

Heritage & Habitus: Designing to Support Situated, Living Knowledge

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ABSTRACT

We refer to an ongoing endeavour aimed to assist Indigenous communities in Australian in persisting their personal and cultural memories linked to temporally dynamic interactions *in situ*. The design enables Indigenous users to upload items they collect themselves (e.g. photographs, audio, video) using mobile phones, in their traditional lands into a topographical simulation; and, then to associate these items with their own hand-drawn markings in the simulation. The design responds to the rich interconnectedness between Indigenous culture and the land and the need to converge spatial information technologies with practices that are not, inherently, conditioned by the geometries of the West. We propose that the design approach contributes to thinking about ways that mobile guides can respond to multiple realities and corporeal and affective phenomena.

Categories and Subject Descriptors

J.5 [Arts and Humanities]; I.3.7 Three-Dimensional Graphics and Realism, I.6.8; Types of Simulation; H5.2[Information Interfaces & Presentation]:User Interfaces; K4.2[Computing Milieux]:Social Issues

General Terms

Design, Human Factors, Theory

Keywords

Representation, Mobile devices, cultural knowledge, Spatial Practices, Dialogic, Indexicality

1. INTRODUCTION

More Indigenous territory has been claimed by maps than by guns. This assertion has its corollary: more Indigenous territory can be reclaimed and defended by maps than by gun” Nietschmann 1995 [28]

In this paper we refer to an ongoing endeavour to address Australian Indigenous communities’ requirements to transmit their knowledge and memories embedded in their land. The design enables Indigenous users to upload items they collect themselves (e.g. photographs, audio, video), using mobile phones, in their traditional lands into a topographical simulation; and, then to as-

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sociate these items with their own hand-drawn markings in the simulation (Fig 1). We intend this venture to empower Indigenous people in persisting their personal and cultural memories linked to temporally dynamic interactions *in situ*. Given the rich culture of interconnectedness that has evolved for a people inhabiting a land for over two Ice Ages, we propose that the approach contributes ways that mobile guide design can respond to multiple realities more generally.

We proceed by outlining the need to better converge spatial information technologies with cultural practices that are not, inherently, conditioned by the geometries of the West. Then we summarise insights from various projects, with which we have been involved, that contribute conceptual appreciations informing our current interaction design. These include the achievements of a partnership to develop simulations of Indigenous traditional lands (e.g. [32][33][37]); our research on the role of natural features by people in cultural transmission to support a sense of belonging; and, our research into corporeal and affective dimensions in people’s experience while traversing natural places. We conclude by describing our progress in addressing these insights in our design.

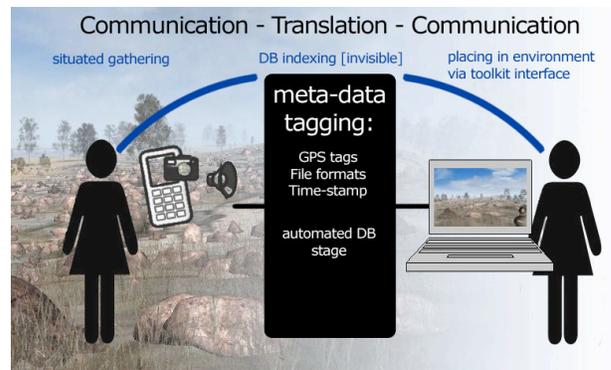


Fig. 1 Indigenous users upload items they collect *in situ* into the simulation associated with their own markings (see [36])

The way people represent local knowledge using spatial information technologies can reveal as much about their sociopolitical conditions as it can the meanings emerging from their own situated experience of places. Increased participation in Geographic Information Systems (GIS) enables diverse communities to interact with economic forces and governing authorities by describing the places in which they reside. In an increasing range of initiatives formerly marginalized people use Global Positioning Systems (GPS), data on the Internet, GIS, aerial photographs, satellite or remotely sensed imagery to promote their issues and concerns. For example, they support Australian Indigenous groups’ Native Title Claims to recover their nations’ traditional lands. Participatory GIS (PGIS) can integrate diverse forms of information to enable culturally-suited, peer-to-peer dialogue; however,

empowerment across socio-economic contexts, sectors and locations depends on interactions with certain representational conventions. So, usually geo-referencing and visualising two or three-dimensional maps are major conduits for participation.

