran, 2002a; 2002b). Yolngu Aborigines routinely separate questions of what to do from questions over what is a true representation of reality. The notion that places might be done this way or that is explicitly recognised.

Aboriginal knowledge traditions recognise and celebrate the ways their places hold together through the infinitely creative possibilities of allegory and metaphor. The ways Yolngu Aboriginal clan members collectively perform places –as in for example firing them as a form of land management, shows that they value the generative possibilities of ambiguity and ambivalence. At the same time they clearly recognise (and arrange for) enough collective coherence in a performance: setting fires in an agreed on and orderly manner (or at least attempting to).

Western accounts of place in contrast insist on place as really a singular given objective location (established in the sciences of cartography and surveying) with real geophysical and biological characteristics that can be definitively described. As science and Western though generally understands place, it might of course be multiply experienced by its inhabitants or visitors, they might have differing versions, but that is a matter of affect, emotion and art. Science's reality outlaws vagueness. Scientists claim not to use allegory at all. However the cartographic, geophysical, and biological accounts they give can be understood as a particular sort of allegory—allegory that refuses to recognise itself as such. The metaphor involved in science, the transfer from one domain to another –from a hot and uncomfortable prickly grass plain that 'needs' burning for this reason or that, to a series of scientific reports, is forgotten.

As Law notes it is sometimes said that allegory is a lost art in Western life "we have lost the craft of saying things indirectly". He suggests that this has a lot to do with the overwhelming dominance of literal representation, direct and singular representation is celebrated. However

> [t]he *appearance* of direct representation is the effect of a process of artful deletion. So the argument we need to make is this. On the one hand, indeed it is the case that direct representation offers no overt space for allegory. But on the other hand direct representation is *built* in allegory. There is nothing direct or literal about the link between present statements and the absent realities. .... They are effects of allegory that conceal their allegorical origins. That is what [direct] representation is: *allegory that denies its character as allegory*.
>
> ...wherever there is depiction, so too, there is allegory. So it is not that allegory has been lost [in modern Western life], but rather that it is covertly practiced. Or to put that differently, we are all

> steeped in the art of allegory. Natural scientists, social scientists, politicians, journalists, workers by hand and by brain, all of us are expert allegorists. (Law, 2004: 89)

In pulling you my readers (painfully?) into a new imaginary for realness and knowledge I have taken you on a long and difficult excursion through the vague and paradoxical terrain I call ontics. I now return to the issues that prompted that diversion. The question of TAMI's agency and how it works through promoting non-coherences as Aboriginal children learn about place through using digital technologies.

AN ABORIGINAL DIGITAL COLLECTION

Why do Aboriginal communities, families, and individuals want to make and display collections of digital objects? In working up to formally introducing TAMI, I now go on to describe a particular collection of digital objects that has been made by some of our co-researchers in IKRMNA. Describing Mängay's collection, one of the products of our IKRMNA work, a DVD "East of the Arafura Swamp", helps to see the serious purpose that Aboriginal curators have for their collections of digital objects. Playing the East of Arafura DVD displays seventeen short movies about different places around the eastern edge of the UN World Heritage listed Arafura Swamp.

