

Submission to Connect Australia
Backing Indigenous Ability
Discussion Paper
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Background

This submission arises from experience as a Computer Engineer working at the UNSW and implementing projects in the Urban Indigenous community in Sydney. It also relates to prior experience as an Electrical Engineer working in remote Indigenous communities in Australia and the Pacific. This submission is made on the premise that Knowledge Management through ICT is crucial for the advancement of Indigenous people in present day Australia

Introduction

Knowledge Management is the basis of much existing successful enterprises and community development Indigenous projects in Australia. The existing markets in Indigenous Art reflect the commercial value attributed to the specific knowledge which is represented through the stories in painting. Tourism and Park Management all involve the sale of indigenous knowledge of the environment to a broad and keen market.

Knowledge Management through ICT can be in three forms

1. Managing knowledge from the broader community, such as government reports, recommendations, statistical data, etc
2. Managing knowledge as presented to the broader community through art works, video, music, stories, histories and scientific information on the environment and its management
3. Knowledge sharing within the community in possibly secure networks

In relation to these three aspects, there are some important points to consider when developing an overriding architecture for ICT to handle this process.

ICT for Knowledge management

There are three major issues that will be dealt with in this paper

1. The need for broadband links to remote communities from initial start up of the internet connectivity service
2. The need for open source development of tools for Indigenous communities which can be tailored as much as possible by community members, or requests can be made for such support to the open source community
3. The need to acknowledge the economic and health benefits of recognising community knowledge in any form, be it stories or histories, or tourist programs; and supporting the growth and sharing of this knowledge for future generations

Australia has a unique knowledge heritage, which is being lost. ICT offers an opportunity for Indigenous groups to store and share this knowledge in a format which is largely under their control. We must grasp this opportunity as it now exists, and provide the resources to communities for this process.

Hence the first point. Broadband access is crucial. While lower bandwidth options may be cheaper, and may be all the community will utilise during early engagement with the technology, the very format of the information which is being shared, such as videos and music, suggest that high bandwidth technology will be required soon in all communities. Rather than duplicating the infrastructure in the future, it would be realistic to require that the bandwidth be maximised from the start. Where a wire network may not be available through an existing community centre or satellite link, full broadband installation should be the first option considered before low bandwidth options.

Secondly the tools available for use either as internet communication tools, or applications for local on-site use, are becoming more and more varied. Initially it is hard for newcomers to the area to select from the wide range of tools available, hence custom built products are ideal. However this project can be put to the open source community. There are many sites for obtaining (or placing) new tools and for their public sharing, such as:

Source Forge: <http://sourceforge.net/>

Open Source Initiative: <http://www.opensource.org/>

The Gnu Free Software Foundation: <http://www.fsf.org/>

NewsForge.net: <http://www.newsforge.com/>

While these sites are not general user friendly at present, a similar site could be developed for specifically Indigenous software development projects. There could be a requirement that the software be used by an Indigenous community before release, and that they sponsor the link to support other communities who wish to use or modify the software. The type of software modification envisaged is the ability to add graphics, simple editing of options, etc which can be done by users with minimal familiarity with software.

Finally the implementation of Backing Indigenous Ability should not be limited to direct economic return on infrastructure. There are many secondary effects, such as including Indigenous people in the ICT economy, lifelong learning access on the web, and improved health resulting from projects that promote self-respect.

Indigenous people in Australia have a long tradition of knowledge sharing and respect for knowledge, and ICT can contribute to this process in the modern context. The sustainability of ICT systems should be linked to at least the following considerations:

1. Much knowledge is not openly shared and is being lost as the number of people trained to understand and receive this knowledge is small. Also the existence of levels of Knowledge in Indigenous society has led to many non-Indigenous people assuming that the lower levels of knowledge are “all there is”. For instance the Dreaming stories are taken at face value as stories for education of adults on

- the evolution of characteristics of species. A little knowledge can be a dangerous thing. There is a need for private storage of knowledge which will acknowledge and respect the holders of this knowledge and give them greater hope in the future of their people.
2. Knowledge which is shared is shared across many communities. Hence networks need to be set up and secured between participating communities in specific project. These networks will be part of the open internet system, but involved password protected sites. The project may be collecting information on a particular species, or a particular people, through genealogy or history, or on a particular story. Alternative the project may be more modern in focus, as in sharing music in language or even just sharing language. There is no direct economic return on such project, however the people involved would again have respect for their contribution to the knowledge pool, and be able to control how their knowledge is presented to others over the internet.
 3. Knowledge which is common knowledge. There is much knowledge which is stored in the community wisdom of Indigenous people which is either lost from European cultures, or may never have been obtained. An example is the increasing use of teams in industry. Especially in the area of engineering, teams are a vital part of a successful project. Yet non-Aboriginal Australians are not good at this skill and need much on the job training. The analogy between Aboriginal skins, and the roles which are associated to a skin, are useful lesson for Engineers to understand their roles in a team. It is not possible to quantify the economic advantage of Indigenous people being able to access and use internet resources on a scale which matches the use by the non-Indigenous community.