Geo-spatial mapping in PGIS is a vital vehicle of advocacy for those formerly disenfranchised in decision-making but implicitly absorbs power relations. These uniform abstractions may help manage the indeterminacy of everyday experience of places in cultural practices for communication but they are neither neutral (e.g. [10][21]) nor compatible with situated usage (e.g. [7]). Rather, geo-spatial models are an ontological legacy of the enlightenment; for example, consider the bindings between the prime meridian of latitude and global exploration and empire. Contrast this with Amazonian Indians view where besides longitude there is "latitude, altitude, historical context, sacred sites, and spiritual or mythological sites, where invisible creatures mark watersheds and areas of high biodiversity as off-limits to exploitation" [30]. So patterns of adopting mapping applications portray only aspects of people's spatial relationships with places. This aspect, while important, allows the models of space underlying technologies to obscure specific cultural, historical and topological spatial "infrastructures" ([16]) which shape everyday experience and govern spatial praxis in the world. It also displaces people further (see: [6]) by constraining their technology mediated interactions with the world (e.g. [11])

The interdependency between physical terrain and "ways of knowing, being and doing" [e.g. 23] in Indigenous Australian culture sharply contrast with dominant spatial practices in design. Accounts of the way Indigenous (also known as Aboriginal) culture refers to physical terrain and landscape apply the term 'country' to describe a view of life invested with rich ecological and symbolic interconnections between people and places through many generations. Country is simultaneously lived in and is a system of living for physiological, social and spiritual nourishment. In literally living on the land Traditional Owner groups have accumulated a depth of knowledge about diverse aspects of the ecosystems they occupied to manage abundant resources over 40,000 years. The topological, cultural and historical infrastructures of country, through which an Indigenous person's spatial encounters have meaning, include relationships between flora, fauna, land, water, fire, meteorology and cosmology and interactions between their movements and cultural and personal memories embedded in the terrain. Thus, an Indigenous person has access to a socio-cultural and ecological memory that is embedded in the natural terrain [31]. GPS can record Indigenous people's movements in natural places; but its geo-spatiality flattens the very enlivenings felt in their experience and the meanings in the landscape that guide them as they live and exercise their Traditional Knowledge (TK).

2. FORMATIVE CONTEXTS

Our current venture is informed by several facets of our empirical and theoretical research in designing simulations representing natural places and mobile guides to support experiences in natural places. Here, we indicate conceptual issues shaping the design.

2.1 Digital Songlines Environments

Our endeavour emerged from the achievements of a partnership between Indigenous communities, Indigenous-owned Cyber-Dreaming [14] and the Indigenous Communities project stream of the Australasian CRC for Interaction Design (ACID). Over the

last 3 years the partnership has developed the Digital Songlines Environment (DSE) (e.g. [19], [23], [37]) a set of simulations of traditional lands which translate the schemata of Indigenous communities (e.g. [32],[33]). The DSE approach is named to reflect the complex web of symbolic motifs related to topographical features which Indigenous people use to organize and exercise their TK. The Indigenous conceptual landscape is criss-crossed with invisible storylines or songlines linking nations across the continent. These lines are inextricably linked to spirituality, which encompasses both individual and collective ritual responsibility for the land and practical access to and management of natural resources (e.g. a basic songline connects sources of water and sacred places). The DSEs respond to both the vulnerability of Indigenous culture, in the face of ongoing colonisation, and the "problematic disjunction between the structured information to be found on a computer, and the integrated, holistic, lived and performed knowledges of Aboriginal people on country" [12].

The DSEs use a commercial middle-ware game engine (Garage-Games' Torque) to create inhabited topographical representations of the cultural landscape of individual Indigenous Australian communities. The simulation is constructed using Digital Elevation Models (DEM) and topographic surfaces generated from GPS co-ordinates collected in actual traditional homelands and represented via linear coordinates. Some liberties are taken with this data to create a sense of being in a world (e.g. edges are elevated to hide the game map's boundary and create a frame for the representation). The map is textured and populated with local flora based on photographic data and known ecology. The DSEs' basic topographic landscapes are elaborated with the flora and fauna remembered by Indigenous people who once lived in the area. For example, trees, bushes and grasses lace into the map and carefully modeled and animated fauna sometimes has artificial personality.