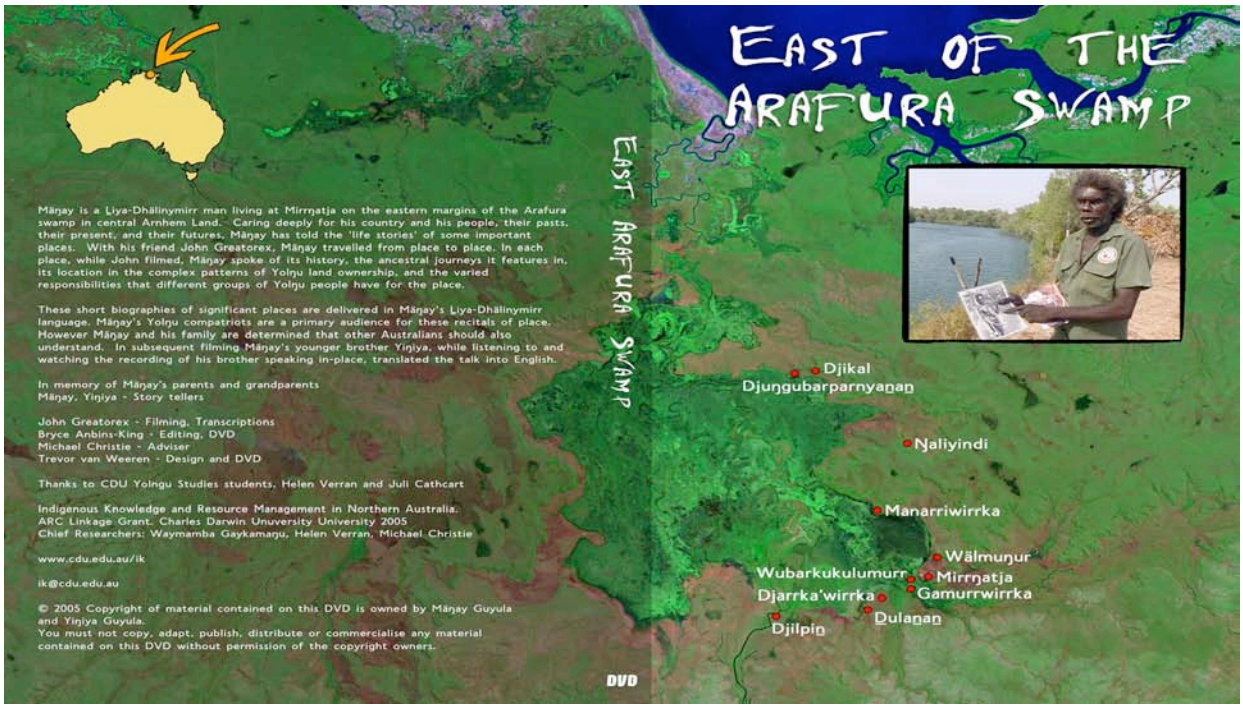


Figure 1. The slick of the DVD "East of the Arafura Swamp" an exhibit of digital objects representing some Yolngu Aboriginal places.

The text reads on the slick of this DVD is as follows:

"Mängay is a Liya-Dhälinymirr man living at Mirrngatja on the eastern margins of the Arafura swamp in central Arnhem Land. Caring deeply for his country and his people, their pasts, their present, and their futures, Mängay has told some 'life stories' of a few important places. With his friend John Greatorex, Mängay travelled from place to place. In each place, while John filmed, Mängay spoke of history, the Ancestral Journeys it features in, its location in the complex patterns of Yolngu land ownership, and the varied responsibilities that different groups of Yolngu people have for the place.

These short biographies of significant places are delivered in Mängay's Liya-Dhälinymirr language. Mängay's Yolngu compatriots are a primary audience for these recitals of place. However Mängay and his family are determined that other Australians should also understand. In subsequent filming Mängay's younger brother Yingiya, while listening to and watching the recording of his brother speaking in-place, translated the talk into English."
(see http://www.cdu.edu.au/centres/ik/db_mangay.html)

Here is John Greatorex telling a story of the making of this collection of videos.

Mängay's Collection of Digital Objects
A story told by his friend John Greatorex

About ten years ago, maybe longer, when I was working in Galiwin'ku, Mängay had the idea of using videos to present a message to other Yolngu. It was the time for a peace-making ceremony or a *makarrata*. There'd been an event and he thought "The way that I can actually get my message to other Yolngu people in this region here and bring this ceremony about is to send messages on video." So he made a video recording of various people talking and distributed that amongst certain people. And that was helpful.

