INDIGENOUS CULTURE AND COMMUNICATIONS

Can stakeholders build a better telephone service?

ROBERT MORSILLO

Mr Bruce Breaden (Chairman Central Land Council) with the author.
Photo courtesy Central Land Council, March 2002

Robert.J.Morsillo@team.telstra.com
Tel: 03 9634 5508

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Abstract

The apparent disconnect between communications and culture in remote Indigenous communities in Australia raises many questions about the nature of the relationship between the preferred and proffered technology of public policy and the needs and aspirations of the user group. It is important to explore these questions, which should allow for the more intelligent design of communications technologies as well as provide insights into what makes for successful technological innovation within the Australian telecommunications industry.

This paper seeks to explore the corporate and cultural complexities involved in developing a new communications technology solution, called Country Calling, for such a user environment. The starting point is the persistent very low take-up and maintenance of personal or household telephone services in remote Indigenous communities. A social construction of technology approach is used to review three primary questions: (i) How is the current Standard Telephone Service culturally constructed with respect to remote Indigenous

communities? (ii) How are users represented in the technology innovation process? (iii) How is a new technology solution negotiated between supplier constraints and user demands?

The paper argues that best-practice public participation processes combined with an understanding of the user environment can provide for the construction of new technologies that will hopefully allow more people in Australia to stay connected.

Introduction

While there is much debate regarding access in regional areas of Australia to new communications, such as broadband Internet, effective solutions for voice telecommunications in remote Indigenous communities are still lacking (most recently noted by Central Land Council, 2006).

This deficiency was officially recognised in the Besley inquiry, which found service levels in Indigenous communities were poor, and "warrant particular attention" (Telecommunications Service Inquiry, 2000, p. 182). The Government has followed up on the Besley report recommendations and after further inquiry and consultation issued a formal report and action plan (the Telecommunications Action Plan for Remote Indigenous Communities or TAPRIC) that "sets out a guiding policy framework and action agenda to deliver sustainable service improvements" to remote Indigenous communities (Department of Communications, 2002, p. 14). In 2005 the Government announced its follow-on Backing Indigenous Ability program as part of the major Connect Australia package of funding for telecommunications initiatives (Department of Communications, 2006).

Recent survey data suggest a continuing deficiency in take-up of the Standard Telephone Service and other communications services. In 2004 only 79% of Indigenous respondents (urban, regional, rural and remote) reported having access to personal telecommunications services compared to 98% for the general population (See Table 1 below). Indigenous respondents living in metropolitan locations reported significantly higher levels of accessibility to telephone services (7.1 rating on a scale of 1 to 10) than those in regional (6.3 rating) or rural and remote locations (5.5 rating) (Low Income Measures Assessment Committee, 2005).

Table 1: Access to personal telecommunications services 2002–2004

	2002	2003	2004
	General Population % **- Indigenous Sample %**		
Fixed	96 - **69**	94 - **61**	94 - **48**
Mobile	74 - **46**	71 - **38**	72 - **63**
Internet	37 - **16**	60 - **9**	61 - **9**
None	NA - **17**	3 - **25**	2 - **21**

Sources: Panorama 2002, ABS Nov 2000 *Households with access to the Internet at home,* Roy Morgan Research Jun-Aug 2003, Sep 2003-Aug 2004, LIMAC research 2002, 2003, 2004.

The Standard Telephone Service as a Constructed Artefact

The question arises as to whether the Standard Telephone Service in Australia is part of the problem rather than part of the solution. Does it encode in its design, construction and implementation significant assumptions about the way (certain) people live or relate, which mitigate against take-up? The social construction of technology approach gives prominence to a technology's interpretive flexibility in the eyes and hands of its designers and users: "…technological artefacts are culturally constructed and interpreted … There is not just one possible way or one best way of designing an artefact" (Pinch & Bijker, 1984, p. 422).

