

Teaching Culture as Social Constructivism¹

Cat Kutay¹, Janet Mooney², Lynette Riley² and Deirdre Howard-Wagner³

¹Computer Science and Engineering, The University of New South Wales
ckutay@cse.unsw.edu.au

²The Koori Centre, University of Sydney
{janet.mooney, lynette.riley}@sydney.edu.au

³Dept. of Sociology and Social Policy, University of Sydney
deirdre.howard-wagner@sydney.edu.au

Abstract: Teaching complex learning domains such as cultural awareness rely on individuals providing their particular perspective. In this paper we present the process and technology to develop an online system to share multiple experiences of Aboriginal Culture in 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 topic exemplifies the knowledge used to maintain societies and provides the setting for social conflict with the non-Aboriginal people who came here in recent history.

We are using stories from the community to augment the learning material. Using innovative web services, teachers can select the stories that are relevant to their course, and link these within 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

The paper describes the design and implementation of an online cultural training workshop based around the complex Kinship system used in NSW, Australia, to be used initially at Sydney University as part of the professional training of lawyers, teachers and social workers and at Edith Cowan University for Health Workers. Australian Aboriginal and Torres Strait Islander people are still alienated and dispossessed within a highly affluent western society and their culture and values are rarely considered in decision-making. It is probably this socio-economic differential more than actual access to health services that has led to the gap in Indigenous health [17].

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

¹ The Australian Government Office for Learning and Teaching has provided support for this project/activity. The views in this project do not necessarily reflect the views of the Office.

web services that can provide an environment in which Indigenous people willingly 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.

The project is based on a face-to-face presentation developed by Riley [19] with the aim of making it available to many more people and enhances it with community narratives. In particular we wish to reflect where possible the Aboriginal knowledge sharing process (see [8]). This is traditionally through interwoven stories, song and dance at a community ceremony or corroboree [15]. These dances provide for re-enactment and 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 [20] this medium does provide more for user adaptation and generation of material.

As Donovan [6] notes there are overlapping commonalities 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 or game environments.

2. Learning Design

We have developed an online workshop that teaches NSW Aboriginal culture relating to certain aspects of life, such as knowledge sharing between distant groups. Knowledge of these aspects of the Aboriginal culture is crucial for Australian professional who will work with Aboriginal people as colleagues and clients. This knowledge is diachronic in that it presents the evolution of the culture and the environment over time. This differs to mainstream teaching that is concerned with generalising in a synchronic form, analysing processes and material at a certain point in time, but in different context.

The original presentation has proved highly successful and has been evaluated, but the focus of this work is how to evaluate the process of converting the material to online format, and how to provide a learning format that is more interactive and incorporates the knowledge of the community, not just an individual, particularly we wish to support the updating of information, to mimic the change in stories presented at Indigenous ceremonies, to present material for sharing that relates to the changing conditions across different locations.

A video of this original presentation has been developed and is now online. Further information has been added to update the workshop, by linking updated comments to time slots in the presentation to keep the information up to

date. Also the interactive role-plays have been presented as short flash videos and inserted into the workshop.

At the end of the original presentation students are placed in a European cultural context that conflicts with the new knowledge they now have. We wish to expand this aspect of the learning for the online workshop by adding more stories of such experiences, and immersing students in relevant role-plays.

The next stage of the project is to run workshops and assist users to upload their interviews themselves and link them to the appropriate section of the workshop video. As we collect these resources we are co-developing the simulation format and learning scenarios to fit the stories available. The focus of the learning system development is twofold. Firstly we wish the Aboriginal students and community members involved in this project to view themselves as knowledge givers, or teachers [22]. Secondly we want the learning to match the learning style used by Aboriginal people. Using story telling for learning has benefits for retention within highly diverse and complex-structured knowledge systems. We are not describing knowledge about a single cause and effect, but a highly interwoven knowledge system and its resilience during a long period of ignorance by the European invaders.

This knowledge is highly significant for Aboriginal people in Australia, and we want the students to engage and learn. Again using one of the teaching techniques of Aboriginal people, we will aim for humour in our stories, reducing the impact of experiences that are often too harsh to confront head on

Furthermore, we are developing the workshop to be integrated into University courses to provide an introduction to Aboriginal Kinship across the disciplines. Hence standard learning methods are being integrated in the form of reflective questions.

