Teaching Through Story Mapping[1]

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Abstract: Teaching cultural awareness relies on individuals providing their particular perspective. In this paper we present the technology developed around creating an online system to share multiple experiences of Aboriginal Culture in New South Wales (NSW), Australia within a social-constructivist framework.

The focus of the material is the Kinship system used for thousands of years in this region. This topics was chosen as the history of conflict over government policy, social inclusion and technology take-up has continually returned to issues of kinship and knowledge maintenance with in the respective societies, areas in which Aboriginal and European society are markedly different.

We are using stories from the community to augment a Kinship workshop presentation which has been videoed and is available online. Using innovative web services, teachers will be able to select the stories that are relevant to their course, and map these to a range of scenarios being developed. The scenarios enable students to select the way they relate to the characters, listen to their stories, and become aware of their own role in the community.

Keywords: Indigenous Knowledge, Cultural Awareness, Community Narrative.

1. Introduction

This work describes the structural design and the development of tools for the delivery of online cultural training. The training is based on a recorded presentation developed by Riley (see Riley and Genner, 2011) and augmented by a database of stories relating to individual Aboriginal people's cultural experience. Hence the training provides many examples from different individual experience, which we wish to build into a coherent simulation of some of the many scenarios experienced by Aboriginal people since colonisation. Many people are contributing to this collaborative project, either helping design a learning environment that suits Indigenous knowledge sharing; or contributing their stories.

Since commerce and education now involve the sharing of information electronically across the globe, it is important that Indigenous people are not excluded. Hence this research proposes software architectures and web services that can provide an environment in which Indigenous people will share knowledge for the maintenance of their culture and the education of others, while maintaining control of what is presented and how this is done.

In particular we wish to reflect where possible the Aboriginal knowledge sharing process. This is traditionally through interwoven stories, song and dance at a community ceremony or corroboree (Langton, 1997). These dances provide for re-enactments that form an environment for experiential learning of the subject matter. While web services provide a form of mediation that is representational and more static than previous methods of knowledge sharing (Verran and Christie, 2007) this medium does provide opportunities for user adaption and generation of collaborative material across time and space.

As Donovan (2007) notes there are overlapping commonalities between ICT and Aboriginal pedagogy that include the experiential nature of learning; the ability to create an immersive space that is flexible to the specific learners and their context; and the ability to combine material from many informants. Furthermore we wish to utilise the notion of performance, and develop the individual narratives into a coherent story, in this case using simulation environments.

We also emulate the strong mapping traditional Indigenous stories have to geographical locations (Kutay and Ho, 2009), but in a contemporary form where stories are mapped to a knowledge context or

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simulation scenario, and thus retain their relevance or 'truth' within the context selected by the contributor of the story.

2. Learning Design

We have chosen to use an environment where the focus is on relationships and interaction, and where a narrative teaching style is used. Understanding relationships is the first priority in teaching Kinship and narratives is the process used by Aboriginal teachers within the context of sharing Aboriginal knowledge. This also provides the opportunity to use narratives from Aboriginal students, staff and community members to convey a variety of perspective on Aboriginal knowledge to non-Aboriginal students.

The teaching of culture would be invalid without Aboriginal contributors 'translating' their experiences into the new context (Ramsey and Walker, 2010). The use of narrative content forms an effective way to teach non-Aboriginal students (Egan 1998; Blakesley, 2010 and Andrews et al, 2010) and respect traditional storytelling methods (Bradley, 2010). Also, this research is based on a social constructivist approach to teaching and learning which presumes students learn through active formation of their own knowledge rather than by memorising or absorbing ideas from presentations by a single teacher (Vygotsky 1978) This suggests learning through experimentation or experiential learning and providing opportunities for students to create their own 'worlds'.

We are developing the material as an online course that teaches NSW Aboriginal culture as it relates to certain aspects of life, such as sharing responsibilities over land management, marriage restrictions and communication across language groups. We explain the benefits of this culture in the context in which it developed, and hence the importance for its maintenance within that context. We then place the students in an historical context that conflicts with this knowledge they now have, as when European settlers imposed their culture.

