

WADAWURRUNG DYA BAAP NGOBEEYT: TEACHING SPATIAL MAPPING TECHNOLOGIES

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Abstract

This discussion reports on a project that developed an education programme to support Indigenous communities in the uptake of spatial mapping technologies in Victoria, Australia. The project developed practical strategies to build community capacity in Aboriginal Cultural Heritage Management and Protection. An educational programme developed in collaboration with Wadawurrung cultural heritage officers supported learners to apply Geographical Information Systems (GIS) to cultural heritage management and to collect data about cultural heritage using a PC mapping tablet.

The paper will discuss the need for universities to have appropriate and respectful relationships with Aboriginal communities to co-develop positive learning experiences that encourage the uptake of the technologies.

Introduction

Whereas those in power have employed maps over the centuries to mark off and control territories inhabited by indigenous peoples, indigenous peoples are now putting together their own maps and wielding them to defend their ancestral lands from encroachment by those in power. (Chapin, Lamb, & Threlkeld, 2005, p. 620)

In the last 40 years, a number of mapping activities undertaken by Indigenous communities around the world have fundamentally changed the way cartography represents knowledge – of land, land use and resources, the way cartographic practices are carried out, the purpose and use of maps and, in a sense, the ownership of the knowledge represented by cartographic practices. Use and Occupancy mapping, which has its origins in Canada in the 1960s, is a methodology beginning to be used with Indigenous¹ communities in Australia (Ward, 2009; Hemming & Rigney, 2012). A range of spatial mapping technologies have also been used by Indigenous communities to locate sites of cultural, natural, economic and environmental significance with geographic information systems (GIS). GIS “is a system or tool or computer based methodology for capturing, storing, analysing, managing and presenting data and associated attributes which are spatially referenced to Earth” (Canning & Thiele, 2010, p. 36). GIS integrates hardware, software and data for collecting, managing, monitoring, analysing and reporting different types of geographically-referenced information and a number of programs are currently being used by Indigenous groups in Australia. Various programs using GIS enable users to easily see, interpret and present data in ways that

make connections, patterns and trends in data clear. The applicability of GIS programs to cultural heritage protection and management is becoming widely appreciated.

Globally, cultural heritage protection and management forms a part of UNESCO's broader commitment to protect and promote cultural diversity. The 2007 *UN Declaration on the rights of Indigenous people* especially acknowledges the challenges faced by Indigenous peoples noting that they are especially vulnerable to the impacts of both globalisation and climate change (UN, 2007). Indigenous mapping activities – by whatever methodology and technologies – around the world have a primary purpose of assisting “Indigenous peoples to claim and defend ancestral lands and resources” (Chapin, Lamb, & Threlkeld, 2005, p, 620). Indigenous sites of cultural significance are under siege from globalisation, climate change, mining and exploration of resources and persistent “development.” In regional areas of Victoria, local governments are excited at the prospect of increased population growth, increased industry, improved infrastructure – all of which activity threatens, in a very physical sense, Indigenous places, artefacts and culture.

In Australia, over 200 years of European colonisation has had devastating consequences for many Indigenous communities. Aboriginal sites of cultural significance in Australia have, in some areas, been completely decimated. With population growth anticipated to continue to increase and areas of land expected to be subject to “development,” the pressures for under resourced Indigenous communities to identify and protect sites of significant Indigenous heritage will increase. The United Nations acknowledges that Indigenous peoples are especially threatened by globalisation and climate change.

Despite the destructive impacts of colonising practices – including massacres, dispossession from land, denial of cultural value, destruction of traditional family structures, the removal of traditional clans from Country, relocation to missions and the dismantling of missions (Department of Planning & Community Development (DPCD), 2013) – Aboriginal people in Victoria had and continue to have a profound and continuous connection to Country. Indigenous knowledge, knowledge of culture, connection to land, as well as a desire to reconnect, retrieve and revitalise Indigenous identities and cultures is strong. The relatively newly established Registered Aboriginal Parties in Victoria means that Traditional Owners have legal responsibility to manage Cultural Heritage on Country. Aboriginal communities must gain direct access to mapping information and technology to effectively and independently administer their land holdings and to define and protect their community and cultural identity. Spatial mapping techniques that support communities to anticipate and manage their future relationship to Country have a vital role to play in protecting cultural heritage, engaging communities in formal education and developing transferable skills and knowledge with applicability to mainstream employment and further education. The Victorian Spatial Council (VSC) (2008) has noted the need for multi-disciplinary approaches to the demands of an increasingly complex world in order to “deliver services in an equitable way, so that everyone benefits, and within the capacity of the environment to support the demands being placed on

it...[Importantly] Spatial Information can be a unifying medium – linking solutions to location” (VSC, 2008, p. 5). If, however, spatial technologies and information are going to play a significant role in detection, quantification, decision making support and monitoring in land, culture and resource management, then educational programs that suit community are required.