Such an approach opens up the sealed box of the Standard Telephone Service to the inspection and analysis of its various constituent parts, its multiplicity of design decisions, its "what might have been" options, as well as their effect upon different users. Indeed, the Standard Telephone Service is defined by a large number of attendant characteristics, including technical specifications, connection, billing, payment and credit management, directory listing, fault repair and priority assistance. The following "features" are significant in the way they presume a certain kind of user of the service:

- *A Voice Service* – the user is someone who belongs to an oral-aural culture.
- *Service Connection Costs* – the user is someone who is most likely to live in an urban area with pre-existing (or at least pre-installed) services and where the dwelling is not very far from the property boundary.
- *Legal Lessee* – the user is a single identifiable person who is able to take responsibility for all usage of the service and including all consequent liabilities.
- *Mobility* – the user is someone who does not move about very often, who lives in a relatively stable household that does not change inhabitants very often.
- *Billing* – the user is someone who has a reliable postal address and regular postal service, access to payment transaction facilities, relative stability of location, and is able to estimate and budget for accruing charges.
- *Pricing* – the user is someone who is most likely to have a stable and reasonable level of income, who can afford the fixed cost monthly access charge and who makes an average number of calls from their service and so benefits from the post-1997 re-balancing between access and call charges.
- *Handsets* – the user is someone who does not belong to the 20 per cent of the Australian population that has a reported disability (Australian Bureau of Statistics, 2003) and might require assistive technology in the use of communications and associated Customer Premises Equipment.

Resisting the Standard Telephone Service

The social construction of technology approach allows a study of the *failure* of a technology to illuminate the relationship between it and society. It gives standing to episodes of user resistance to the technology and/ or to the terms and conditions on which it is offered. Failure and resistance can be seen as two sides (supply-demand) of the Standard Telephone Service in remote Indigenous communities. Kline (2005, p. 54) offers an interesting case-study of "resistance to the use of the device prescribed by telephone companies", namely the party-line connection. The telephone company insisted the service be only used for one-on-one private conversations, rather than for public conversations or eavesdropping, which was possible. "But many farm people viewed eavesdropping in a favourable light, as a way to transplant the rural custom of 'visiting' onto the new technology of the party line" (Kline, p. 55).

Some of the problems associated with the Standard Telephone Service in Australia, including those in remote Indigenous communities, might also be understood as resistance to the unusual nature of the service with its private rather than public purpose and its individual rather than shared features (to generalise from Kline's example). The following four resistance scenarios, by different groups of users, reveal some of the assumptions built into the Standard Telephone Service in Australia.

The Standard Telephone Service as a Disabling Technology

The oral-aural feature of the Standard Telephone Service was resisted when in 1995 the Deaf community in Australia argued before the Human Rights and Equal Opportunity Commission that a Teletypewriter should be supplied as part of the Universal Service Obligation to people who communicate by text on the same or similar terms as equipment supplied to people who communicate by voice. The determination of the *Scott versus Telstra* case in favour of a deaf telecommunications user (Human Rights and Equal Opportunity Commission, 1995, para 39) resulted in the Standard Telephone Service being recognised as a communications service *end-to-end*, rather than just a network connection unrelated to the needs of the end-users and the terminal devices that may be required (such as a Teletypewriter).

The Standard Telephone Service as an Unaffordable Technology

During the early 1990s peak community groups such as the Australian Council of Social Service (ACOSS) were raising the issue of access to communications as a necessary pre-requisite to job searching and finding employment (Australian Council of Social Service, 1993). Surveys noted the resistance to the take-up of telephone services among people who were unemployed and the stated difficulties of affording the ongoing monthly access charge, despite the desire to receive calls from potential employers, supportive friends and family. This led to the development, in consultation, of Telstra's InContact® telephone service.

The Standard Telephone Service as a Credit-Challenged Technology

Initial take-up of the Standard Telephone Service in remote Indigenous communities resulted in a re-interpretation of a technology designed for individual and/ or settled household use. Users resisted this feature of the service. Shared use of the telephone service was consistent with the shared use of other goods and services in the community but proved to be incompatible with the standard offering. At one time it was estimated that approximately 35 per cent of wired telephone services lay idle because of previous disconnection for credit management reasons (Duchek, 2002).

The Standard Telephone Service as a Complex Technology

The situation on Mornington Island in Australia can be interpreted as a resistance scenario to the Standard Telephone Service (Lacey, 2002; Boyle, 2002). The original proposal for service provision involved the community council on the island paying in bulk for the monthly line rental component of the installed Standard Telephone Services and recouping that cost as part of the tenancy agreement with each household. Customers could make calls using a pre-paid calling card that was purchased from the local store. However, problems soon arose. The complexity of using the pre-paid calling card proved to be a large barrier to use. The small print and English language instructions on the card also did not help in a mainly oral culture (Lacey, 2002). Further, the cost of local calls via the pre-paid calling card were substantially higher than normal. The resistance to this solution came about when it was realised that Telstra's Standard Telephone Service cannot be barred from accepting incoming reverse charge calls. Once this became well known on the island the whole system and solution collapsed and other service options had to be quickly enacted.