The DSEs represent traditional homelands [19] as a cultural heritage activity by recognising heterogeneity in cultural groups [37]. Each DSE iteration is developed through participatory relationships with the Traditional Owners of the area reconstructed who provide the visions, stories and other TK (e.g. bush food and medicine). This is important since Western approaches all too often form knowledge of 'Others' that are discontinuous with Indigenous historical contexts [28] and dichotomise TK systems [1] against those of the Canonical Western tradition. So the DSE approach represents the difference between tribal groups via place. For example, the Gunggari iteration aims to support a sense of 'walking the country' with Irene Ryder one of the few remaining speakers of the Gunggari language of regions in Queensland (the Maranoa, Warrego, Condamine and Balonne regions). Another, DSE recreates the landscape of pre-colonial Sydney harbour area in New South Wales.

To prioritise the communities' deeply cultural meanings and support a sense of being in a particular place the DSEs give prominence to country and stories. The stories told by Indigenous communities belong to the land and country has primacy in cultural transmission [31]. So the DSEs forefront land as a protagonist in spatial stories brought to life by cultural artifacts and activities. The environment is populated by different groups of people (women, men and children) engaging in appropriate activities and animals (e.g. eagles fly overhead, emus scatter in response to movement) and is further enriched with ambient audio (e.g. frogs chorus). In many instances, cultural information is embedded in the DSEs via pop-up text, video and audio, including recording as much of the community language words as survive (see [38]).

The DSEs significantly contribute to archiving aspects of TK and addressing the need for Indigenous communities to demonstrate to outsiders the meaning of their encounters with country. With the ongoing disappearance of Indigenous oral languages preserving cultural heritage is urgent and includes supporting communication between cultures over contested places (see: [32]). The DSEs communicate Indigenous cultural meanings to outsiders by exploiting Western emblematic spatiality and the interactional conventions of computer games. Although the DSEs conform with some concepts of space important to the communities (e.g. tracks left by animals and markings outlining people's camps that represent their interconnection) they use Western cartography rather than Australian Indigenous mapping traditions. The DSEs harness established game conventions to render topological data in linear perspective, where the world's geometry is inherently at the mercy of the interactant's position in the world. Some of the iterations also introduce other extrinsic views by using devices to support navigating the terrain which simultaneously inform the visitor that they are a passive "tourist" [9] able to affect the world only in the way designed. For example, a 'Heads Up Display' (HUD) imposes an interpretation of moving in the space in a way that is detached from the world; indeed it encouraged non-Indigenous focus groups to expect further game conventions (see [38]).

2.2 Dialogical Mechanisms of Belonging

We have been considering strategies to design simulations that support a sense of belonging by linking the places simulated with temporally evolving, individual and shared meanings. The term "habitus" refers to the bodily anchoring of culture, a person's daily practices and their sense of homeground [35]. Places become part of habitus via a person's continuous, ongoing proxemic interactions with those places. Certain locations become personally significant when they have some function in the routines of everyday life; have specific physical or social value; satisfy specific desires; or, are associated with meaningful events (In: [35]). Many of these proxemic interactions occur in an immediate, unreflective state of "being in the world" [18] which differs from states that can be accessed via Cartesian abstractions which separate the mind from the body and its surroundings. By privileging Cartesianism photo-real simulations coerce an interactant's relationship with a simulated place (see [39]). Their material properties as surrogate objects offer few, if any, of the minutiae of interactions by which people embody meaning in the physical world (e.g. [8]). They rarely allow interactants to shape landscapes, besides deforming environments with explosions, and tend to render interactants passive in physically "depositing" indicators of meaning in the terrain. For instance, interactant's footprints, if any, fade; the patter of multiple "feet" across terrains do not abrade paths; and, camp-fires leave no trace. This has provoked us to explore ways that simulations can harness mechanisms by which people share understandings about features in physical settings.