Mainstream Education and Indigenous Learners: Closing the Gap

Since 2006, the Australian Government’s *Close the Gap* initiative has aimed to improve educational, social, employment and health outcomes for Indigenous Australians. More specifically, the government has pledged to “halve the gap for Indigenous students in Year 12 (or equivalent) attainment rates by 2020 and halve the gap in employment outcomes between Indigenous and other Australians by 2018” (Productivity Commission, 2011, p. 4). At a state government level, the Victorian government’s *Victorian Aboriginal Affairs Framework* (2013) focuses on six areas to improve outcomes for Aboriginal Victorians including one with particular relevance to cultural heritage mapping projects:

SAA 2: Education and training: Successful education and training outcomes enable more Aboriginal Victorians to have increased choice, economic opportunity and healthier and more prosperous lives. (DPCD, 2013, p. 12)

Lack of formal education accounts for a significant proportion of the employment differential between Indigenous and non-Indigenous Australians; traditionally, the number of Indigenous Australians who both access and complete tertiary education has been small (Alford & James, 2007). While some gains have been made in the last decade, the disparity between the formal education levels of Indigenous and non-Indigenous Australians remains considerable. For multiple reasons, “students of low socioeconomic status, Indigenous students and students from regional and remote areas are particularly at risk of being marginalised by the education system” (Bandias, Fuller, & Larkin, 2013, p.10). More specifically, research exploring educational programs in regional Victoria suggests that racism continues to be “a pervasive force in various institutions” (Alford & James, 2007, p.7).

Aboriginal Cultural Heritage

In 2009, the Legal Services Board of Victoria funded research to investigate collaborative approaches to Aboriginal cultural heritage protection within the legal context of the Victorian *Aboriginal Heritage Act 2006* and the Aboriginal Heritage Regulations 2007. The introduction of the Act and Regulations “has had far reaching effects on the conduct of Aboriginal cultural heritage management across the state. Many developments involving ground disturbing activities are now required to develop cultural heritage management plans prior to development applications proceeding through the local government planning approvals process” (Canning & Thiele 2010, p, 24). This legislation provides protection for both tangible and intangible elements of Aboriginal heritage – places, objects and human remains. The project

sought to identify factors that made compliance with the Act difficult. Registered Aboriginal Parties (RAPs) are Aboriginal corporations with particular rights and responsibilities relating to Cultural Heritage Protection and Management (CHMP) under the Act. Significantly, while RAPs have responsibility for CHMP, they are often under-resourced to perform a range of tasks in the CHPM field efficiently; certainly, access to technologies that would enable ease of identification of and documentation about sites of cultural heritage is too expensive for many RAPs. A recent inquiry into RAPs noted that the resourcing of RAPs is inconsistent, and that some RAPs have inadequate technologies, finances and trained staff to undertake CHPM work (Environment & Natural Resources Committee, 2012).

In 2011, Victoria University successfully applied for funding from the William Buckland Foundation to explore the requirements of a prototype-mapping tool and configure it to meet Wadawurrung requirements that would enable Indigenous Cultural Heritage workers to independently capture and store cultural heritage data in a secure database. The data is filed in formats of the community's choosing. The cultural heritage information system is a web-based tool that can communicate cultural heritage information in map form. The project also piloted an educational program that was mapped against the technological training (mostly delivered by technology company Iconyx), project implementation and the in-the-field work undertaken in the project to map 154 sites of cultural significance and manage the information in a purpose-built database. One aim of the training was to ensure the technical and generic knowledge and skills identified or developed during the project could be formally recognised with accredited qualifications.