A Standard Telephone Service for Standard Users

In summary, the Standard Telephone Service provided under the Universal Service Obligation has a number of built-in, scripted assumptions about affordability, mobility, access to postal and payment services, individual (financial) responsibility, household constancy, disability

accessibility and being regarded as a non-essential service. In other words, it configures the standard user as someone who fulfils those assumptions.

The Remote Indigenous Community User Environment

Most inquiries about telecommunications in remote Indigenous communities point to a range of demographic and socio-economic factors that affect take-up (eg. Telstra Corporation Ltd, 2001). Issues such as geographic and social isolation, literacy, income, education, employment and health all play a significant role and have been well documented (Department of Communications, 2002, pp. 18-22).

However, it is the range of *customary* factors that also needs to be drawn out, which might also affect the take-up of the Standard Telephone Service in remote Indigenous communities:

- *Diversity* – Indigenous communities are diverse in their demographic makeup and cultural traditions. Many different languages are spoken and behaviours that might be accepted in one community may not be tolerated by another.
- *Mobility and Kinship* – Indigenous people in remote communities might be quite peripatetic as they undertake important ceremonial business, respond to a death in the community, or move to traditional lands.
- *Social calculus* – is a term coined by Schwab (1995) to describe how Indigenous people will generally calculate transactional value based on social reciprocity, rather than potential financial cost.

  > For such Aboriginal people, whether or not cash is exchanged for access to others' consumer goods, services or labour, and the amounts of cash involved in the transactions, are dependent upon people's own assessments of the social value and context of the proposed transaction, rather than its formal economic value (Altman & Ward, 2002, p. 31)

- *Relational dynamic* – A consequence of this social calculus is the emphasis placed on relationships and having the time to get to know a person and a technology. Technology is constructed in personal terms and requires just as much careful initiation as a new personality. Otherwise, the telephone, and other communications technologies, can be perceived as "white fella" property and alien to the community (Bomford, 2002). "…too often people see themselves as recipients or even victims of someone else's technology" (Fisher, 2006, p. 16).
- *Humbugging* – A further outcome of this social calculus where one member of the clan is able to put demands on another to provide cash, or goods or services, for free, or on a less than commercial basis. Watkins (2002) points out that these "cultural obligations to other family members may be reinforced by poverty – you don't say 'no' because next week you may need *them*." However, it is clear that this shared usage of the Standard Telephone Service is one of the major reasons for "unexpected" high bills and consequent credit management action by suppliers leading to disconnection of services.
- *Community ownership* – resources such as telecommunications are seen as community resources, not belonging to an individual household: "…the notion of household use of telecommunications is an entirely inappropriate framework from which to approach the needs of these communities" (Casson, MacNeil, & Wilding, 2002).
- *Community capacity* – This issue is highlighted in various submissions from Indigenous organisations arguing the priority of human capital development, giving attention to

human infrastructure requirements, along with physical communications infrastructure needs. The Indigenous Remote Communications Association argued for the:

> …adequate provision of human capital development, skill acquisition, career pathways and employment opportunities complimenting remote and very remote Australia's telecommunications infrastructure (Indigenous Remote Communications Association, 2002, p. 7).

- *Cultural business* – In order to build community capacity Indigenous people themselves point to the need to develop, maintain and pass on cultural knowledge. So, an important consideration for the use of communications technologies in remote Indigenous communities will be their utility for communicating cultural knowledge, as dé Ishtar notes: "If our projects are to benefit Indigenous peoples it is essential that we find ways of recognising and honouring the Living Culture of our hosts" (dé Ishtar, 2004, p. 3).

Interpreting the User Environment

In summary, an analysis of the user environment in remote Indigenous communities shows strong evidence of a cultural misalignment between the technology artefact and the intended user. The configured user is not recognisable in that environment. The conception of household and family is much broader, itinerant and diffuse than generally allowed in western cultures. The notion of individual property and ownership is problematic in a largely communally based society where most resources are shared. The communications requirements of cultural and community business take precedence over private individual business needs. The capacity of many communities to successfully self-organise and enter into sustainable agreements cannot be assumed.

