The Ethics of Indigenous Storytelling: using the Torque Game Engine to Support Australian Aboriginal Cultural Heritage

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ABSTRACT
Digital Songlines (DSL) is an Australasian CRC for Interaction Design (ACID) project that is developing protocols, methodologies and toolkits to facilitate the collection, education and sharing of indigenous cultural heritage knowledge. This paper outlines the goals achieved over the last three years in the ethics of developing the Digital Songlines game engine (DSE) toolkit that is used for Australian Indigenous storytelling. The project explores the sharing of indigenous Australian Aboriginal storytelling in a sensitive manner using a game engine.

The use of game engine in the field of Cultural Heritage is expanding. They are an important tool for the recording and re-presentation of historically, culturally, and sociologically significant places, infrastructure, and artefacts, as well as the stories that are associated with them in a highly situated context. The DSL implementation of a game engine to share storytelling provides an educational interface. Where the DSL implementation of a game engine in a CH application differs from others is in the nature of the game environment itself. It is modelled on the 'country' (the 'place' of their heritage which is so important to the clients' collective identity) and authentic fauna and flora that provides a highly contextualised setting for the stories to be told. This paper provides an overview of the ethics behind and the development of the DSL game engine.

Author Keywords
Cultural Heritage, Storytelling, Torque Game Engine, Indigenous Heritage.

INTRODUCTION
Digital Songlines (DSL) is an Australasian CRC for Interaction Design (ACID) project that is developing protocols, methodologies and toolkits to facilitate the collection, education and sharing of indigenous cultural heritage knowledge. This paper outlines the goals achieved over the last three years in the ethics of developing the Digital Songlines game engine (DSE) toolkit that is used for Australian Indigenous storytelling. The project explores the areas of effective recording, content management, and virtual reality delivery capabilities of culturally sensitive stories involving indigenous Australian Aboriginal custodians, leaders and communities. It provides a toolkit where players, in a serious gaming sense, can experience Indigenous virtual heritage in a high fidelity fashion with culturally appropriate interface tools.

Cultural Heritage (CH) is concerned with the preservation of historically, culturally, and sociologically significant places, infrastructure, or artefacts for current and future generations[1]. Most recently the use of virtual technologies

[1] The two key bodies with the primary charter for the preservation of world heritage sites are UNESCO (United

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to reconstruct, and thus explore in a non-intrusive manner, sites of CH significance have become an important tool in their preservation and investigation in highly situated contexts. More particularly, 3D real-time interactivity with these 'virtual' sites offers a new educational program for sharing the knowledge and information gathered about these sites. Many applications for real-time interactivity include the use of a game engine. A number of research institutions have explored the efficacies of using game engines to provide convincing reconstructions of places of cultural significance (MiraLab, VRLAb, LandLab, HitLab, MIT MediaLab, the Ikeuchi Crest Project, the JSA Bayon Project, MVS lab (The Virtual Room), iCinema, and ACID, among others).

Most of the reconstructions that inform the CH of these projects is the modelling of past civilisations [1]. They also tend to address built environments rather than the landscapes that envelope these buildings. Most built environments follow an orthogonal format. Game engines and their associated modelling packages are particularly well suited to simulating orthogonal built environments [2]. Where the DSL developed game engine differs significantly from these more typical CH implementations of the game engine is in its re-presentation of non-orthogonal environments. The DSL game engine supports embedding of Indigenous Australian storytelling (an important and central component of indigenous Australian CH) in its natural landscapes. As such, the focus is on authentic organic landscapes, fauna and flora rather than built environments *per se*.

This paper includes a brief background on the DSL project and Indigenous virtual heritage, overview of the DSE toolkit, implementation experiences, the cultural heritage philosophy of the DSE development process, implementation of the toolkit and, and the ethical considerations of such a design in the form of protocols for engagement consultation with indigenous Australian clients.

Introduction To Digital Songlines

The Australasian CRC for Interaction Design (ACID) is a collaborative research organisation formed with a number of Universities and industry partners. Within the Virtual Heritage program the Digital Songlines project is developing protocols, methodologies and toolkits to facilitate the collection, education and sharing of indigenous cultural heritage knowledge across Australian communities, cultural institutions and commercial businesses.

The Australian Aboriginal and their culture are known to be some of the oldest in the world. Aboriginal occupation in Australia has been dated at over sixty thousand years, with recent advances and scientific discoveries continuing to change this time frame [3, 4, 5, 6, 7, 8]. As such, the DSL project objectives are to protect, preserve and promote Australian Indigenous culture (an ancient and alive culture), its practices, myths and legends, expanding and re-vitalizing a culture through the visualization of its most prized asset – the land. The project has developed a virtual landscape of oral histories and mythological stories based upon the eternal sense of land and spirituality understood by the Aboriginal people. Research to-date has been focused on investigating how the design of virtual environments can capture the spirituality, significance, cultural importance and heritage values of Indigenous people and impart these in an empathic way so that indigenous and non-indigenous people alike throughout the world can understand the significance and cultural heritage of these areas.