The need to protect and manage sites of significance to Indigenous Australians is becoming increasingly pressing given urban development and climate change. There is no area of Victoria that does not have evidence of the fact that thousands of generations of Aboriginal people have lived and continue to live on Country – although connections to some places have been irreparably damaged. A range of different cultural heritage places are of significance to Indigenous Victorians such as places of “first contact” between European and Aboriginal people, massacre sites, sites of missions, properties where Aboriginal pastoral workers were central to the economy or places linked to the Aboriginal rights movement. The Victorian Aboriginal Heritage Register (VAHR) is the mechanism whereby records of the existence of Aboriginal sites and places are documented. In many cases, the foundation data of the records held in the register has been verified as inaccurate. GIS and, more specifically, Global Positioning Systems (GPS) clearly have roles to play in ensuring greater accuracy of locating culturally significant sites and, therefore, also in their protection.

The Legal Context

The Victorian *Aboriginal Heritage Act 2006* (the Act) and the Aboriginal Heritage Regulations 2007 are designed to protect Aboriginal cultural heritage which is defined as Aboriginal places, objects and human remains. However, as a previous report notes, the legislation is “largely silent upon the matter of the provision of resources to facilitate Aboriginal participation in the active

protection of their cultural heritage” (SZCC, 2010, p. 93). While heritage officers might have a profound understanding about Indigenous sites of cultural significance, and while Indigenous communities may have a wealth of information and knowledge about such sites, communities may not have either access to or training in some of the technologies that can help to document, monitor and manage those sites. The Cultural Heritage Mapping and Management Project (CHMMP) sought to pilot a sustainable knowledge management approach to collecting, protecting and preserving cultural heritage information and artefacts and to build capacity in a community to manage a highly technical system. The legislation can only be upheld if communities have the resources, training and technologies to carry out the work.

Technologies and Cultural Heritage

Indigenous Australians are responsible for – and increasingly legally responsible for – managing large and small tracts of land across the country. Land, sea and waterways management and cultural heritage protection and management are areas of considerable concern for most Indigenous communities and, having won some gains in terms of land rights, there is a clear need for appropriate strategies to manage cultural and natural resources for the long term benefit of Indigenous people. The role of technology in this management is growing. For example, the I-Tracker (Indigenous Tracker) program supports Indigenous Land and Sea Managers and rangers to collect and manage data about natural and cultural resources in north Australia (NAILSMA, 2012). The I-Tracker program is a customised version of the free South African GPS field data collection program, CyberTracker. CyberTracker can be used “on a Smartphone or handheld computer to record any type of observation” (CyberTracker, 2012) and is free. The Australian government is keen for communities to use CyberTracker to provide data on Indigenous Protected Areas and Working on Country projects (Department of Sustainability, Environment, Water, Population and Communities (DSEWPC), 2012):

CyberTracker is software which can be loaded onto a personal digital assistant (PDA) device and used to collect field data in a very easy and structured way. It [uses]...GPS, camera and voice recording functions built into a PDA to enhance the richness of the data. The software is first loaded onto a PC or laptop where the database can be customised to the data capture task at hand. Once data is collected in the field it is downloaded onto the PC or laptop where it is stored and basic analysis and reporting tasks can be undertaken.

Technologies such as CyberTracker can complement communities’ ways of looking after Country in culturally appropriate ways. For the purposes of legally protecting cultural heritage in the state of Victoria, however, there was a need to build community capacity to use systems that could provide robust evidence to legally support a right of protection.

The need to build capacity in Indigenous communities that have legal responsibility for cultural heritage protection and management is both

immediate and political. Legal protection can only be afforded sites of cultural significance registered with the Office of Aboriginal Affairs Victoria. The project developed a database that could both meet the legal and technical requirements of site registration and store all digitalised information about sites or associated areas in one secure location. Project participants were trained to use mapping tablets that accurately collect location information and allow site information to be inputted in situ. Together, these technologies allow Indigenous cultural heritage workers to identify, document, monitor and register sites and artefacts of cultural significance.

Iconyx's system was chosen because of its ability to manage geographic assets in rural locations and for its capacity to accommodate a broader understanding of heritage and a range of types of assets, other than just archaeological and physical ones, including intangible elements of heritage. It was specifically customised and designed to include a range of permission levels for types of information and to provide "one stop" for the management of all digitalised heritage including cataloguing. The management system provides a range of tools to search, manage and present cultural heritage information that has been captured. For example, the Wathaurung's Cultural Heritage Manger can easily produce a table of all the different site maps catalogued as part of the project (see Figure 1).