User Representation in Technology Development

Traditional paradigms of technology development generally give priority to the manufacturer, who determines the problem or need, undertakes research and development, design and construction of the new artefact and then seeks to commercialise it. In order to have successful take-up of a technology designers might investigate certain aspects of the intended user and their environment. Usually this is done through market research, with the results of qualitative and quantitative surveys fed back to the designers by firms that specialise in such research.

More recently it is being recognised that users do play an important role in innovation. The work of von Hippel has shown that "lead users" in particular play a role in a large proportion of successful innovations, often by constructing a prototype solution to a problem they have encountered and then convincing a manufacturer to take it to the wider market (von Hippel, 2005).

A social construction of technology approach reveals that the user has been represented in the design of the technology almost from the very beginning, even if only implicitly. The question becomes whether more successful technology outcomes can be achieved if users are *explicitly* represented in the design and development phases.

Technology Democracy

With the increasing importance to and impact of technology on human life and society there is an increasing call for the democratisation of technology, particularly when developing countries are confronted with multi-national technologies.

> Just providing access to basic technologies is not enough. People also need control, both over the use of existing technologies and the development of new ones. The only way of ensuring that any technology will benefit people is to provide opportunities for them to participate in its development. Such processes should not only draw on their existing knowledge and practices, but also their assessment of particular circumstances in which the technology might be used (Wakeford, 2004, p. 3).

Closer to home, this democratisation of technology view has been reflected by Peter Binks, CEO Nanotechnology Victoria Limited:

> For successful commercialisation of technology, there has to be engagement between the people who are developing the technology, the people who are funding the development and the people who intend to use it. The relationship must be one where they are all equal parties (Binks, 2006).

Public Participation

Technology democracy can be viewed as the application of more general participation processes specifically to technology development. Public Participation is a well-developed and recognised process (International Association for Public Participation, 2006) that seeks to allow user influence in decision making. It can also be referred to as consumer consultation or community engagement. According to the International Association for Public Participation (IAP2) effective processes must be based on the following seven core values:

1. The public should have a say in decisions about actions that could affect their lives.
2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

(International Association for Public Participation, 2006)

A public participation process can be useful where there is a large number of disparate stakeholders involved in the development process. The ability of a process to bring together and take into account the views and interests of such a large range of stakeholders, while focussing on the decisions that need to be made and outcomes expected, is its strength.

Who is the Public in Public Participation?

In applying a public participation model to technology development a key issue is: who is the "public" that is engaged. Large companies tend to rely on market research to gather end-user data, but it is clear that users are not the only interested stakeholders. Jessika van Kammen notes the opportunity to "extend the diversity of techniques for constructing representations of

users beyond market surveys" (van Kammen, 2003, p. 158) even if complexities arise when multiple stakeholders represent multiple views of the user.

It is clear that in the case of remote Indigenous communities there are many significant stakeholders involved in developing communications solutions. These include: representatives of remote Indigenous communities, who work with and advocate for improved services on behalf of their constituencies; community organisations, who provide human services such as health and welfare to these communities; the Commonwealth Government, which provides funds and overall policy direction and State Governments, who are responsible for health, education and other infrastructure requirements; and supplier business units, who may not necessarily all be consistent in their views of the intended user.

Telstra has been engaged in participatory processes with each of the identified stakeholder groups and the following consultation processes and forums were utilised in negotiating the construction of a new telephone service for remote Indigenous communities: the Telstra Consumer Consultative Council (TCCC) with representatives of remote Indigenous communities; the Low Income Measures Assessment Committee (LIMAC) with representatives from community organisations; the Commonwealth Government's Indigenous Communications Committee with representatives from the supplier and the provider of funds; and internal project committees.

The latter provides another window onto the complex construction of any technology. There is a large number of different and contributing stakeholders *within* the organisation that builds and implements what is (first) thought to be a relatively straightforward solution.

- Pricing – approving customer charges
- Billing – adapting systems to suit
- Credit management – ensuring credit risk was contained
- Marketing – branding and customer information materials
- Product development – adapting calling card systems to suit
- Consumer affairs – providing user environment/ customer needs input
- Network technology – assessing network traffic and demand impacts
- Customer service processes – integrity of ordering processes
- Customer facing business unit – channels to market
- Regulatory – signing off on compliance

Advocates as Stakeholders

While it is important to understand from users directly their relationship to a possible technology, engaging with advocates can bring to light different issues that may still be crucial for success of the technology.