Implementation of Backing Indigenous Ability

In view of the above approach, this paper now addresses some of the questions asked in the discussion paper, under the relevant section headings. While not all the questions are addressed, the areas relevant to this approach are discussed in more detail.

3. Backing Indigenous Ability

Long term sustainability of any infrastructure will require the installation of high bandwidth technology where possible. The need is to plan for near future expansion of network use, rather than basing on existing use. However for the full potential for Indigenous expansion into the internet to be realised there needs to be a fully integrated approach as developed in the report. In particular there needs to be:

1. Involvement of older people in the community in ICT use so they can model and assist the younger members, through history and story projects.
2. Training of Indigenous people in network installation and software development, from early school years through involving students in relevant projects for their community
3. Employment of community in any installation project which occurs in the future, including accepting delays in implementation this may cause
4. Acknowledgement of Indigenous Ability in terms of organizations, process and knowledge management within the Connectivity process

3.3.1 Shared Community Phones

Telephones are a basic right to all Australians, hence Community phones are vital. They form the first step in not just communication but also knowledge sharing. However in installing a phone, space in the network should also be included for future upgrades

In the past phones have been installed by Telstra on a waiting list that was at least two years. This left many people isolated and in possibly dangerous situations. Two way radio was used as a stop gap, but did not provide a reliable service if the relevant vehicle was not in the community, or if maintenance of a fixed system was not done locally. Also the battery was often re-usable as a car battery. Again the 'single community phone' solution was not always reliable. There is increasing technology in terms of microwave links⁴ which provide short reach wireless connectivity and hence may offer immediate service for outstations to an already connected community.

There is a significantly large market in Indigenous communities to justify developing a list of options for different situations (such as distance to existing broadband network) with particular focus on the option of installing basic computer system and internet connectivity with the phone. This would not increase the hardware cost greatly over phone systems, at the community end, although the network cost would go up. It would also raise the value of the system to the community, and hence the likelihood of its ongoing care. While this would not be appropriate if there is no-one in the community who can use the computer, it would assist in basic services, and also if acceptable, could include a camera to double as a phone system.

Suitability for a particular system could depend on the maintenance skills of the community, and previous experience. What are the resources of the community from which they came previously? What are their aspirations based on other community facilities. If they are used to radio in the main community it may not be appropriate to introduce phone in the outstation, for example.

The installation of phones or related system should be done as a regional or area project. While this may cause some delay, if a full network is to be installed, the more communities linked in at the start, the more attractive the project.

3.3.2 Public Internet Access

The need for training in both use and maintenance of internet facilities would suggest that hub communities are the place for such access. Since the initial link may be through satellite, with other outstations being linked by smaller distance micro wave links, suggests that the hub can provide both the training and resource distribution centre for a wider network in future. Also the hub can run a server which contains the most useful tools to the community which can be accessed locally (low bandwidth) by future computers.

The world wide network is designed as a series of hubs and links, hence this format should be emulated in communities. However ownership of the resources and experience

in maintenance must be shared with the community and not be the domain of the non-Aboriginal staff.

Again the selection of communities for facilities should be based on prior experience with similar technology. For instance a community which has previously only had radio is unlikely to use a computer with video link in lieu of a phone system, unless they can accept the use of a 'hidden camera'.

Internet access models which may offer some alternatives include:

1. Networks: Peruvian system used by highland dwelling communities to verify price of potato and wool produce to middle merchants (UNITEC New Zealand handled technical support). This project is operating under a model of transformational participatory (TR) research which aims at politically empowering and liberating relatively disenfranchised groups. Urban Indigenous people from the rural region were employed to travel to communities and initiate projects, as well as organized installation and training. Local community members were involved in the installation, and low cost technology used to provide microwave links to remote areas.⁴
2. Software: Open source interface such as Ubuntu⁷, a student developed, no frills, Linux system providing email, Web browser, document editor, spreadsheet editor, and more.
3. New Zealand Review of alternatives models, included in report Technology Planning and Support Models Training and Resources⁵. Review looks at Government initiated ICT development and business and academic partnerships.

A further matter is the site for any computer system. There is a tendency for particular community buildings to be associated with the family who staff that office, and hence such a building would not be accessed by all families. Also the need to lock up computer equipment is an issue for access.