3. Learning Style

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 use of narrative content is a way to teach non-Aboriginal students [7], [3] and [1] and respect traditional storytelling methods [4]. 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 [21]. This suggests learning through experimentation or experiential learning and providing opportunities for students to create their own 'worlds'.

The knowledge in this learning environment is provided in a manner that supports Indigenous knowledge sharing processes ([11] [15]) as part of the process of elevating Indigenous knowledge as a legitimate knowledge system:

- i. Community: Enabling the uploading and linking of stories from multiple authors (with accrediting of ownership) to provide a community narrative
- ii. Coherency: Providing a consistent framework into which individuals can insert their stories to form part of the knowledge sharing on that theme
- iii. Context: Opportunity for individuals to add their stories to existing ones while retaining a consistent context over time.
- iv. Methodology: Focusing on experiential learning rather than theoretical
- v. Format: Using multimedia format so that visual and audio elements are available for learning, as well as text format.
- vi. Diachronic: Providing for continually updating of content through additional comments, modules and clipping videos to enable diachronic analysis
- vii. Immersive: Opportunity for students to immerse in the environment they are learning about, in this case relationships.
- viii. Interactive: Opportunity for students to try things for themselves and get feedback that is advisory rather than specific or didactic.
- ix. Teaching methods: Provide for teachers and learners to use different approaches to knowledge to help retention and understanding, such as abstraction, analogy and humour.

We will now describe how we are implementing this learning process online. In particular we wish to show that the system is using up to date and innovative technology in a domain that is usually not included in software design consideration.

4. Workshop Design

The software being developed is highly modular so that we can support different applications, for instance non-video focus material can be used in future for implementation within other topic areas, while retaining audio/video support for comments. The web services include the ability to 'chop' and annotate the video so the Kinship workshop can be presented in segments, and interactive games interleaved where required. These games are implemented as a flash version of the short face-to-face role-play used in the presentation. The next stage of the development will be a virtual world scenario and set of stories selected by the instructor will allow the students to go through relevant scenarios interactively after viewing the workshop.

The methodology used in the software development is Action Research, a process of continual iteration through different forms of evaluation, and consulting the various stakeholders. In this project the interface and simulations are developed in stages with regular feedback from Aboriginal community members, who are developing their IT skills in line with the system. The system is written in HTML5, using a Pylons framework that allows for WSGI editing and RESTful data sharing. There are interfaces for novice users to:

- i. Install introductory focus material, based on Wiki format developed in HTML5 [11] using MySQL database.
- ii. Select clips of video and audio contributions for commenting and adding related material and stories using Annodex [18]
- iii. Insert cultural stories using MPEG 7/21 standards for annotation in XrML including traditional rights of access [9].
- iv. Listen to other peoples stories sorted by tags in a non-interactive environment.

The simulation system will provide interfaces for novice users to:

- v. Author scenarios, chose relevant contributed stories and develop teaching support and assessment [2]
- vi. Select and run single user scenarios on website.
- vii. Develop a range of images and scenarios for prototype insertion of stories into a 3D multi-player environment.

4.1. Architecture

The learning system development components are shown in Figure 1. The first stage and second stages are complete and will be evaluated below. The first stage comprises the software for running the introductory workshop, which is in eight modules.

The second stage is the additions of further material and links related to themes of the workshop and the personal stories. The design of software for Australian Aboriginal users is described in other work [13] and will not be expanded on here.

The third stage is under development and will use the teaching framework we are developing to provide teaching feedback, an interface to develop scenarios for the learning context using the database of audio, video and text content to support learning in the virtual world.

The simulation system has been designed with separate components (and related tools) for content development, scenario modeling and teaching support and feedback, using the experience from game based e-learning system and modular online learning and assessment tools such as Adaptive E-

Learning [11]. We have separated the resources (content), the interface including the visual location (context) and the teaching support (consciousness):

- i. Narratives: the content of the learning derived from the database repository.
- ii. Scenarios: the context of the virtual worlds or eLearning interface including learning paths; and
- iii. Teaching goals: the consciousness we aim for in the students or the goals of the learning supported by learning paths and feedback authoring tool;

The fourth stage is to develop a multi-player Virtual World as an extension of the single-player scenarios and retaining some of the agents and narratives from that system.