Then in 2003 he became fairly frustrated with a number of issues so he thought I want to make more videos. He was concerned that many Yolngu growing up in communities like Galiwin'ku and Gapuwiyak had never seen parts of the country which were important to them. They didn't know the histories of places and the stories, and the patterns of its ownership and responsibility. And for some time he had been concerned that many non-Yolngu people especially those working for mining companies and people working on a proposed gas pipeline, were doing things without involving all those who should be included in making decisions.

In 2003 Mängay asked me to come to Mirrngatja with a video camera. We travelled from place to place. In each place, while I filmed, Mängay told some stories of the place. And when he pointed out particular features of a place we focussed the camera on them so people could clearly see what he was talking about. What he told and showed were only 'outside' or 'beginners' stories.

The plan was that the details which Mängay is giving of each place in the video would be transcribed and translated. Then he would have written texts in electronic form that documented his stories accurately. Yolngu studies students from Charles Darwin University were given the chance to work on the transcriptions and translations, and they are still being worked on. Then Yingiya, Mängay's younger brother looked at the videos we had made. Recognising that some of the sound track was pretty unclear because of noise of wind against the microphone, he worked to produce another set of videos for student use. He repeated more slowly and clearly what his brother had said in the original video to make transcription and translation easier. Then later still Yingiya made a third set of videos where he speaks in English giving a spoken Aboriginal English translation of Mängay's stories.

In addition to these collections of video clips and texts about each place, for many of the places Mängay spoke of there are other images that have been returned to him from the Donald Thompson collection at the Melbourne Museum. In some of the original videos he is holding up one of these images.The museum has now given him digital versions.

Mängay and his immediate family have a gradually growing collection of digital objects concerning the on-going life of places that are important to them. The collection is housed on several computers, and has been assembled through using DVD Media Pro software to generate a display product that can be played on television sets. In this way Mängay is using various elements from the collection to educate both his Yolngu compatriots and others who in his opinion need to be educated.

Each copy of the DVD Media Pro display that is burnt distributed and watched, can be understood as a new performance of the choreographing work that Mängay and John Greatorex undertook in 2003. There is however a problem with this arrangement. Once assembled by the expert hands and eyes and skilled sensibilities of IKRMNA design researchers Bryce Anbins-King and Trevor van Weeren using proprietary software like DVD Media Pro, or iView Media Pro the collection is stuck in a particular array. Its capacity to be tailored specifically for each type of audience and each time-place of performance is very limited.

There is a very real danger that the movies on the DVD will come to seem like a scientific report, because the display is set and stabilised. It plays without explicit recognition that like the stories Mängay tells, any particular viewing should be understood as also a particular performance of place. As representations that are immutable they will suffer the debilitating effects of the literalism that pervades contemporary modernity. Despite the best efforts of Mängay and John the movies can all too easily be viewed as if they are claiming to be a singular, definitive account of the places they visited.

The immutability accomplished so seamlessly by the technology imposes very severe limitations from an Aboriginal point of view of 'doing place'. In part it was recognition of this limitation on flexibility of performance that most software for dealing with collection of digital objects embeds, that led us to design TAMI. As practitioners of their knowledge traditions Aboriginal Australians recognise, respect, and value what coherence can achieve but insist that knowledge is performance. Knowledge of place is necessarily particular collective enactments of place. Coherence with other collective performances is routinely choreographed and problematised. It is as performance then that we need to understand collections of digital objects designed by Aboriginal knowledge authorities to attest place. Aboriginal Australia knowledge traditions 'do' place with a full recognition of the generativity of allegory and metaphor (Verran, 1998; 2000a; 2000b; 2004).

If TAMI is developed we can imagine it being useful to Mängay. It would be much more flexible than the DVD Media Pro software in developing exactly the collection of digital objects he needs for the rather varied groups of people he would like to use them with. In addition to playing (performing) various video clips with some groups—say a group of family members who hold interests in the place different to those Mängay is mobilising, is likely to be a useful occasion for recording further clips or making audio recordings. TAMI will allow such newly minted digital objects to be added to the collection in unstructured ways. Both the givenness of place and its continuing emergence is enabled:TAMI enables different configurations/performances for different contexts, and its use allows for further emergent productions of place through the added contribution of others.