Background: Indigenous Cultural Heritage

Traditional Aboriginal culture was passed on to others through oral traditions, art, dance and rituals. Aboriginal Legends have served an important purpose in the teaching and learning for Aboriginal people, adding to their understanding, connection and interpretation of the world in which they live. Stories are a means by which knowledge and understanding is passed from generation to generation. As they live with such a close connection to the country and seasons, know it so intimately, the stories, songs and culture are inextricably linked to the land. Aboriginal culture is still alive today with older people from the country still able to tell their stories [9].

In the Digital Songlines project we aim to communicate the culture, history, rituals and stories and their association with the country through 3D virtual environments, by re-presenting these in the context of the originating country. The importance of this work is in the way it demonstrates an appreciation of the natural environment and the Aboriginal affinity to this land. The game-based virtual environments seek to explore the spiritual, mythic, magic and superstitions of the landscape as a traditional hunting ground and hallowed place of worship. To-date, the Digital Songlines project has been used to illustrate a number of significant Aboriginal spaces within Australia [10][2].

The Digital Songlines Toolkit

A core component of the Digital Songlines project is the ongoing development of a digital toolkit. The aim of the toolkit is to allow communities of Australian Indigenous peoples to create their own virtual cultural landscapes through story telling in a 3D gaming environment. As well as being available for indigenous heritage storytelling, this toolkit can also be used to communicate issues of sustainability, land use, water use, explain development issues and contested narrative issues for a number of

Nations Educational, Scientific and Cultural Organization) and ICOMOS (International Council on Monuments and Sites).

[2] See also [32] for a more detailed discussion on an example of Aboriginal rock art modelling.

different uses. The toolkit can be used to facilitate asset management over a large geographical area. While the primary use of the tool has been in the area of cultural history, a wide range of potential installations have been identified including: museums, science centres, cultural centres, interpretive centres, community consultation, local councils, forestry, water resources, development organisations, schools, mining, safety training, media and data fusion capabilities.

The DSL software developed to-date is based on the display and manipulation of arrays of 3D objects recreating landscapes populated by indigenous flora and fauna. These assets have been imported into the game style application based on the Torque Game Engine (TGE) [see 11]. The active features include sound [33, 34], animations, artificial intelligence [14, 15], weather and daylight simulation. An established mechanism to import digital terrain models has been modified for importing satellite based geo-spatial data, or data that is prepared for use in GIS software, for accurately mapping the cultural heritage landscape.

Many issues arise from the creation of virtual spaces representing vast rural lands and its reliance on the computational capacity of real-time hardware and visualization technologies. Some are difficult to resolve in a suitable way to communicate the presence required within the virtual space. For example, how to convey immersive narratologies such as, while in place, indigenous knowing pauses at each rock, knows the cycles of the winds, can track underground water, find food and medicine, and uses of the land to speak its stories and keep its history? The kind of knowledge represented and the 'field' in which it is held by local indigenous peoples is often deep, subtle and most intimate [12].

Although some of these issues remain unresolved, most have been addressed by a 'tiered' model of development. 'Layers' of content are created, accessed, and linked back to the virtual model of the physical place. With such a model, we are able to conceive of the (virtual) land as an interface through which the more traditional dynamics of software creation can be accessed. Moreover, this layered model allows the creator to participate in indigenous knowing and being-with, at the most basic level, as the tool is used.

The content can be layered to support virtual heritage applications and narratives (such as land ownership issues, spiritual knowledge, historical and oral stories) and as a community content development and archiving tool (re-populate the virtual spaces with indigenous content). These can be used in entertainment, display, community consultation and education, such as museums, cultural centre displays, as an indigenous language walk, 'bush tucker' walk, or oral history lesson. These are all developed with the notion of land-as-interface where the (virtual) land is layered with information and practices that arise from that very landscape.

Philosophy of the DSE Development Process

Most of the clients for the development of a DSE-supported virtual heritage simulation are groups of Indigenous Australian people who have a strong desire to maintain and share local cultural knowledge. However, as they are often located far from major urban centres funding is a primary issue. The low-budget nature of these projects is disproportional with their importance to the groups involved and Australian cultural heritage in general. Hence, this aspect of each project has to be taken into account when planning what can be achieved within time and budget constraints. However, budget aside, the most significant issue expressed by all groups is the need for a strict region-based authenticity. This relates to landscape re-presentation, totems (local cultural and spiritual signifiers), and storytelling alike. Finally, the toolkit developed for the client must also be easy to use for the management of the stories contained and for new stories to be added over time.