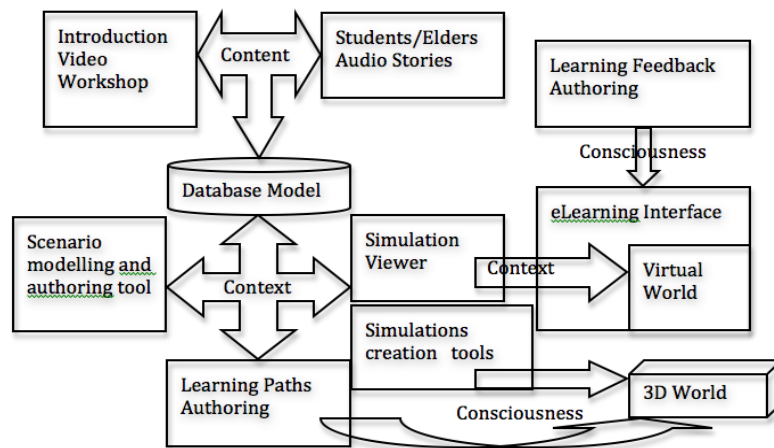


Figure 1 Architecture for learning design separated into Model (Content), View (Context) and Control (Consciousness) components

4.2. Repository

The database model we are developing has two main requirements as extracted from development of IT resources for the Aboriginal community over many years. The repository must retain information about the author or contributor and the context in which they wish this story to be re-heard, and it should provide the data in a format suitable for the users' application, such as low bandwidth mobile learning systems and different media players.

For the first case this we are using MPEG 7/21 standards. Hunter [9] notes that international effort has been focused on managing rights of access and control associated with digital content for protecting commercial rights. However Indigenous knowledge requires further restrictions and so specific extensions to XrML have been developed [10] in the form of customary con-

straints, to support the description of customary or traditional laws that commonly affect access.

We are using this protocol to annotate and define access to the stories. In particular the kinship relationship of the student to the storyteller is important in some scenarios.

5. Development Process

We present here the design of the final stages of the project before we explain the evaluation of the workshop so far, as the next stage is significant in the evaluation of the previous ones. For instance some knowledge sharing aspects will only be implemented in the later stages.

We will be collecting student's narratives on the web site during computer workshops where they will be assisted by staff to investigate how their cultural knowledge relates to the broad spectrum of learning and cultural practices at the university and in their professions, and how to use their stories to teach non-Aboriginal students. The site will be a combination of Aboriginal people's experience, including those of students and staff at the Koori Centre, University of Sydney and Aboriginal elders, forming a community narrative. Additionally non-Aboriginal academics from professional teaching areas, are involved in the project to ensure the resources are appropriate for use in their degree structure.

The final stage of the project will involve users in developing their own stories within the 3D multiplayer world. This has been successful in other Indigenous projects, such as the workshop on Aboriginal Territories in Cyberspace Skins using a digital game and virtual world, Laneman and Lewis [16].

5.1. Teaching framework

While retaining the diversity of views that are being collected on the themes we need to ensure the experiences do not become stereotypical. The initial teaching requirements came from the Kinship workshop format and discussions with community elders. Following this, Aboriginal students and University Teachers are expanding the themes and techniques (see [14]).

The content used in teaching is the video of the original presentation, comments and links to external material and the items in the repository including videos and audio files and other links used in a simulation. The teacher needs to select the most relevant of these for their students. To assist this the repository stores tags to sort items. The context in which this material will be pre-

sented will be specified through a series of pre-designed scenarios that can be used to link to story types according to tags.

The teaching then aims for a consciousness that will be developed through the creation of the scenarios (including introductory material) and through reflective questions linked to the uploaded narratives. We are considering some minimal scoring (eg does the user listen to the correct people) due to the motivational nature of these systems, and to provide a simple evaluation of the user's achieved level of learning.

In particular there are two aspects of consciousness that we want to deal with: providing students with an experience from an Aboriginal person's kinship knowledge; and the experience of how people relate within and between cultures. The first is simply gathering the relevant stories. The second aspect is more difficult and is being developed through the design of state charts.