By creating practical scenarios that can be tailored to the student's specific professional interests (such as law, education, social policy or health) we aim to allow broad sharing of the audio resources within existing university courses and so highlight:

i.   The importance of Aboriginal people's experiences in explaining the significance of cultural differences and thus validating this knowledge.
ii.   The value of a repository of resources for Aboriginal students to share with non-Aboriginal peers on different approaches to culture within the community, and the need for a regular update of the repository.
iii. The wide range of issues that exist as cultural variations, and the opportunity provided by the web to provide tools to support course development in such areas (Kutay and Mundine 2010).
iv.   The need for culturally relevant online resources to include Aboriginal perspectives in online knowledge sharing.

In effect the web service is similar to YouTube, providing the tools to upload videos for sharing, but it also provides a strong context for the material, so that it can be re-used in learning scenarios. Also issued related to copyright and knowledge sharing protocols are handled in the learning environment, as discussed below.

3. Software design

The system has been designed in three components to allow the insertion of new stories over time, and the redesign of the learning modules to suit student's domain of learning. These three components are separated throughout in the development and can be related to each other through different interfaces. These components are:

i.   Content or Narratives: the content of the learning derived from the database repository of stories.
ii.   Context or Scenarios: the context of the virtual worlds or eLearning interface including learning paths; and

iii. Consciousness or Teaching goals: the consciousness we aim for in the students or the goals of the learning supported by learning paths and feedback authoring tool;

We have developed two interfaces for learning the material, based on the three components discussed above, and are in the process of developing the third and final one. These are:

i. Focus Material. Workshop modules presented as video clips, with interactive games added to replace the face to face role-plays used in the original presentation and links to further material such as other websites and community narratives
ii. Story Collections. Community narratives categorised under topics described above and displayed in a searchable interface with paths linking related stories
iii. Simulation Games. Community narratives to be linked to avatars in an online simulation game where scenarios are set up by teachers for students to explore.

The design is described in the follow tables including how the components are developed.

Table 1 Focus Material

Content	Context	Consciousness
Video form workshop	Streaming server	Provides information
Flash simulations of presentation role-plays	Inserted in place in video stream	Provides visual images of the relationships between people
Links to other resources	Present as overlay to video and time selected in left margin	Background reading
Additional stories from students and elders	Linked to place in workshop video and time selected in left margin	Provide more experiences of the situation

The original focus material provides the background material for learning from the narratives, and also provides support for community to upload and link their stories around the themes (Kutay et al 2012). The teacher can select a playlist of specific comments and links that are shown to a particular class. However those who upload the information specify the location and timing of these extra materials.

Table 2 Story Collections

Provides	Type	Tags	Comments
Context	Theme	From the workshop modules, eg Moiety, Totem, Skin Name	Provide stories on one theme for simulation
Context	Location in workshop	Provides extra support for 'Theme'	Provide timing sequence of stories along learning path
Context	Profession	Law, Health, Education, Social Policy	Select stories on topic for a course
Relation to player	Relationship role	Relative Skin (ie parent, child, etc)	Provide relation to player to fit into scenario learning path (will not always apply to story type)
Relation to Kinship themes	Kinship role	Alternative to above	About a specific Kinship concept rather than relation to player Provides link to themes
Scenario type	Cultural context	Aboriginal culture, Historical change European Culture	Provides link to select for relevant scenario type

The Narrative Search interface provides a simple interface to listen to stories in a context that continually provides further related material. The searches are enabled by the tagging system used on narratives as they are added. We have listed the annotation types above and the table describes how these tags will be used to link stories to each other in the narrative search or to the learning path for players within a simulation game.

The narratives or stories are collected in the repository and these can continue to be added over time. At present only the researchers on the project do this, but the interface is designed for novice users and will be improved during workshops with the trained interviewers who will be using the site to add the stories. For example the drop down lists with the descriptors of the tags to support the annotation and these will have to be customisable for future versions.

This interface is the prototype for the development of learning paths within the simulations. The development of simulations that are adaptive, and make use of the growing repository of stories, requires that the teachers be able to select and edit generic pre-coded scenarios by collection relevant stories and placing these in the learning paths provided.