INTRODUCING TAMI

The TAMI proof of concept imagines parents, children, teachers, grandpas and grandmas generating and collecting digital objects of various types. It sees users as presenting and representing their places and collective life by designing and presenting/performing collections for many sorts of purposes. TAMI is software that allows users to collect and store digital objects, and to use them in various arrays and forms to 'do' their places and their collective lives in ways that make sense to them. It is a digital tool for recognising the generativity of allegory and metaphor, and for interrupting in doing the ontics of place. However, claiming this points to a precondition for the usefulness of TAMI. Its use in both generating collections and performing (showing) them, is interaction, involving conversation, performance, selection, display, reactions, reconfigurations, assessments and so on.

In TAMI digital objects are stored solely on the basis of their file type, and the interface of this software privileges and prioritises visual searching mechanisms. It is possible for users to identify

a file on the basis of the thumbnail and pick it up drag it and drop it into an emerging collection that expresses something of their understanding of place or an episode, event or person. There is also a fuzzy text search mechanism for those who do use written words to search, but whose grasp of literacy is minimal. There is a capacity to arrange folders of objects that have been collected and put together, in this way or that onto the figure of a map. So folders can be dragged and dropped into places on a map (see http://www.cdu.edu.au/centres/ik/db_TAMI.html).

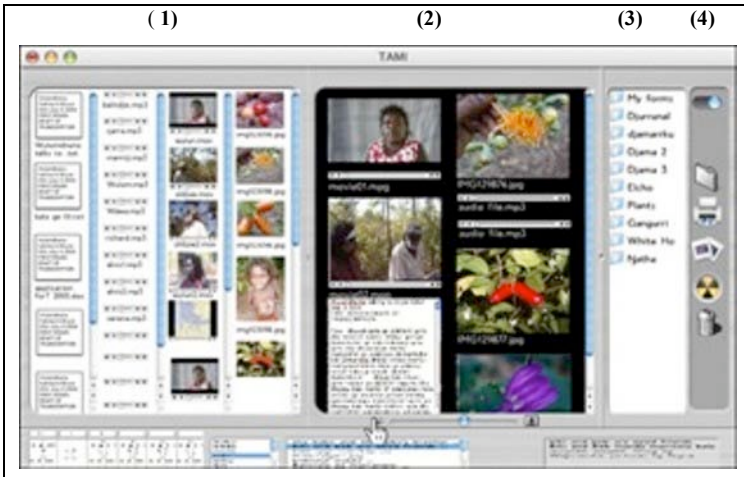
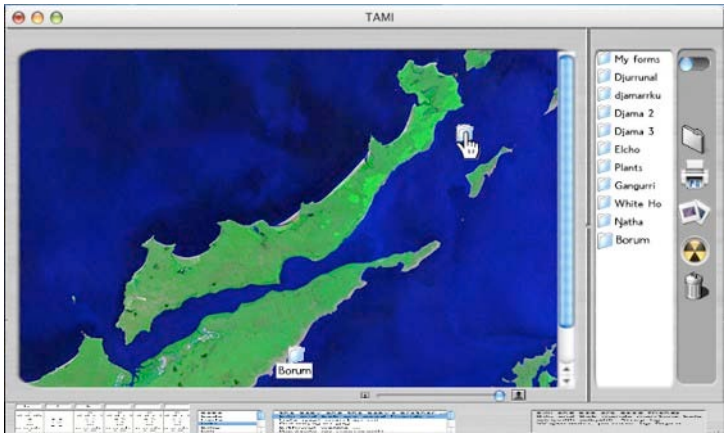
<table>
<tr>
<td>
</td>
<td>TAMI has a flexible single screen drag-and-drop interface, organising digital objects by media type.
Visual navigation prioritised:
1) 4 column file storage view area- Texts; Audio; Movies; Images
2) A central viewing arranging area
3) Collections storage area
4) Functions: slide show, burn disc
5) A single metadata field with dynamic search function</td>
</tr>
<tr>
<td>
</td>
<td>This view of TAMI shows the place-map image-based storage idea. Through drag-and-drop functionality users create collections and link them to places on map images.</td>
</tr>
<tr>
<td>
</td>
<td>This view includes the expanded dynamic search and single metadata view for easy searching using local languages with a fuzzy spelling capacity</td>
</tr>
</table>

Figure 2. Introducing TAMI by displaying some of its working screens.