Data depicting people's egocentric experiences as they traverse natural places provides insights into processes by which meanings embedded in places contribute to habitus. We recorded data on visual, audio, and tangible interactions while people traversed natural terrain using a panoramic head-mounted video camera system [3]. This revealed a dialogical process [27] as people draw together the site's spatial resources, their past experiences and immediate interactions to render meaning. When people described what made the site personally significant the memories they mentioned (e.g. social relationships, activities and concerns; affects; aesthetics; motives for visiting; and, the rhythm of a visit) coupled

with features of the setting. They used features *in situ* as aide mémoire, to prompt meanings about places or similar features; as mnemonics to retain information in the flow of stories that articulated their experiences; and, indexically [21], to communicate with others without explicating salient referents. For example, seeing a rock besides a water-hole triggered a participant to recollect visits with her young children to collect tadpoles and to swim. We have found a dialogical approach [25] useful in understanding how meanings emerge from experiences and evolve and sustain constructs about places. One aspect of this is the tendency for people to interact at any instance with a place as if it is a finalized concept [25]. That is despite our own continuous, reciprocal shaping of past, current and future interactions with places we treat them in the moment as if we know everything that can be known about them. We maintain our sense of belonging via this finalisation fantasy by cross-referencing our immediate and recollected experiences to incorporate changes to spatial infrastructures.

Habitus is closely linked to people's sense of identity and tendency to form mutually supportive social groups [34]. The perspective that a person's identity is defined by their relationship with a place is acute for nations with ancestral inhabitant across thousands of years. For example, in focus sessions Indigenous communities were eager for the animated characters in the DSEs to reveal who they were in relation to the represented place.

The historical contexts of displacement in Australia and the efforts of Indigenous communities to pass on their TK even when they are displaced from their traditional homelands motivates us to develop ways to afford interactions with simulations of traditional lands that contribute to ongoing sense of habitus. Choices on which aspect of landscape are predicated by the cultural emphasis of the representation maker. Indigenous people depict sites by conveying their mythological, spiritual and/or ancestral relevance orally in stories and songs, visually in art, bodily in dance, and aurally in music (e.g. [22]). These forms help guide people's actions and interactions with the land. Rather than measuring, parceling or objectifying the land Indigenous symbolism refers to inter-connectedness (e.g. concentric circles form a design representing the interaction of eternal patterns of spiritual, ancestral and geographical significance). So a cluster of hand-prints under a boulder signifies a clan's sense of their personal and collective relationships and responsibilities for country rather than possession. Ancient meanings become embodied by people and, before colonisation, by the ecosystems in which they lived. For instance, Indigenous people interrelate the TK, contained within their stories and songs, to practicing traditional fire regimes and the influences of their fires on the vegetation and associated faunal population ecology (e.g. [40]). It is a tragic paradox that this, most concrete of inscription mediums, which reflects an equitable dialogue between human and nature, is also the most contentious.

2.3 Corporeal & Affective Orientations

Integrating Indigenous spatial praxis is essential to conserving Australia's unique biodiversity (e.g. [34]). The movements of Indigenous people in their country are a rich language conveying a 'Living Knowledge' *in situ*, tightly coupled with multi-sensory indicators of meaning in natural ecologies. To maintain their TK Indigenous people must continue to walk the land to affirm their songlines and storylines. This raises challenges for linking simulations with the dynamics of exercising knowledge on country, particularly given constraints on Indigenous people's access to their homelands and increasing urbanization.

Contemplating a person's direct contact with an environment can inform insights into how the body, mind and surroundings are integrated in situated ways of being, knowing and doing. The data we gathered using a panoramic head-mounted video camera system while non-Indigenous people traversed natural sites [3] revealed couplings between people's memories and bodily movement. When we analysed the dynamics of this engagement we noticed a proprioceptive connection with the land (e.g. [39]). To retain posture while walking participants spent an average of 25% of the time looking at the ground, depending on the unevenness of the terrain traversed. Such a connection is not as banal as might first seem. For example, when stepping into a muddy area along a dirt track a participant was pleased to discover the wet; later, recalling the muddiness and where the incident occurred provoked memories of his youth when, unlike recent years, the site had been wet and densely inhabited by waterfowl.