5.2. Evaluation

The evaluation of the project so far goes beyond evaluating the original presentation, and looks at two aspects of teaching:

- i. Can the online web system provide the teaching approach used in the original face-to-face presentation
- ii. Can we extend that presentation through additional web resources.

We have so far achieved the first stage, and some aspects of the second area. Using an Action Research approach, we have consulted with the different stakeholders at each stage of the development. The original presentation have been evaluated and improved to suit the understanding of students and staff who will support the online version. The presentation was then recorded and is now online.

This version has been evaluated by a group of teaching staff, which resulted in the video material being edited and reloaded, and future material linked to the site. Then it was requested that we provide a more interactive version of the role-play games, and this was developed and interleaved into the online modules, using video clipping.

The first web services that provide the interface for uploading, tagging and collating narrative material have been developed and tested for usability issues. This had to consider the needs of the novice users and extending the format to mobile phones as a more accessible format for Aboriginal users. We explain now how the learning format of the original presentation and each of the aspects of Indigenous knowledge sharing listed above (where relevant), are incorporated into the existing online system:

- iii. Community: Commenting and narrative interface to link stories at ongoing workshops, and later for public use with moderation

- iv. Coherency: Workshop provides themes and subthemes that are used to tag narratives, as well as other tags such as cultural context, subject area, specific location in space or time and cultural relation to listener
- v. Context: The workshop provides an interface for displaying stories in sequence, and a separate narrative search interface for viewing stories by tags (see **Error! Reference source not found.**). However, the third stage of simulation gaming will provide the main context for learning from these stories.
- vi. Methodology: The information is presented entirely as stories and discussion, then presented firstly in a simple sorting interface and then presented as roles in the simulation scenarios. Authors can include some reflective questions with their stories which are displayed after the story is finished, but these are not assessed.
- vii. Format: The format is similar to YouTube in that users can view the material in multimedia format, but the site links these into learning environments and simulations
- viii. Diachronic: Users can upload comments (eg external links) and stories. Further tests need to be done to verify usability.

The next stage of the project, to incorporate simulation and role-play games into the system will provide:

- ix. Immersive: The simulation will provide learning material and narratives in a gaming environment
- x. Interactive: The generic simulation interactions have been designed and will be implemented by computer agents within the simulations

The teaching framework has been designed [14] to consider the different ways of presenting information, including:

- xi. Abstraction: In the workshop Aboriginal views and processes are presented and then an explanation is given of how this is enacted within the culture to preserve the specific society and the environment in which the peoples live; and then present how this varies from non-Aboriginal culture
- xii. Analogy: An aspect specific to Aboriginal culture is selected, then students are asked how this aspect could be enacted in mainstream culture and how this would affect relations, responsibilities or survival within the new cultural context
- xiii. Humour: The stories offered by Aboriginal users that relate to the themes of the workshop are frequently told with humour, so this style will be common on the site.



Figure 2 Stories on location

6. Conclusion

The story formats and protocol used by traditional cultures for knowledge sharing can be emulated in software to some extent. Further research is needed to unify these features within systems that are easy for novice users to tailor to the theme they wish to develop online, and to support the multimedia formats that users may prefer. While much work still needs to go into this project, we envisage great benefits.

The software will be published as open-source under the Creative Commons Attribution-Noncommercial-ShareAlike 3.0 Australia Licence (CC BY-NC-SA) and the teaching guidelines will be published on the final workshop site. It is expected the project will continue as part of the University of Sydney Research and Development Program.

By working with similar existing oral collection projects at other universities, such as Edith Cowan University, we will be able to verify the flexibility of our system as we progress. This requires the initial design to include options to add and change features.

As well as providing a means to save stories for future generations that convey the knowledge of existing Indigenous communities, the environment will also support the experience of urban culture. The stories that are shared in the contemporary Aboriginal culture include family histories or genealogies, moral stories, and life experience, for example the Bringing Them Home Oral

History Project. Such stories are important in the education of the next generation of Australian children and their parents.