Site Type	Number of Sites Mapped
Artefact Scatter	47
Historical Place	3
Human Remains	33
Stone Feature	15
Shell Midden	11
Scarred Tree	42
Earth Feature	1
Quarry	1
Art	1
Total	154

Figure 1. Report of sites as produced by management system.

The Tablets

The mapping software allows users to collect data from the field about cultural assets using a PC mapping tablet. According to Chester (2013), "The field-mapping application gives the cultural heritage officers a typical GPS map view of their region that shows their present location and can be zoomed, dragged...to find sites marked on the landscape" (p. 40). The location of the site is accurately recorded using the tablet's GPS. This GIS data is uploaded into the database, which acts as a central register hosted on a remote server. In addition to the location data, other information collection has been systemised by creating a range of fields for entry on site. This includes a range of information types such as traditional descriptors like location, physical

descriptions, condition and dimensions. Data can be viewed and updated in the field on the tablet. The interface displays a multilayer map view of the region and shows the user's present location via highly accurate GPS. When the user selects locations on the map in the software, a data entry form pops up and prompts the entry of selected relevant information. Site data that is included in the form includes type of site, dimensions, description of site (including the condition of the site). The form can also include photos, videos or audio of the site (see Figure 2).

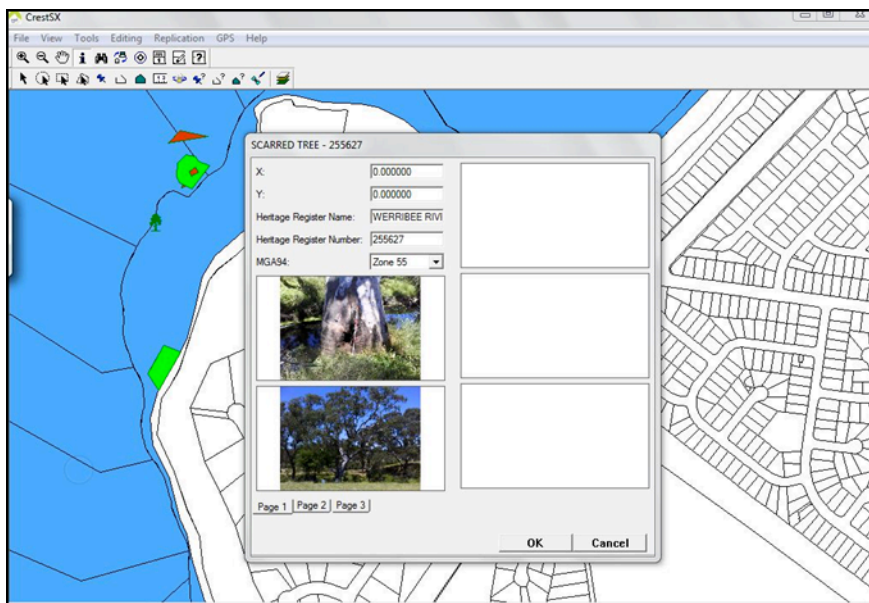


Figure 2. Template for recording site data.

The Database

The database forms had to be configured to suit Wadawurrung's requirements and several additional features were added to the database. Form types include such categories of cultural heritage sites as: Artefact Scatter, Historical Place, Human Remains, Stone Feature, Shell Midden, Scarred Tree, Earth Feature, Quarry, and Art. The GPS position recording was automated and new kinds of information allowed, primarily to record intangible sites of cultural heritage. Data can also include other forms of digital information like maps, audio, video, photographs or scanned documents. In terms of cultural appropriateness, it was vital that all decisions about data collection were the community's – including the fields for inclusion and the naming of the fields – and that all data is encrypted. Encryption limiting access to sensitive data is a key cultural requirement. Most importantly in respect to community business and different encryption layers, the community can control who accesses what information. Maps can be produced for different audiences and some information can be selectively released to an external body or kept for private community use. Data release is controlled by the community. Management users can access the system via the web from any PC. There is also a backup system that ensures that the data is well protected (see Figure 3). Various summary reports can be produced for different purpose from a master list.