Corporeal interactions are not easily abstracted into software design, with its legacy of rationalism in elevating the mind over the body. Indeed, Coyne suggests: "*Paradoxically, even virtual-reality systems deny the importance of engaging the senses in the physical world*" [13]. Game-based visual simulations do not offer the minutiae of interactions by which meaning emerges during actions with the physical world and rarely demand interactants to minutely adapt their behaviours to the terrain (see: [5]). For example, avatars do not travel slower because they have mud on their boots or make detours because rain has changed the terrain. Indeed, the terrain rather than being an essential a partner in the process tends to be subservient to other functions (e.g. gameplay). Even when interactions are grounded in the physics of the terrain they emphasise the player's operations rather than empowering the represented landscape in creating meaning.

Representation of places, be that in story, song or simulation, become invested with corporeal meaning only when we relate them to situations in the world *in situ*. For example, one Gunggari community Elder said of a DSE: "*I can almost feel the dust between my toes*" because she associated the simulation with her own experience on country. However, for those who have yet to experience country as deeply as the Elder, who have not lived her life, understanding the terrain, traditional cultural forms and the DSE will develop reciprocally each absorbing meanings generated through the other. For example, consider the emergence of meaning from a wayfinding artifact such as a map to guide a cross-country run: "*Over time looking at the map evokes those [] bodily sensations, and running the terrain evokes that convergence of lines [on the map].... It is as if our sense of the situation and our sense of the map co-evolve.*" [28]. This means devising interactions with the simulation that enable appropriate meanings to emerge from, and be absorbed by, people's corporeal experience in the terrain.

Representation of places may also become invested with affective meaning by our relationship with the represented places *in situ*. Through our work with the Traditional Knowledge Retrieval Pathway [36] we have begun to appreciate the deeply affective connection between Indigenous people and their land and ecosystems. For example, a Kuku Thaypan Elder laments "*The place is now ruined Look how the magpie geese, the pelicans are all sick. It makes me sorry.*" [36]. We propose that this means devising interactions with the simulation that engage people's sense of felt-life "*at the level of their personhood*" [28] that emerges from, and is absorbed by, experiences in situ.

We have proposed that to support the range of couplings between a people, their setting and a representation of that setting we need to recognise a mosaic of information encounters. This is informed by situated field "experiments" on wayfinding (e.g. [2]) and reveals patterns of deliberate information seeking behaviour and serendipitous information discovery (e.g. [4]). We have used this to create two metaphors to inform the design of a mobile guide. "Daisies" are items that are salient to a sequence of landmarks along a route. "Berries" are items that are notable for other reasons, for example landmarks that are evocative of specific emotions or occur at points when corporeal sensations were noted (e.g. hunger, tiredness, heat). These metaphors are adaptable to designing for Indigenous conceptions of space and a mobile interface to the DSE. Daisies can be used to include items within an inherited songline (e.g. a chain of lakes, boulders and mountains) and berries can be used by an Indigenous adult to record items arising in their experience of the terrain as it exists today.

3. DESIGNING THE INTERFACES

Our current endeavour extends on the way the DSEs support a memory space for community members to relate a sense of habitus to the simulation and link the simulation to 'Living Knowledge' *in situ* in the land. Our design aims to empower users in Indigenous communities who have no technical or design expertise to control the evolution of their own DSE rather than to communicate cultural memory to outsiders. This enables us, as designers, to respect the rights of Indigenous-Australians to own and control their cultures and to maintain confidentiality about their personal and cultural knowledge and affairs. Sacred and secret material refers to information that is restricted under customary law (e.g. some information may only be learned or viewed by men or by women, or only after initiation). We seek to enable Indigenous people to transmit their personal and cultural knowledge memory through the DSE by linking markings they make on the digital landscape to items they have collected and, when these are collected in situ, correlate them with an appropriate location in the physical world.

Our iterative interaction design process focuses on users in Indigenous community groups, particularly in those situations where young people can no longer easily "walk the country" with Elder TK holders. Given the importance of maintaining TK by ensuring songlines and storylines are transferred to future generations in context, this connection between the physicality of country and the shape of cultural knowledge is critical. Here, we describe our progress to date in developing the technical components.