Table 3 Simulation Games

Content	Context	Consciousness
Story collection		
Stories	Hear story with necessary background information	Understand where that experience fits into Kinship obligations, or where these obligations differ across cultures
Tags	Link to introductory information to story	Access to other relevant stories, where a sequence may exist
Relationship status (relative skin)	Provide a role for story in immersive simulations	Assist in providing link to player and also experience of different relationships
Video link point	Assist in locating stories in workshop themes	Provide some timed sequence, or grouping to stories
Scenario templates		
Themes	Cultural Context Kinship role applied in some scenarios Kinhship Theme	Provide introduction on learning outcomes expected from scenario template
Story Paths	Provide template of types of stories, and types of links needed.	Provide a clear picture how the kinship roles lead to the conflict or different approaches.
Select Role of player	Use Skins in cultural immersion simulation or professional role in mainstream simulations	Provide relationship with each speaker
Link stories	Experiences must be relevant to that role	Provide sequence that builds on previous stories. Ensure that correct protocol is followed in seeking information.
Assessment Types		
Questions	Generally open ended	Either 'Why is this being done in Aboriginal culture – advantages and disadvantages' or 'How is this done in other cultures'
Selection	The selection of certain paths and length of listening time is logged	Assess respect for and understanding of the Aboriginal culture in that context
Feedback and Contact	Provide opportunity to question online	Future: FAQ and multiplayer games for immediate responses

The table above provides the options for developing scenarios given the material we have so far. These components were designed to assist in developing generic scenarios that could be edited for the simulations. As we have not collected many stories yet we cannot finalise the scenario designs, however the workshop format and initial focus groups discussions have provided these components that will assist in automating the linkage of stories.

As an example of a scenario, we can consider the legal students. They may in future work in Aboriginal communities, for example helping on land claims, or work in a law court representing Aboriginal clients. In these roles they will need to understand some of the oral history that their clients

bring with them as prior knowledge of the European legal system, as well as any protocols relating to dealing with legal matters.

For example in providing an interpreter, not all Aboriginal people are allowed to speak directly to each other, so the relationship of the interpreter to the client is important, Also in juvenile cases, the Kinship system provides for all the aunts and uncles of a client to fulfil the role of parent. Hence the client or their immediate parents will select the 'parent' most suited to representing their child in court. This person often will not be legally recognised by the court as their guardian, which creates problems and has led to cases of forced removal of children in the past.

Hence in the narrative search we would want a student to hear stories that explain the effect of different kinship relations on people within the courts, but in the simulation we would like them to interact with narratives in a specific kinship role assigned to them. Hence we are assigning all authors with a role based on the workshop system, so that they form a kinship network in which we can place the student.

The process is shown below in a flow chart for collecting the narratives from community and professions, teachers designing simulation scenarios and student running the simulation with assessment applied.
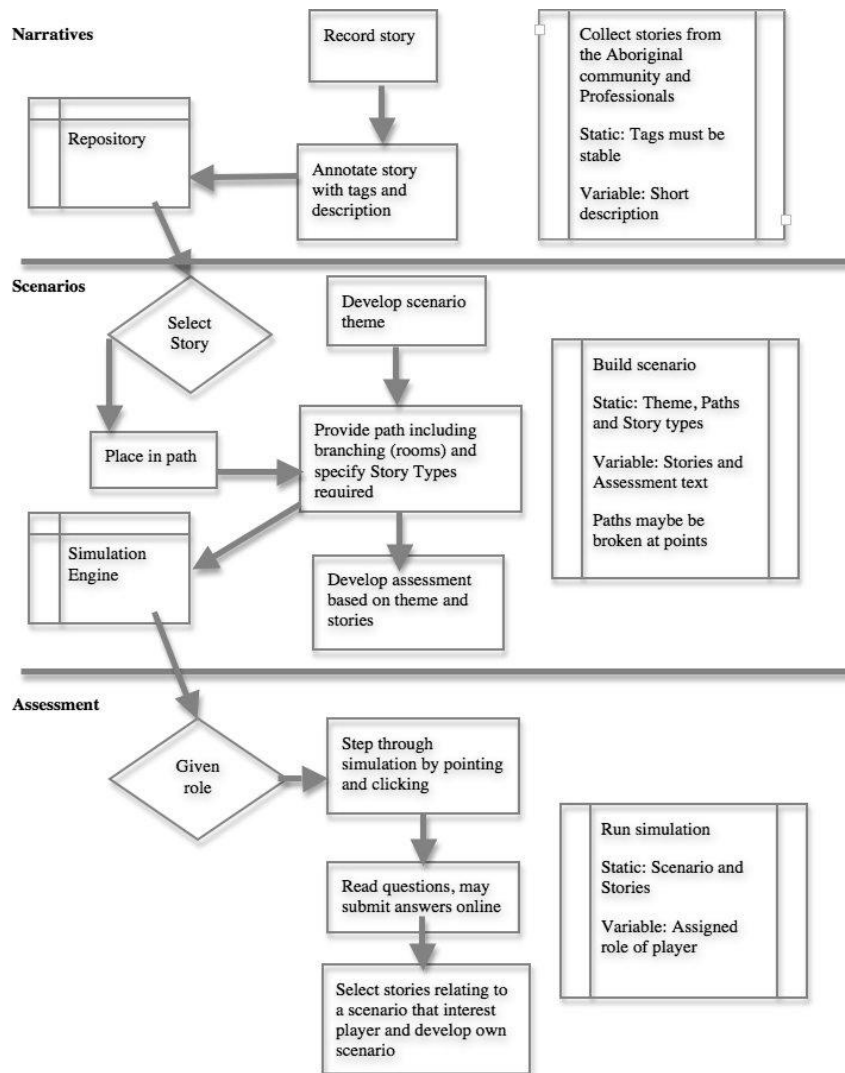