Type	Item ID	Description	Property ID	Status	Created Date
STONE FEATURE	217559	VALID		Active	20 Dec 2011
STONE FEATURE	217560	VALID		Active	20 Dec 2011
STONE FEATURE	217561	VALID		Active	20 Dec 2011
STONE FEATURE	217562	VALID		Active	20 Dec 2011
STONE FEATURE	217563	VALID		Active	20 Dec 2011
STONE FEATURE	219559	VALID		Active	15 Dec 2011
ARTEFACT SCATTER	219564	VALID Toilet block in reserve at Lal Lal Falls		Active	15 Dec 2011
ARTEFACT SCATTER	219566	VALID		Active	19 Dec 2011
ARTEFACT SCATTER	219567	VALID		Active	19 Dec 2011

Figure 3. Information management system list of sites.

Capacity Building: Teaching Technologies

Even within a small group of learners, there was considerable diversity in learners' digital literacies and learning styles. Each learner needed to be able to demonstrate his/her understanding of the following aspects of the technology, the concepts and the broader context of cultural heritage protection and management by the completion of the project to an equivalent level – and they did. The potential trainees varied in age, work experience, use of technology and literacy and this presented a challenge in mapping the project activity to one level in the Australian Qualifications Framework (AQF). The team decided to map the project against a range of qualifications and AQF levels and to monitor the development of skills and the support required by the team members. A key consideration for the pilot was to identify what degree of training and experience was required to ensure that, at the end of the project, the community was self-sufficient in its ability to manage the system and to continue to independently map and collect cultural heritage data.

Primarily, learners demonstrated their competence through a capstone task that involved other community members as learners. Learners demonstrated their understanding of:

- Geospatial concepts
- The rationale of the system (tablet, database)
- How to map in the field and how to synchronise data to the database
- How to manage user access to both the system and different encryption levels of data
- How to maintain and update data
- How to access data
- How to produce maps of different types

A key objective of the project was to develop the capacity of the community to independently manage their own cultural heritage; thereby, reducing the community's dependence upon (usually non-Indigenous) external experts. In

developing the capacity of the community, a balance is required between developing individual learners, supporting their learning needs and guiding their career aspirations, on the one hand, and developing the individual to contribute to achieving cultural, business and community objectives on the other. By participating in this project, learners had the potential to develop technical skills and knowledge as well as increase “employability” or “work education knowledge” including problem solving, team work and project implementation. Certainly, research suggests that, historically, Vocational Educational “mixed-field” programs with high levels of interpersonal skills and job search skills have comparatively high levels of Indigenous enrolment due to their practical and transferable nature (Bandias, Fuller, & Larkin, 2013).

The programme combined class-based sessions and individual mentoring with hands-on in-the-field training in spatial mapping technologies. Importantly, negotiating appropriate cultural protocols was crucial from the outset as was the community’s confidence in and control of the technology. The learning and assessment plan mapped learning in the technical and generic knowledge and skill sets during the face-to-face training, in the field data collection as well as naming and storing data and managing the database system activities. The trainees’ experience ranged from a respected Elder of the community with no experience in using technology but considerable knowledge of Indigenous sites to a trainee with good technical skills who lacked confidence in teaming with an Elder of the community or in discussing issues or places of cultural significance. As with any heterogeneous student group, strategies were needed to ensure all trainees gained the necessary knowledge and skills including peer support, individual reflective practice exercises, rotating the tasks and roles of the team members and providing one-on-one support where required. The objectives of the project were continually returned to and provided an important focus for learning activities. A capstone task served both as a final assessment and as a means of communicating and sharing the project’s outcomes, the technologies and the skills developed with the wider Wadawurrung community. Each team member had to select a member of the community to demonstrate mapping and collecting data in the field. Participants demonstrated how the final data was managed to produce reports, maps and protection of cultural heritage sites. The community members then shared their experience alongside the trainees with the community at an end-of-project event.

Pilot Results: In the Field and What the Participants Said

The learning and competencies developed by learners during the project were identified and mapped to create two different qualifications at different levels. Each qualification offers a mixture of technical and employability skills in addition to an understanding of the legal and cultural context of cultural heritage work. The evaluation of the trainees at the end of the project yielded recommendations to adjust the training program in terms of increased scaffolding of some skills as well as adjustments to the time apportioned to a number of the learning activities. The skills and knowledge gained were comprehensively mapped to the project activities to ensure the resulting qualifications could be used as evidence of competency in gaining work or

seeking entry into other qualifications. A robust set of pathways are planned into a range of other qualifications and potential careers including surveying, spatial mapping, archaeology, project management, community development and general Higher Education degrees such as tourism, business or humanities. The project met its objectives of both building community capacity and developing individual capacity for work and further education.