We complete our formal presentation of TAMI by reproducing below the textual component of TAMI's proof of concept.

TAMI has been designed

• with and for people with few or no literacy skills

• people who want to manage their own digital resources for perpetuating local knowledge traditions.

• assuming that by and large, each TAMI database will be small and users will generally have a good idea of what they are looking for in the database.

• to make smaller amounts of valued resources easily enrichable for the purposes of on-going collective memory making, not to store large amounts of anonymous information.

• to be ontologically flat: as far as possible it encodes no assumptions about the nature of the world or the nature of knowledge, it is the user who encodes structure into the arrangements of resources and metadata.

• for the users to become the designers of their archives as they bring together resources, then group and order them, and create products (like DVDs and printouts). The ways in which truth claims are assembled and validated collectively within the knowledge traditions of particular knowledge traditions, can be left fluid.

• so that one single screen enables search, upload and view. A workspace enables different objects to be viewed simultaneously, and arranged into folders.

•to enable users to upload resources into the database by a simple drag-and-drop

• so that the only a priori ontological distinction at work in the database is the distinction between texts, audios, movies, and images. Apart from that there are no pre-existing categories, as there are in other database where metadata are sequestered into fields. This provides ontological flatness so local knowledge traditions are not pre-empted by scientific assumptions.

• objects can be uploaded and searched without metadata. Metadata can be added at any time. Its sole purpose is to help text-based searching.

• the usual way to find objects in the database is without a text-string search, that is, without a text driven FIND function. Texts, audio files, movies, and images can be searched by flicking through the full set of thumbnail resources.

• users can make assemblages, ‘folders’ of associated and linked resources. They can give these folders metadata. So the database can hold collections of resources based on a theme and these folders can be labelled and found through text-search.

http://www.cdu.edu.au/centres/ik/db_TAMI.html

TAMI is designed as a clunky piece of software. All its 'mechanical' processes lie on the surface. It is a learning/teaching surface designed to recognise and manage ontic incoherence, interference, and interruption, and to make that managing obvious and explicit. Consequently TAMI will never be a very comfortable experience either for teachers or learners. Users would be constantly aware that representations stored in TAMI, and the various configurations in which they might be arrayed are mutable. Any particular collection that helps us do place is provisional. Questions of 'true representations' of place cannot easily arise when doing place with digital objects managed with TAMI. Seamlessness is difficult to achieve. And that this is so is kept in the foreground. Recognition that places can be legitimately done with this set of files or alternatively with that set cannot be avoided.

Using TAMI will not enable singular answers to questions of how to live in an underdetermined world as conventional databases do through claiming to offer information that adds up to true representation. People might still use TAMI to try to make definitive and singular claims about place, but TAMI allows for those claims easily to be relativised by competing allegories. When that happens the work of deciding whose collection is valid and how is inescapable. Software like TAMI will promote learning to work differing practical repertoires in doing places. It will develop learners' capacities to shift between those repertoires and manage ontic uncertainty or fluidity in generative ways. TAMI can support authentically Aboriginal ways of learning about and knowing place.

Learning to recognise and manage ontic uncertainty and fluidity is a good thing. And with appropriate software, digital technologies can nurture capacities to do that, and not only for Aboriginal children learning about their places. Software along the lines of TAMI can be useful for inducting learners into multiple ways of doing place in all communities. Working with such software brings to the fore questions of the various 'goods' that are associated with various alternative ways of doing place.

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