Figure 1 Story Collection and Simulation Building

4. Learning Interface

The first two interfaces for the focus material and the story collection have been written in HTML5, using a Pylons framework that allows for WSGI editing and RESTful data sharing. Annodex (Pfeiffer, 2003) is used to provide an interface for selecting clips of video and audio contributions. Teachers can add comments and link to related material based on the time slot in the workshop where they are most relevant. Also the uploading of narratives uses MPEG 7/21 standards for annotation including providing support for traditional rights of access (Hunter 2002), which is discussed below. Material that is uploaded is converted using ffmpeg to ogg video/audio format and m4p/mp3, although other formats can be added.

The initial simple interactive games have been developed in Flash using the first recordings from workshops. These games do not need to be updated as they are based on the generic cultural example presented in the workshop, however they can include external links to introductions collected from interviewees, so that the player is make familiar with the characters they will meet in the games they then play. Hence the first interface provides a static presentation of the workshop, but can be updated by attaching comments. There is no assessment or feedback at this stage.

The second interface provides a simple interface to browse narratives. A Teacher can select the groups of stories that are relevant to their students and add further 'paths' or links between stories to help with navigation. Before narratives are uploaded to the site, authors attend a presentation of the workshop. We encourage them to add simple open-ended questions relating their story back to the workshop themes. Teachers can add to these to support the learning within this system, or use as assessment.

The final system will be more complex, as we try to support open-ended contributions and form these into online multi-player games. The initial simple narrative search interface is being used to help us refine the possible scenarios and learning paths for this later version. Also we will ask authors to create or select their own 3D model or avatar for the simulation, to provide more suitable simulations in the virtual world (see similar work by Lameman and Lewis, 2011) and integrate these into the scenario environments.

The simulations could also be based on games such as Sims City where the user creates a new community, however in this case the environment will already be inhabited when they start their game, and useful conflicts can arise from the assumptions made by the player in this process.

5. Learning Paths

Based on the work by Harel & Politi, (1998) we are developing a computer simulation that utilises state-based modeling. This approach allows the selection of narratives along the learning path to move more naturally from state to state in response to students' actions or questions.

Given the open nature of the collection of stories, and the breadth of topics, we envisage that it will be difficult to achieve total consistency until many stories have been collected, that can provide the different answers to questions that may be put to the system, or supply experiences that relate to different actions by players with in the system.

The system is designed to monitor the states of the computer characters and a representation of the state of students' knowledge (progress) to provide suitable questions.

The state charts consider events such as recommend (r), listen (l), enter cultural conflict stories (e), generate linked question (q), redirect user (d), listening time as function of duration (t) and user choice (c). Prior to integrating the narratives we have designed some basic statecharts that use to the tagging system design above.