Over several weeks, the learning program combined resources, people, activities and formative assessment to ensure that trainees could confidently use all of the technologies to effectively map, manage and promote heritage sites of Indigenous cultural significance. Evidence that the training was a success is perhaps most concretely seen in the 154 sites of cultural heritage significance that were mapped during training. These sites are presented in a multi-layered electronic map showing not only the geographical location of sites, but also other information including photos, audio and textual descriptions. Not only does the uploading of data about these sites (including descriptions, photos, GPS) demonstrate a technological competence in trainees, but competence is also evidenced by the identification of sites, logistics to get to sites, explanations of the significance of sites and the ability to link the sites to other relevant artefacts or documents demonstrate other skills and knowledge including cultural knowledge. Planning, negotiation, research and communication skills are all required to achieve these technological outcomes. The other demonstration of the success of the program and the newly developed capacity of the community is the continued mapping of sites by the cultural heritage officers of the community, the community undertaking further mapping work for Department of Sustainability and Environment and the collaborative discussions and mapping of a boundary with a neighbouring Aboriginal community.

Conclusion

The most recent Victorian Aboriginal Affairs Framework (2013-2018) emphasises the need “to build partnerships, trust, mutual respect and focus on areas that will foster strong cultural, social and economic outcomes” (DPCD 2013, p.7). Many Indigenous communities in Victoria are grappling with choosing culturally appropriate, sustainable and affordable ways to map, protect and manage their land and culture. Cartography has long been regarded in postcolonial and de-colonial discourses as “a tool used by the powerful to carve out empires” (Harley, 1988, p. 282). However, accessible methods of using maps and, indeed, more participatory ways of developing and contributing to maps that show landscapes that demonstrate Indigenous people’s continuous and contemporary connections to Country through stories, images, artefacts, as well as more technological techniques such as GIS, mean that groups who have previously been disenfranchised or rendered invisible by imperial and government cartographic practices can be both empowered and seen. That is not to say that neo-imperialist power imbalance between Indigenous groups in Victoria has been magically redressed nor that there is no work to be done to develop a more trusting relationship with Government agencies responsible for the legal protection of sites of Cultural Heritage to Aboriginal communities. While various Aboriginal-controlled cartographic methods have the capacity to safeguard cultural diversity and Indigenous

knowledge, any such technologies or methodologies also present potential problems that must be worked through and groups must be wary of “the colonizing tendencies of disciplines such as geography...when [it] work[s] in tandem with new technologies and the governments of settler democracies” (Hemming & Rigney, 2012, p. 128). Community concern about digital technologies that perpetuate colonialist tendencies and disenfranchise “Aboriginal knowledge authorities,” in effect treating Aboriginal knowledge as a commodity (Verran & Christie, 2007, p. 214), need to be addressed.

Cultural Heritage Protection and Management (CHPM) requires considerable investment from current governments, communities and philanthropic entities. Especially given the damage wrought by colonisation and Eurocentric values that refuse to acknowledge the worth of Indigenous cultures, economies and ways of life combined with expected threats to land from continuing urban sprawl, the impetus to protect Indigenous cultural heritage and to manage it for future generations of Indigenous and non-Indigenous Australians is critical. CHPM almost offers a ready-made curriculum that addresses an acknowledged need for “greater emphasis on Koori culture and Koori language in curriculum and the education and training context overall” (Alford & James, 2007, p.7). CHPM projects can offer Indigenous students an education program that is inherently about Koori culture, that uses Koori language and is taught in a peer supported way with community input. A program that is accredited in the mainstream education and training system and develops transferable generic and technical skills has real potential to help “close the gap” and improve the educational outcomes of Indigenous students in Victoria. “Strong cultural identity and connection is increasingly being linked to better outcomes in education, justice, health and wellbeing, and employment, as well as being a positive point of difference for economic activity” (DPCD, 2013, p. 13). CHPM projects that are aligned to accredited learning have a clear role to play in developing strong cultural identities for individuals and communities.

Note

1. The term ‘Indigenous’ is used to refer to all Aboriginal and Torres Strait Islander people. When Aboriginal is used it generally refers to programs, government initiatives or policies but refers to the same cohort. Koori is used to refer specifically to Indigenous people in Victoria and southern New South Wales.

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