References

1. Andrews, D., Hull, T. & De Meester K. Storytelling as an instructional method: research perspectives. Rotterdam and Taipei: Sense Publishers (2010).
2. D. Ben-Naim, M Bain, N Marcus, Visualization and Analysis of Student Interactions in an Adaptive Exploratory Learning Environment, CEUR Workshop Proceedings, Bernhard Beckert (2008).
3. Blakesley, S. Yukon: storytelling as an insightful tool for understanding educational leadership in Indigenous Yukon contexts. Canadian Journal of Educational Administration and Policy, Issue 111 (2010).
4. Bradley, J. Singing saltwater country. Sydney: Allen & Unwin (2010).
5. Cronin, D and Jebakumar, L. Indigenous Methodology: Indigenous research and the academy. Social Policy Research Centre Newsletter Nov, 109 (2011)
6. Donovan, M. Can Technological Tools be Used to Suit Aboriginal Learning Pedagogies? In Dyson, L.E, Hendriks, M, Grant, S. (eds.) Information Technology and Indigenous People (pp 93-104). Miami FL: Idea Group Inc (2007).
7. Egan, K. Teaching as story telling: an alternative approach to teaching and curriculum. Chicago: University of Chicago Press (1998).
8. Holcombe, S. Indigenous Ecological Knowledge and Natural Resources in the Northern Territory, A report commissioned by the Natural Resources Management Board (NT). <http://law.anu.edu.au/ncis/SH%20IEK%20Guidelines.pdf> (2009. Accessed May 2012)
9. Hunter, J. Rights Markup Extensions for the Protection of Indigenous Knowledge in The 11th International World Wide Web Conference - Global Community Track, Honolulu, 2002.
10. Hunter, J. The role of information technologies in Indigenous knowledge management. In Nakata, M, Langton, M. (eds.), Australian Indigenous knowledge and libraries (pp. 113-128). Kingston, ACT: Australian Academic & Research Libraries, Australian Library and Information Association (2004).
11. Kutay, C, Ho, P Australian Aboriginal Grammar used in Knowledge Sharing in *Proceedings of IADIS*, Rome (2009)
12. Kutay, C, Ho, P. Story Telling for Cultural Knowledge Sharing. Proceedings of the Third International Workshop on Story-Telling and Educational Games (STEG'10), Shanghai, China December: 28-34 (2010).
13. Kutay, C. HCI study for Culturally useful Knowledge Sharing, 1st International Symposium on Knowledge Management & E-Learning (KMEL) Hone Kong, 2011
14. Kutay, C, Mooney, J, Riley, L Howard-Wagner, D. (accepted 10.4.2012) Experiencing Indigenous Knowledge On-line as a Community Narrative. Mackinlay, L and Nakata, M (eds) Australian Journal of Indigenous Education, Vol 40S (2012).
15. Langton, M. Grandmothers' Law, Company Business and Succession in Changing Aboriginal Land Tenure Systems, in Galarrwuy Yunipingu, Our Land is Our Life, St Lucia, Queensland: University of Queensland Press, (1997), 84-117.
16. Lameman, B, Lewis, J. Skins: Designing Games with First Nation Youths, Journal of Game Design and Development Education, 1, pp.54-63 (2011).
17. Marmot, M. Status Syndrome: How your social standing directly effects your health and life expectancy Bloomsbury, London (2004).
18. Pfeiffer, S, Parker, C, Schremmer, C. Annodex: A Simple Architecture to Enable Hyperlinking, Search, and Retrieval of Time- Continuous Data on the Web, Proc. 5th

ACM SIGMM Int'l Workshop Multimedia Information Retrieval, ACM Press, 87-93 (2003).

19. Riley, L, Genner, M. Bemel-Gardoo: Embedding cultural content in the science and technology syllabus in Two way Teaching and Learning: toward culturally reflective and relevant education, ACER Press, pp119-155 (2011).
20. Verran, H, Christie, M. Using/Designing digital technologies of representation in Aboriginal Australian knowledge practice, in Human Technology, 3(2) May (2007), 214-27.
21. Vygotsky, L.S. Mind and society: The development of higher mental processes. Cambridge, MA: Harvard University Press (1978).
22. Yunkaporta, T. Aboriginal pedagogies at the cultural interface. PhD thesis, James Cook University. <http://eprints.jcu.edu.au/10974/> (2009 - Accessed February 2011).