The features of the landscape and the fauna and flora contained must be faithfully reproduced in such a manner that the stories to be told in this medium are closely linked visually and experientially with their 'country' of origin (the local landscape environment which may extend beyond view – literally and metaphorically) and on budget. Hence, working with individuals within the community and in the development or construction phase, ethical, moral, social, and budgetary issues are raised daily. These are discussed as a group and a cyclical process of consultation with the various communities engaged is sought at each juncture.

The underpinning philosophy of the DSL game engine and content development work is to provide an accurate, affordable solution to a community that is directed and owned by that community and meets their needs. Much of the material gathered is of a sensitive nature[3].

The main concerns are aural, visual, and narratological authenticity. Working in real environments – established and traditional community lands – these environments have to be accurately re-presented. Each project has specific

[3] There are a number of sensitivities involved in the garnering of support, gathering and application information. In the first instance, the communities involved need to be actively seeking technological applications for the implementation and re-distribution of their local knowledge on a game-based platform. The groups and their members need to have the appropriate authority from their clan elders to talk with the DSL team about cultural heritage issues. There are some sacred and spiritual knowledge that cannot be shared without those with access having gone through a lengthy initiation process. But the initiation process itself is too sensitive to discuss hence will never be a part of any DSL project. The only information available in this area is of a very generalised anthropological nature form past studies. There is little or no contemporary access to this knowledge.

requirements. Thus, new assets are created for each project. Assets from one project are not easily transferable to another. For example, we cannot use didgeridoo music where it does not belong in that country. Along with other assets within the country, 'country' itself can be thought of as an artefact. It is the largest artefact in Aboriginal culture. The accurate portrayed of this country is thus of paramount importance. As ostensibly an educational product, if we create inaccurate environments then 'inter-actors' (not just users) with the product may be misled about a particular story, or scene within a story. This has implications not just for knowledge acquisition and cultural maintenance for posterity but, in Australian Aboriginal culture, the inaccurate telling of stories may affect the environments they refer to with deleterious spiritual consequences.

There are vital differences in Western and Aboriginal knowledge traditions and practices. Western traditions emphasise the differences between subject and object, between what exists and how we represent it in a variety of symbolic systems. By contrast Aboriginal knowledge traditions emphasise the unity of subject and object – of what exists and how we represent it. In Aboriginal knowledge traditions, language, ceremony, singing, dancing and other representational forms can influence events and cause things to happen. Objects and phenomena can be "sung" into and out of existence. These processes of the amalgamation of representation and reality have been going on since the Dreamtime (in Australian Aboriginal terms, the time of creation of all things) and continue to this day (see [13] for a more detailed discussion on this topic).

Figure 1: Screen image of animated fish with representative contemporary Indigenous art work.

With 'country as artefact', unlike most gaming environments, the landscapes depicted in the DSE environment is not just a backdrop. It is very much an enveloping influence on the overall immersive experience [16]. It is both a receptacle and it actively participates in the telling of the story. Hence, every component developed must bear the burden of the responsibility to re-present country accurately. There are few insignificant details that can be excluded – every*thing* matters. To ensure this accuracy, an extensive consultation process is conducted with the original custodians of the story – to ensure the assets have been used in the correct manner. This includes not just the landscapes but the knowledge that is embedding in those landscapes. Each individual plant and animal must be of the correct type or subspecies, and the narratological information associated with them has to be accurate and authentic. For example, a totem animal or Yurdi (an animal of special significance) may have a recurring theme in a story told by a particular community. Therefore, it *must* be included. Different animals have differing significance in different country. Another challenge is when the landscape, or the fauna or flora it contains, needs to be abstracted in some manner. For example, when contemporary artwork is used as a texture map for a Yurdi, it must be of the appropriate type and created by an artist from that region using the correct iconography for that animal in its landscape context and the context of the story itself. For example, the artwork and the fish in Figure 1 are incongruous, and should be replaced by more accurate artwork from a local Indigenous artist associated with fish of that type in their region. These are complex operations that require diligence and be allowed for in the production budget.

THE PROJECT CYCLE

Each project follows an iterative cycle. Initial planning is done in consultation with the community onsite. Planning which occurs offsite, is returned for comment. Consultation continues throughout the project's development. A project cannot be finalised until this authentication process is completed. The typical process includes:

- visiting a remote community;
- members of that community are shown the main features of the DSE toolkit environment; and,
- their needs are discussed.