Scenarios are composed of combinations of these basic state chart sequences with tags to describe the type of narrative to be inserted.
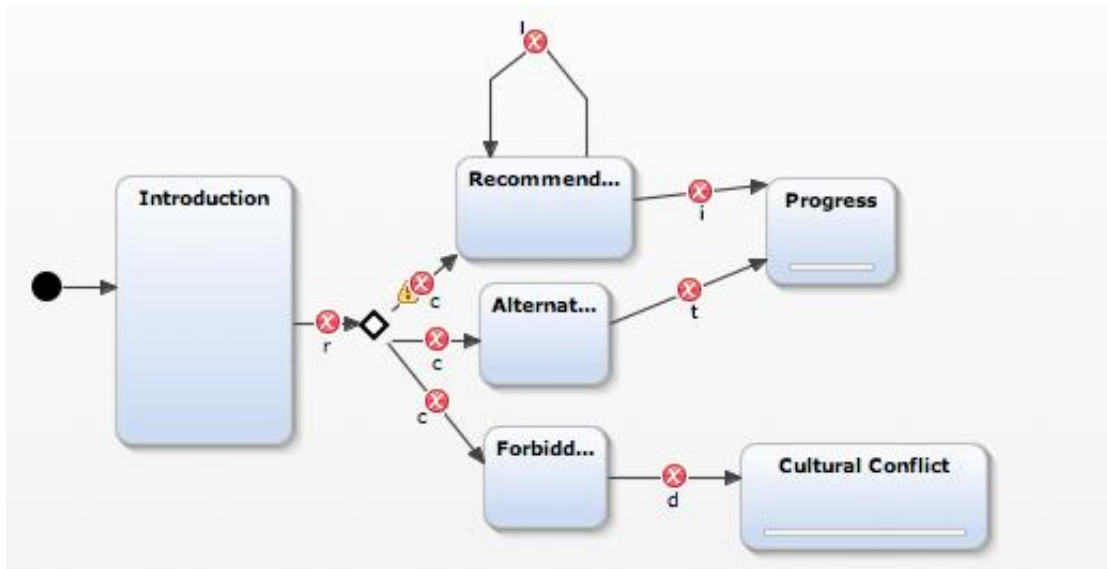
Figure 2 Simple step scenario (to fix)

6. Technical issues

As mentioned above we are supporting traditional rights of access issues, however taking into account that many of the Aboriginal contributors are living in a contemporary Indigenous culture and these rights of access have been accordingly modified. The main issues are:

i. Privacy. Contributors are very concerned about their knowledge in the form of these historical stories being taken out of context or misused. This relates to clipping segments from contributions and the context in which the material is presented, which may distort the meaning. To deal with these issues, manual clipping is only enabled on the site for the workshop material. Also the authors who supply narratives are encouraged to provide tagging and descriptions of the material, as well as linking to workshop clips, which will be the means of linking stories into learning paths. In this way they supply a description of the desire context for their story.

ii. Intellectual Property. Related to the point above is the need to acknowledge the author of any story, and provide their identity in terms of kinship, which includes their link to a particular land area and language group. However we do not want to repeat this section every time a student hears the same person tell a story, so these are separately recorded by the author, with an introduction provide for the first time that author is listened to.

iii. Respect for deceased. A concern with sharing indigenous knowledge is the protocols around deceased. For Aboriginal people in Australia, there may be a period when a deceased person's photos and video image may not be viewed. While this protocol various across Aboriginal nations, this will need to be supported for some users. This can be enforced through software using XML/SVG wrappers to store information on the resource and provide time located transcription if this has been written. For this process auto-clipping to remove restricted material may be needed (Kutay and Ho, 2011).

iv. Audio effects. The narratives will be recorded at a range of volumes, so we will need to equalise the gains to retain a relaxing learning environment. We are therefore presetting an average volume level, and auto adjusting each new upload. We are not normalising within each audio clip as this would make the sound dull.

7. Conclusion

This work is part of a broad project to include indigenous knowledge online without external editors of the material and within a learning context that is designed with and by Indigenous users. This has been a process that required continual consultation and re-assessment of the design to ensure the stakeholders understand the issues involved and are satisfied with the product as it develops.

Familiarity with the Kinship topic has helped the authors develop a process of annotation of narratives that will to a limited extent automatically provide paths through the learning material, or allocate stories to existing pre-created paths. We will also enable teachers to make their own selection of stories.

We aim to have the original information in the form of the workshop video, and the separate narratives, remain as submitted by the authors, out of respect for the different cultures of these contributors and their concern that teachers and students not be able to re-interpret and mis-interpret their stories.

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