3.3.3 Video Conferencing

Video conferencing by computer requires high bandwidth connections. Also the use of a "hidden" camera as the small computer cameras appear to be, can be undesirable in communities which are not familiar with this style of technology. However if a computer broadband system is acceptable to the elders of the community, then it would be preferable to install such flexible technology. However there would be a need to ensure access for video conferencing, rather than overuse as a games machine or bank teller.

3.3.4 Training and Skills Development

A teaching process based on the concepts of Problem Based Learning is used at Batchelor College and adapted to the technical training courses at the Centre for Appropriate Technology provide a basis for training. A similar approach would be suitable for cross discipline training in communities. The PBL approach states that training should start with the students' skills gap and provide them with the skills and resources to fill this gap. By proposing exercises or 'problems' in ICT, the students will identify their skills gap. However they are not required to identify or solve the issues alone, and are guided on how they can solve them themselves. Also in this training, the student is usually encouraged to nominate their own problem, such as the purposes for which their

community would like to install and use ICT, then work out the resources and skills they need to support this.

PBL is defined as learning which focuses on the need to:

- Integrate knowledge and skills from a range of multidisciplinary modules
- Acquire knowledge through self-study
- Enable students to work in groups and manage group projects
- Improve and develop skills of students which they can transfer to new situations
- Develop problem solving skills of students
- Encourage self-motivation, curiosity and thinking
- Ensure students own the problem they study and control their learning
- Finally, to make learning fun!

This provides features of learning which have been seen to be necessary for Indigenous students to engage in a course, such as a real life learning environment, giving the students ownership of the problem, and ensuring the training is relevant to the community needs.

This training must start at installation, even if this delays the implementation of the system. Phone systems can be integrated into regional training of one or two participants for a locality. Computer networks would involve more training and personnel. In the case of computer networks, training sessions can be handled in the hub communities, assuming this is where the equipment will be located, and the students should be involved in its installation. Training may have to be small groups, rather than attempting to integrate students into TAFE or other courses, if the community does not identify closely with the aims of the local TAFE college. The training will then require less dislocation from community and provide more relevant information. It will not help to train students in maintenance of a satellite system if they are going to use an optical communication link. The increased cost of small group training will be offset by the familiarity of the students with their own system and the improved ability to maintain and diagnose this system.

Ongoing training of personnel can then be carried out in the region (for telephones) or hub community (for computer networks) by these trainees, if the resources developed for the original course are provided for their ongoing use. The training itself can be developed in a regionalised manner given the PBL flexibility, and trainers will be centrally trained in PBL strategies of teaching as well as assisted in developing resources for local needs. Only the delivery and finalized resources need to be localised. Thus the central training would be outside community grant management, however the training would provide trainers as a resource for training as part of any localized submission. Again as mentioned above, any installation would be preferably integrated into a regional approach to reduce cost and increase the likelihood of a broadband system due to the increase demand from multiple communities in the area.

The difficulty with training is the need to tailor the training to the community needs and infrastructure. Hence telephone maintenance training can be more regionalized, while computer system will vary more. Also in the more remote areas where there is greater need for these systems, the training needs to be within the community are as much as possible.

3.3.5 Community Champions

Community Champions could be an ideal way to overcome the gap in knowledge about ICT. The requirement for such a champion are difficult, as they must firstly be part of the community and nominated by elders of the community, and secondly adept in ICT, or willing to train externally to gain this knowledge. Importantly these elders may not include the Chairperson or Council used in previous projects involving Indigenous and non-Indigenous consultation. Invariably the need for external training and nomination by community are contradictory requirements, as the community may want someone who stays locally. It is important that the champion not be chosen as they are good at computing without first verifying the community faith in them as a provider of suitable knowledge. Secondly there may be a need for at least two (male and female) champions.

Community champions have to be nominated by the elders of the community. If the community elders estimate that a person is suitable to be trained up, then that should be respected. If the community has no experience at all in computing this will be hard for them to estimate, but then they will be able to provide the learner with the most likely potential.

3.3.6 Culturally appropriate content

There is precedence in Australia for community networks based on Business partnerships, as in the Cape York Lands Council and CISCO partnership network. Much of this network focuses on the immediate economic benefit to the involved company and the Lands Council, as in charging for banking transactions. While this provides money for the community, there is also a need for recognition of the long term economic benefit of knowledge management through the internet.

By providing a venue for knowledge gathering and sharing, Australia recognizes the values of its Indigenous citizens and provides the internet or a virtual venue for sharing this knowledge with the broader community, under Indigenous control. This process could be supported by Academic partnerships. For instance ANU supports research by developing ASEDA: the Aboriginal Studies Electronic Data Archive, which has subsequently moved to the government domain.