This may take several days. In the mean time, other members of the team may collect photographs, video, sounds, and samples of local materials, such as bird noises, grasses, and notes on and photographs of local landscape features with the permission of the community custodians. These are then used in conjunction with satellite and aerial photography of the region to build the toolkit. From this, a 3D 'snapshot' of their country is created. In prototype form, it is returned for comment. From this, more information is provided by the clients about what they would like to see in their simulated country, the stories, what animals are needed and so on. A collection of agreed fauna and flora is modelled and animated. From here a core version of the stories in the virtual environment can be generated. This is again returned for further consultation, and so on, until

consensus is reached on levels of authentication. Once the authentication process is completed the developed toolkit is handed over to the custodians of the client community for their express use and distribution.

IMPLEMENTATION OF THE TOOLKIT

With the specific DSE implementation of the TGE in the context of country-embedded Australian indigenous storytelling, the DSE toolkit assists the rapid authentic and inexpensive creation of 3D scenes in a cultural heritage template. Moreover, the DSE toolkit assists and fosters the maintenance and sharing of indigenous Australian storytelling through its accessible, flexible, and intuitive interface (see http://songlines.interactiondesign.com.au/). This has been achieved by the conscious application of the core DSE development philosophy, outlined earlier: consultation, authentication, budget wise, and ease of use.

The DSE toolkit is based on the notion of a strict landscape metaphor with editors that allows one to alter that environment using a game editor – add objects and place them, and alter their behaviours from a large gallery of components. With a licensed toolkit, one is presented with a complete simulated environment with all their needs. The various community groups are able to find their region and associated forests, and the sorts of trees and animals with behaviours already attached and characters and camps they need. They can then add dialogue to those characters, and rich media components, such as pop-up media: videos, images, and voice over. All of this is served by a central portal that supports the development and traditional communities alike.

The implementation in DSL of a networked structure of community-based content creation is a powerful paradigm model for research in interaction design, ambient, or serious gaming. The sociologist Manuel Castells [17] describes such networks as consisting of knowledge-based information technologies which enhance and accelerate the production of knowledge and information, in a self-expanding, virtuous circle. The network represents the divergence of production, access to, and display of nodes of knowledge. While traditional models of production in the field of display-based technologies tend to concentrate on either the product (the game), or the hardware (display), DSL sees workflows and methodologies that incorporate and evolve the two in a constant communication for the life of the product. For DSL, this communication begins with the recognition that the landscape is the ideal and essential metaphor for addressing indigenous cultural heritage issues, and provides a rich base for branching development and production.

The networked toolkit, as represented by DSL, becomes an empowering model of research and production – at once a site for capturing, archiving, developing culturally-appropriate virtual environments, and a site for sharing, collaboration and community content development. In the networked environment, knowledge becomes more powerful as it is shared and deployed [18-23]. DSL has grown through this network model. The umbrella of digital content and database development has provided a rich sandbox of opportunities for researchers, communities, educators, archivists, government and non-government organizations alike.

How we see, store, integrate and serve knowledge across the network is vital. Rather than merely seeking to refine and consolidate existing forms of knowledge – film, 3D animation, or game technologies – DSL has sought to provide methods of access and creation across combined knowledge bases, as it concentrates not only on the tool, but shapes itself to support and enable the voices which are carried upon and create the tool.

EVALUATION

The Digital Songlines project has been a joint collaboration with the research and development team and numerous Aboriginal communities, groups, schools and museums. These groups have grasped the opportunity to gather information relating to their particular area of 'country' using a range of digital media. Our joint collaboration has not only led to the skilling of many community members in digital media, but has provided a cultural focus for the sharing of knowledge practices between generations. Early, evaluation groups of Aboriginal adults and children have responded enthusiastically both to the Songlines concept and also to the visual interface and interactive activities that are possible within the Songlines environment.

Evaluation of the Songlines environment and user interactions has yielded rich data about the nature of representation of Aboriginal knowledge, the pedagogical implications for Aboriginal learners, and the participatory design process for the construction of accurate local landscapes and cultural activities. The key thematic areas addressed to-date include, language learning, traditional food sources or 'bush tucker', traditional crafts (see figure 2), and narratives associated with traditional landscape representation in painting

Figure 2: Screen shots of the Digital Songlines project interface showing net-making, grain grinding, and spear-making.

Feedback

All evaluation has occurred in networked collaborative settings with educators, developers and participants interacting both physically and virtually through the media. Participants varied in their make-up. Ages ranged from primary school children through secondary school, and adults. Each session took about 30mins – this is the time needed to learn how to navigate in the world.