> Room was created for … advocates to introduce different frames of meaning … for example … their concern for the kinds of relations between users and providers that such a technology might constitute (van Kammen, 2003, p. 170).

Advocates for remote Indigenous communities Community did introduce "different frames of meaning" that may be important for success. Firstly, there was a strong focus on the need for community capacity building that promotes economic development and effective Indigenous

participation, in addition to technology infrastructure building, for example from the Indigenous Remote Communications Association (2002). This communal perspective would not necessarily be apparent when considering the individual and their use of a technology. Secondly, there was a strong focus on the diversity of needs and community situations with advocacy for a range of solutions to be trialed, for example from the Central Land Council (2006). This introduces a broader perspective on finding communications solutions than simply focussing on the product features of a household telephone.

The State as a Stakeholder

The relationship between technology and culture is not necessarily a neutral one. The question has to be asked whether in seeking the successful domestication of an alternative household telephone service in remote Indigenous communities the State (that is, the government of the day representing the dominant or majority culture) is also seeking to recreate certain "normal" patterns of household life and responsibility that are more in keeping with the dominant culture rather than with Indigenous culture. Resistance by remote Indigenous communities to such technologies might thus be also interpreted as a political-cultural clash.

> Citizens who reject technologies developed by the state for a common public good … or who fail to use them in the prescribed way, not only become inappropriate users of technologies but also fail in their civic responsibilities and eventually are deemed "bad" citizens (Oudshoorn & Pinch, 2003, p. 19).

Issues of hegemony and assimilation can also arise from the offer of certain normative technologies such as a household telephone and Internet access. In this view, users must also be considered as citizens, not just consumers, who have a certain relationship to the State, not only to the technology.

Negotiating a New Technology

Evolution or Revolution?

Thomas Kuhn, an influential contributor to the history and philosophy of science, outlined a theory of *The Structure of Scientific Revolutions* (1962) that distinguishes between "normal science as puzzle solving" and "crises" that may lead to revolutionary "paradigm changes". In a similar way, technology commentators and futurists have come to talk about "sustaining" and "disruptive" technologies. The latter term, in particular, was coined by Harvard Business School professor Clayton M. Christensen (1997) to describe a new technology that unexpectedly challenges and begins to displace an established technology. Sustaining technology relies on incremental improvements to an already established technology. Christensen points out that large corporations are designed to work with sustaining technologies. They excel at knowing their market, staying close to their customers, and have mechanisms in place to develop *existing* technology.

The question becomes whether successful communications solutions for remote Indigenous communities can come from further development to existing technologies such as the Standard Telephone Service or whether such a user environment represents a crisis of the prevailing paradigm.

Constructing Country Calling

The case of the reverse charge call

It was clear from the experience of Mornington Island that the unrestrained bills caused by reverse-charge calling was an issue that needed resolving in some way. However, no suitable revision of the reverse-charge feature could be envisaged by the project team and the conclusion reached was that it needed to be controlled through selecting a telephone service level that barred reverse-charge calls altogether, namely the InContact® telephone service. Thus a culturally apposite mode of placing a telephone call through verbal-aural means for remote Indigenous communities was withdrawn.

The case of a not-so-free InContact®

The only problem with InContact® from the supplier's point of view was that it was free (of ongoing monthly charges). However, the high cost of infrastructure maintenance in remote areas meant that no discount could be envisaged on standard line rental charges. The tussle between wanting to encourage telephone take-up, but not at any cost, is revealed. Ironically, a scarcity (telephone take-up) is restricted by scarce resources (infrastructure availability) and price signals, which are the usual variables used to encourage greater demand, are to be kept as close as possible to standard rates.

The case of Centrepay

As part of the development of its Access for Everyone programs for people on low incomes Telstra had introduced the option for its customers to utilise Centrepay to make regular credits to their telephone account from their Centrelink pension or benefit payment. A special contract was created with Centrelink just for the Country Calling Line and a fortnightly even dollar amount chosen ($12 per fortnight) that came closest ($26 per month) to the Standard Telephone Service rental for the standard offering (HomeLine Complete, $26.95 per month).

The case of the local call price

In order to make Country Calling relevant to communities like Mornington Island, where all services were within a local call of each other, there was a strong user preference to make the local call price as close to standard as possible (25¢), particularly if the line rental was also close to the standard price.

