Getting in Touch: Language and Digital Inclusion in Australian Indigenous Communities

Margaret Carew

Batchelor Institute for Indigenous Tertiary Education

Jennifer Green

The University of Melbourne

Inge Kral

Australian National University

Rachel Nordlinger

ARC Centre of Excellence for the Dynamics of Language, The University of Melbourne

Ruth Singer

The University of Melbourne

Indigenous people in remote Australia face many dilemmas in relation to the status and vitality of their languages and communication ecologies. Cultural leaders want to maintain endangered heritage languages, yet this concern is balanced against an awareness that English competency is a necessary life skill. Remote Indigenous groups must also negotiate the effect of globalized media on language and cultural practices. While public policy seeks to bridge the digital divide in remote Australia, little attention has been paid to the dominance of English in the new digital environment and the potential impact that increased English language activities may have on endangered Indigenous languages. In this paper we discuss the Getting in Touch project, a joint initiative between linguists, Australian Indigenous language speakers, and software developers. Using a participatory, collaborative process, the project aims to develop ideas for digital resources that privilege Indigenous languages and knowledge systems. We argue that taking Indigenous languages into account in app design may help enhance digital literacies in remote Indigenous communities and promote digital inclusion.

1. INTRODUCTION.[1] Access to the internet and the growing availability of mobile technologies in remote Indigenous Australia has introduced both positives and negatives. On one hand, we have witnessed a rapid expansion of the possibilities for speakers and learners

of Indigenous languages to use digital resources for language maintenance, entertainment, education, social networking, sharing culture, and archiving cultural resources (Boyle & Wallace 2011; Corn 2013; Kral 2013; Kral & Schwab 2012; Ormond-Parker et al. 2013). However, the new digital environment has also catalyzed concern regarding the impact of digital technologies on already fragile endangered languages around the globe, including those in the Indigenous Australian context.[2] At the same time, digital inclusion is a serious social equity issue for many minority groups in Australia, including Indigenous Australians, and language and literacy are key factors which impact access to digital technologies (Leung 2014).

Lack of access to digital technologies and the resulting lack of digital literacy skills in marginalized minority communities continue to entrench disadvantage and prevent full participation in contemporary society (InfoXchange & ATKearney 2009). As Warschauer (2003:9) noted more than a decade ago, "the ability to access, adapt, and create new knowledge using new information and communication technology (ICT) is critical to social inclusion in today's era." This 'digital divide' (Leung 2014; IRCA 2010; Gawne 2015) is also rapidly changing local language ecologies, as language use within the growing digital domain is dominated by English and other majority languages. Kornai (2013) suggests that there is a "massive die-off" of small and endangered languages caused by the digital divide and argues that, in spite of "feel-good" language revitalization efforts, over 95 percent of the world's languages have virtually no chance of crossing the digital divide (Kornai 2013:2). Furthermore, the dangers of "digital language death" are extreme for hunter-gatherers and nomadic peoples, in particular those without well-established literacy practices (Kornai 2013:4).

Despite this gloomy prognosis there is also evidence that Indigenous minorities around the world are harnessing the potential of new technologies for language maintenance and revitalization. Wider access to broadband and the hybridization of technologies that reach new generations of users, plus the globalization of the digital gaming industry, are providing new contexts, opportunities, and challenges worldwide (Reinhardt & Sykes 2014:2). In some regions, Indigenous youth are also communicating in minority languages on Facebook and other social media, developing apps and games in Indigenous languages, and broadcasting music and stories on YouTube and Indigenous media platforms (Wyman, McCarty & Nicholas 2014). In this respect, youth are navigating the rapidly changing relations and practices of cultural reproduction in endangered language contexts, as well as taking up activist stances towards maintaining Indigenous languages and knowledge systems.[3]

Since the 1990s, the field of language documentation and conservation (LD&C) has been transformed by new digital tools and data management strategies (Bird & Simons 2003; Thieberger 2004). Language data can now be recorded, reproduced, stored, and mobilized for a much broader range of purposes than previously thought possible (Nathan 2006). New technologies thus offer many opportunities for minority language groups to work with linguists and other specialists to mitigate some of the impacts of digitally mediated language

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[2]There has been a catastrophic loss of Indigenous Australian languages over the last 200 years. As few as 13 of the original 250 or so languages are considered 'strong' and spoken by all age groups, and in the last few years surveys show a steady decline in the number of languages still spoken at all (Marmion, Obata & Troy 2014).

[3]Examples include: Games in Indigenous Mexican languages (http://indiancountrytodaymedia-network.com/2014/09/21/saving-native-languages-and-culture-mexico-computer-games-156961); Virtual Reality games in Native American languages in the US http://ua.lecturecast.arizona.edu/Panopto/Pages/Viewer.aspx?id=8b8494e9-9380-4789-b9ce-523ad328ce2c); and the Never Alone game, based on Alaskan stories and available in 10 different languages (http://www.theguardian.com/technology/2014/sep/29/never-alone-alaskas-indigenous-game-never-alone-teaches-cooperation-through-stories).

shift. However, LD&C is not just about language artifacts and their metadata. Models of collaborative and participatory research that recognize the linguistic rights and empowerment of language minorities have arisen from community demands for an equal voice in research that involves them (Cameron et al. 1993; Rice 2010; Yamada 2007:271). Such models of practice recognize that language documentation and description happen within a social context and are grounded in the identities of the participants and their relationships to each other (Cameron et al. 1993; Stebbins 2012; Wilkins 1992; Yamada 2007). This is a strong argument for digital language documentation projects to support capacity building across the digital divide, and so to avoid reinforcing existing inequities. Collaborating with communities to develop appropriate apps and other tools and resources can support and be integrated into a 'digital outreach' model for language documentation (Gawne 2015).