With a range of ages of participants represented there were multiple expectations of the kinds of learning the Digital Songlines environment could support. Preliminary feedback indicates that young participants, already familiar with the gaming culture, came to the pedagogical exercises with prior expectations on how games work and were either disappointed that the Digital Songlines environment was not like their own (commercial) games, or delighted that it was better. Where the younger participants expected typical game-like activities and tasks, including quests, the older participants looked for tribal stories, traditions and languages to be 'brought to life' so they could pass them on to the next generation. Older participants and educators saw the most important feature of the tool was how it allowed for exploration of the media so that they could construct their own materials for addition to the environment. They saw this process as evocative of 'real' learning through experience and recreation of a 'living history'. The game became a kind of 'new literacy'. Some of the more negative experiences included: younger children (not yet acculturated to game-playing) became quickly disoriented, and right clicking for information was not intuitive. Some of the more salient discoveries are listed here:

The Aboriginal children who participated in this exercise showed real pride when they saw what the program represented. They were surprised at the rich graphics and interaction. Some felt it was a historical simulation. Others felt it related to a contemporary environment. Thus, as a tool for empowering self-determination and overcoming negative stereotyping by mainstream media, it was instrumental in dismantling preconceived ideas of self-worth and image – the normally held view that somehow indigenous peoples 'cannot do this kind of non-indigenous hi-tech work.'

Most of the younger participants, seven years of age and older, were used to games software which included some sort of quest. Therefore, they were focused on killing animals in the scene rather than investigating other features, such as visiting one of the campsites. They needed a purpose to go to the campsite. Their prior games acculturation meant they thought of interaction with games software as a demonstration of skills and the completion of tasks. To make them walk to the campsite, it was necessary for the teachers present to give them clear guidelines, a mission, or quest.

In terms of language acquisition, we found that to learn some of the words, children needed to repeat the words as they listened to them, or have collective sessions with their teachers after interacting with the Digital Songlines environment to have particular points not clear in the game environment explained.

A small difference in age groups made a big difference in how they interacted. Younger children took quite a while to engage and understand the exploration method and simple teacher-directed quests. These preschool children were still acquiring motor skills and needed various levels of mouse mastery to navigate. However, this was achieved within the timeframe of the session. Older children requested more of a challenge or quest-based interaction.

There was a high level of interaction between the players. They talked to each other about what they saw and what they were doing. This indicates a strong association, connection and engagement with the software and environment depicted.

CONCLUSION

This paper outlines the development of protocols, methodologies and toolkits to facilitate the collection, education and sharing of indigenous cultural heritage

knowledge developed by the DSL team over the past three years. The DSE toolkit used for Australian Indigenous storytelling developed over this period goes some way towards helping to preserve the historically, culturally, and sociologically significant places, infrastructure, and artefacts of many remote Australian Indigenous communities for current and future generations in highly situated contexts [32]. The use of a game engine has proven to be instrumental in engaging with young and old members of these communities alike. Its 3D real-time interactivity provides an educational platform for the sharing of local knowledge. The three-dimensionality of the game environment also provides an appropriate interface for contextualising Australian Aboriginal knowledge sharing in its re-presentation of their most important cultural artefact 'country', embedded with authentic fauna and flora. This work highlights the need to find new ways to communicate diverse cultural understandings. More particularly, how technology can assist in the empowering of cultural identity in an increasingly homogenous world mediated by Western cultural values advanced by the same technology.

PROTOCOLS

It is important to develop a set of protocols for dealing with the intellectual property and copyright issues regarding Aboriginal cultural knowledge. This is intended to ensure that respect and recognition of such knowledge occurs and that protection from abuse of such information is avoided. The following protocols were developed after original research and review of existing protocol documentation (such as that contained in: [24-31]). They are addressed at each phase of the toolkit production:

- That the stories of Traditional Owners be recognised as a 'body of knowledge' that may be tens of thousands of years old.
- That the stories are sourced from the Traditional Owner who represents the country of which that story might originate.
- That the communities make their own decision on what stories they want to have represented in any Virtual Heritage project.
- That an approval process be implemented and approved by communities.
- That the story represents the community and clan, and is specifically placed geographically.
- Ownership and copyright of the story is always held by the nominated traditional owner group or community council.
- That the content of the Virtual Heritage application including artist styles is approved by the community at all key production stages.
- That the story provided by the community is not modified unless approved and endorsed by the Traditional Owner representative of that community.
- That the community be paid industry standard rates and receives royalties from revenue earned from any capitalization and commercialisation.
- That Indigenous people design and participate in the creation of the Virtual Heritage application development at all stages of planning, design and production.

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