The case of the family call option

Another strong user preference was to be able to use this household telephone service for family conferences. The importance of kinship as a driver of mobility and cultural business has already been noted. A precedent came from the development of the larger Telstra payphone booth that had been specially designed with lots of room so that a whole family could gather around the payphone and take turns to talk on the one call.

The case of a dual-rate pre-paid calling card

Country Calling was intended for the remote market segment, though it was allowed that users of the Country Calling Card (see Figure 1) should be able to roam and use it from any Telstra service, whether in a remote or urban area. To that end, a novel suggestion was made to have differentiated tariffs depending on where the Country Calling Card was being used. If it was used with a Country Calling Line it would have a generally beneficial tariff for remote

Indigenous households. If it was used from any other access service, such as a public payphone, it would revert to standard call charges.

The case of micro-prepay

Micro-prepay refers to the ability of a customer to efficiently (ie. whenever and wherever desired and at low cost) top up a pre-paid telephone account with very small amounts of credit. Examples to date come mainly from developing countries and it appears that micro-prepay is successful in promoting affordability and the use of communications generally among people on low incomes. "Micro-prepay is a powerful and obvious tool for improving affordability" (Milne, 2006, p. 46).

Country Calling is a pre-paid fixed line service but it does have line rental payments aligned to the fortnightly cycle of Centrelink payments (deducted through the Centrepay service) and with small denomination ($5, $10, $20) top-up calling cards, locally obtained. In this way it attempts to align the charges for the service to the actual income availability of the customer for both timing and actual dollar amounts. Country Calling therefore implements some of the elements of micro-prepay.

Figure 1: Country Calling Card

Country Calling as User Innovation

In summary, Country Calling as a new product reflects in many more ways the user environment into which it is being trialed. In a very real sense, then, this alternative telephone service innovation has been constructed by the intended user in remote Indigenous communities. However, it is also clear that Country Calling is but an incremental improvement to a sustaining technology for the supplier. It is very much work in the mode of "normal science as puzzle solving", which seeks to build on the traditional household telephone paradigm and extend the value of the considerable investment in fixed copper network infrastructure and associated technology platforms. This is similar to the TTY provision for the Deaf and InContact® telephone service provision for people who are unemployed (see Table 2).

Table 2: Users in technology development: From the standard to the alternative

Standard Telephone Service	Standard User Environment	Resisting User Environment	Resolution Process	Alternative Telephone Service
Voice service	Aural-oral culture	Deaf community	HREOC discrimination action by (non-) users	TTY and other equipment supplied at equivalent cost to Standard Telephone Service
Monthly line rental	Stable income	Unemployed people	Public Participation processes by supplier with internal technology advocacy and negotiation	InContact telephone service supplied at zero ongoing cost
Post-paid billing	Postal and payment services	Remote Indigenous communities	Public Participation processes by government and supplier with internal technology advocacy and negotiation	Country Calling Line
Individual lessee	Stable household			Country Calling Card
(Re-) connection fees	Stable location			"Robust" community payphone and (pre-paid) mobile phones

Conclusion

The aim of this paper has been to propose ways in which representations of the remote Indigenous communities user environment might drive communications technology innovation to produce more successful outcomes.

Using a social construction of technology approach to study the various components of the Standard Telephone Service reveals an artefact that is culturally constructed. When a person in a remote Indigenous community looks into the mirror of the Standard Telephone Service they do not see any resemblance of themselves in the user that is being reflected back.

Pushing the social construction of technology paradigm further: if the intended standard user is at least implicitly reflected in the constructed standard artefact, then this opens up the possibility of *explicitly* including the intended user in the construction of a new artefact. To do this, the paper looked at two basic processes. Firstly, understanding the user environment in as broad a cultural context as possible through direct fieldwork and listening to user representatives. Secondly, actively representing the user in the technology construction phase through the participation of stakeholders external to the supplier, as well as through the advocacy of the internal Telstra Consumer Affairs function to the range of business unit stakeholders. A successful pathway to innovation can be opened up through direct user consultation and active representation by interested stakeholders. Arguably, this is an expanded model of user-innovation (cp. von Hippel, 2005) that includes other important stakeholders.

> The perspective of the social determination of technology leaves open the possibility that people can make a difference to their technological future if they are interested and get involved (Green, 2002, p. 9).

Country Calling is currently being trialed in a number of remote Indigenous communities. Its ultimate success or otherwise as a sustainable alternative telephone service is still to be determined. In the end it will be a mix of technologies that will increase communications access for remote Indigenous communities.

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