3.1 Graffiti: Interface & Database

We are in the process of "play-testing" the first prototype of our "Graffiti Engine" which enables Indigenous communities to make their own markers or mnemonics in a DSE and connect these with their own items or stories (e.g. metaphorical "berries"). For example, they can use representations of sharp stones to carve and organic dyes to paint trees and boulders and sticks to scratch sketches in the sand. Our design adds on to any existing DSE without requiring technical expertise in installing it. Ironically, we have modified the game-engine's default gun to create an invisible tool, that when the user is proximal to a drawable object, leaves a persistent trail of markings. The user can select from a wide range of terrain features (e.g. boulders, trees, sand) on which to draw by transferring a graphic overlay, or decal, onto the appropriate terrain surface and fading the decal to transparent (Fig. 2).

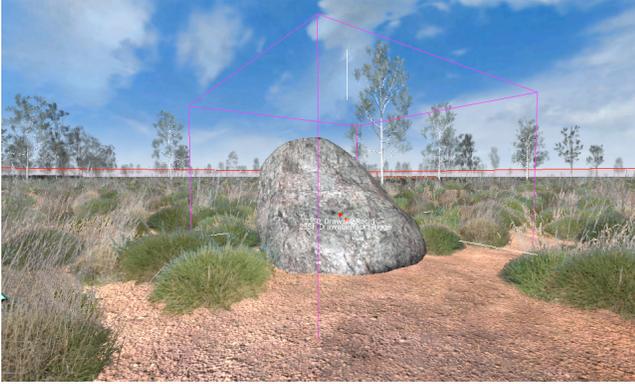


Fig. 2 Prototype drawable object within a DSE

The play-testing phase looks to the efficacy of the Graffiti concept in terms of treatment of virtual landscape as re-presentation of the real [10] where the purpose is not the construction of those second earths where the only limit is imagination. Rather, indications of success arise when the virtual is reconfigured by its resonance with the real, those moments of interaction with the landscape that are the intimate stuff of TK. Such intangible knowledge should remain intimate to its holders, the Graffiti engine endeavours to allow them to say: “Here, in this place.” and to then make further connection with other media items that they might deem important, exploiting a naturalistic interaction device in the same way that such ‘scratchings’ have given voice to those outside official histories since ancient times. This scratching mnemonic marker option might appear simplistic, pandering to the constraints of the real in an environment where such constraints have no requirement, however, it is essential to such oral knowledge that it is not open to individual construction of meaning that the second earth virtual worlds encourage [see: 38]. A recent event where a large company reconstructed an iconic area of Indigenous country as part of their second earth world offers an extraordinary example. The Traditional Owners raised objection and the iconic area within the second earth is now closed to trespass in the same manner as its real counterpart is carefully cared for.

The Graffiti Instances Database persists Indigenous users’ inscriptions to enable sharing between members of their community. It will involve database functionality to enable people to associate their own markings in the DSE with items they upload (e.g. photographs, audio, video) and store these relationships without interpretation by a technical expert. When “impacted” by the drawing tool (or on mouse release) the drawable object sends the 3D position of the decals to create a bitmap. This is applied to an invisible clone of the drawable object.

3.2 Mobile Mnemonics & Future Interface

The Mobile Mnemonics Interface enables Indigenous users to upload into the DSE items (“daisies” and “berries”) collected from places represented in the DSE. Our technical design is informed by experiences in creating location-based games using mobile phones [5]. We are in the process of testing mobile camera phones which we have programmed using Bluetooth and Java MIDlet technology to access GPS data, and store and catalogue photographs, using Java servlets, on a central server with their GPS positions. We will then start on functionality to pipe these items (e.g. photographs) from a mobile device via the Graffiti Engine into the DSE.

Our final intention is to enable information to be downloaded from the DSE onto mobile devices. This will enable an Indigenous person to download items relevant to a songline or storyline archived by a more senior community member (e.g. an Elder) to support persisting that motif *in situ*.

4. CONCLUSION

We believe that efforts to converge spatial information technologies with cultural practices that are not, inherently, shaped by the geometries of the West will be rewarded in diverse ways. Most importantly they can empower previously disenfranchised knowledge, such as that belonging to Indigenous Australia. However, designing interactions that facilitate this empowerment yields insights for designing mobile guides and simulations of place for non-indigenous peoples, particularly with respect to responding to the ephemeral phenomenon of embodied interactions and felt-life experiences in places beyond the city (see: [15]).

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