Most, if not all, Australian Universities have resource centres to support Indigenous students, although the lack of computing studies students precludes these centres from much involvement in this area. However the computing departments in Universities are always interested in researching different applications for computing, and expanding the algorithms and approaches used in computing to satisfy the new domains. This is an area to be tapped by Indigenous communities.

Knowledge management can be through databases, publicly accessible, or open to a select few. Existing software developed for recording social histories, such as the Ara Irititja⁹ electronic archive, have been developed in response to the specific cultural needs of one group, in this case the Anangu. Where possible, Pitjantjatjara language is used. Software protects and/or restricts access to private, sensitive and offensive materials. Also the collection of historical materials is not seen as static, but is structured so that as well as viewing records people with password access can add, expand, or correct data and historical details.

Such projects can be made open source and enable other communities to edit features to suit their needs. It should be noted that the Ara Irititja project has been very successful in adapting to other communities, but the opportunity for communities to tailor the system could only improve this access. For instance the language could be changeable.

The important features of this project could apply to any interface development: simplicity of interface, use of local language where possible, inclusion of specific cultural needs around information and access, online editing of information for continual update.

Clearly the existence of, and access to, such software provides an avenue for knowledge management which communities may be keen to take up. This is not necessarily a matter of 'communities have not requested this', it is a matter of knowledge access in that all communities do not know what is possible through computers and this information needs to be made more generally available. While it is the role of government and other institution to provide this initial information it will be up to the communities to act on this through applying for grants, training and infrastructure.

When communities seek funding for ICT resources, information on usage of these resources by other communities could be included. The initial funding applications may not include infrastructure for cultural or historical data recording as the community does not feel competent in ICT, however grants should be available for subsequent applications. Hence while the hardware and software grants can be combined, they should not be tied to each other. However training will be integral to both types of applications.

3.5 Innovation and Flexibility

Training in Indigenous communities is better performed by Indigenous people from the area. Hence training and installation should be carried out in a distributed manner. Centralised training of interested Urban or semi-urban Indigenous people could provide the personnel for more regional training of people from hub communities, who would then train more remote personnel. The resources used in these courses, and the technology adapted for each installation can then be passed down to each level. While the regional personnel may understand an expanded number of networking options, such as satellite, microwave or optical fibre, a hub community need only specialize in the technology relevant to them

The important factor about technology is that it carries with it cultural assumptions in its development. Hence any design of technology for communities needs to involve an understanding of the community where it is to be implemented. This is a second reason why community trainees must be involved in the installation decisions, including the technology to be used. If the government chooses to install through centralized suppliers, there will be cost savings, however if this is done without communities understanding and being competent in the variations between options, many communities will suffer from inappropriate systems. An example above is the use of computers for video linkages only if the community is comfortable with the small and therefore 'hidden' camera on the computer.

In effect there are not a great range of choices for any community, however the combination of different features, such as how many telephones or computers, where they should be sited, how many trained, does provide an large range of options for consideration by the community.

It would be advantageous to introduce the idea of open databases and management of knowledge by setting up a database of Telecommunications projects in Australian Indigenous communities. This database should cover the features that are believed to distinguish different projects⁶ and lead to the suitability of different designs.

Information can be collected in an online database which is editable by Technology and Training providers. A prototype is being set up at UNSW and will be available soon at the site
<http://cgi.cse.unsw.edu.au/~ckutay/twiki/bin/view/Cities/CommunityTechnologyLearningCentresDesignModel>

Conclusion

These issues have wide ranging effect on how the Backing Indigenous Ability project will be implemented and how long lasting the effect will be on Indigenous access to mainstream ICT, both for training, employment and self-acknowledgement of community worth. This is just a summary of some of the points.

In the Information centre at Strahan, Tasmania, at the mouth of the Franklin, there is a room exhibiting Indigenous History of the area. There were three particularly interesting plaques, which explained that:

1. Aboriginal people of Tasmania built house. They were decorated with woven mats of many colours.
2. Aboriginal people have novel ways of adapting to technology. A kitchen bench top was used as a surfboard
3. Aboriginal people used the telephone. They used it to organize the protest

The protest by the Aboriginal people of Tasmania preserved the environment and Indigenous knowledge of this environment which had been preserved in the cave drawings and artifacts for tens of thousands of years. This was indeed World Heritage and the communication of the existence of this knowledge and its preservation was vital.

The implementation of Backing Indigenous Ability should not be limited to direct economic return on infrastructure. There are secondary effects which have a scope well beyond communication issues, such as including Indigenous people in the ICT economy, access to lifelong learning courses on the web which could be tailored to indigenous needs, and the acknowledged health benefits resulting from projects that promote self-respect.

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