Building on the notion of 'digital outreach,' this paper discusses some strategies to develop locally relevant digital tools for language documentation, the presentation of language resources, and Indigenous language teaching and learning. Our main focus is on mobile digital technology and situated practices surrounding mobile devices. We commence with a discussion of mobile technology access and use in remote Indigenous communities in Australia. The paper then describes Getting in Touch (henceforth GIT), a digital outreach project which aims to support app design and development from a community perspective. We conclude the paper with a discussion of progress towards developing a set of mobile language apps for mobile devices and outline future prospects for this project.

2. ACCESS TO DIGITAL TECHNOLOGY IN REMOTE INDIGENOUS COMMUNITIES. In remote regions of Australia, broadband and mobile telephone services are improving (Featherstone 2011; Rennie et al. 2010).[4] Although some regions are now networked, many Indigenous communities still have limited access to broadband and to computer facilities and training.[5] While inequities in community- and household-based access and participation are evident (Rennie et al. 2011), collective models of public access (via media organizations, arts centers, 'telecenters,' and so forth) have made the internet more accessible in some communities (IRCA 2010:67). However, as Featherstone (2013:46) argues, simply providing access to the internet and training in new technologies does not solve the digital divide. Nor can the digital divide be lessened without an understanding of how digital technologies have already been adopted and adapted by people in remote communities.[6]

There have been a number of ethnographic studies of mobile phone ownership and patterns of use in remote Indigenous communities. These help to provide background context for the design of Indigenous language mobile apps and they show how use of mobile devices is shaped by the context, values, and practices of the user community. Understanding how digital technologies are used in remote communities is key to strengthening the digital presence of Indigenous languages and to building digital capacity in remote Australia. Although rates of personal and household computer ownership are low in remote Indigenous communities (Rennie et al. 2011; Auld, Snyder & Henderson 2012), studies reveal that

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[4]These improvements are principally driven by national aims for equity in Information and Communications Technology (ICT) training and efforts to provide public access to online resources and services for improved educational, health, and economic outcomes for Indigenous people (IRCA 2010:67).

[5]Access to broadband in remote areas of Australia is set to increase considerably with the launch of the National Broadband Network (NBN) long-term satellite service in 2015. See: http://www.nbnco.com.au/connect-home-or-business/information-for-home/satellite.html.

[6]See *The Australian Journal of Anthropology* Special Edition August 2014 exploring the impact of communication technology on social life in a number of communities around the globe including in remote Indigenous Australia (Kral 2014; Vaarzon-Morel 2014).

personal ownership of mobile phones, iPads, and tablets is on the rise (Dyson & Brady 2013; Featherstone 2011; Kral & Schwab 2012; Tangentyere Council and Central Land Council 2007). Rather than being personalized and privately owned resources, phones are often shared amongst family and friends. Mobile phone ownership is also characterized by high turnover and regular repurchase of devices (Auld, Snyder & Henderson 2012). While mobile phones are used for everyday communication in many remote communities, they are also employed widely to create, share, and store diverse media and information (Edmonds et al. 2012; Ormond-Parker et al. 2013). In Maningrida, for example, phones may be used as "a shared multimedia resource around which powerful literacy events occur" (Auld, Snyder & Henderson 2012: 288). Preliminary observations by the authors of this paper in a range of remote Indigenous communities corroborate and support these claims.

Rather than relying on internet connectivity to share media with others, digital objects are shared via local wireless ('Bluetooth') networks on phones and tablets. Songs and ceremonial performances are recorded on mobile phones and distributed within family networks. USB storage devices are also regularly exchanged and used for viewing video and audio recordings of a range of content, including traditional performance, hunting trips, and storytelling (Auld, Snyder & Henderson 2012).[7] A recent study of language use among young male speakers of Murrinhpatha in the Northern Territory community of Wadeye describes how mobile phones are used as media devices to "create a social network of digital exchange" (Mansfield 2014:66). Again these observations are supported by our own knowledge of local digital sharing practices in a range of community contexts.

In the discourse around situated literacies, it has been claimed that the arrival of digital technologies and the emergence of new social practices surrounding digital media and mobile devices is creating a seismic shift in the ways that 'literacy' is imagined (Crystal 2008; Hull 2003; Hull & Nelson 2005; Kral 2012; Kress 2010). While the acquisition of alphabetic literacy (usually in English) in instructional settings remains problematic in many remote Indigenous communities, the spatially-oriented and icon-based symbolic conventions used in many new media applications are enabling users (many with minimal or no literacy), to interpret, read, and manipulate multimodal digital interfaces. Auld et al.'s (2012) study of mobile phone literacies at Maningrida certainly supports this assertion and begs the question not only of how such new literacies can be utilized in education, both in and out of school contexts, but also whether there is a place for Indigenous and minority languages in this rich new multimodal spectrum.

3. THE GETTING IN TOUCH PROJECT. The Getting in Touch project aims to explore how app design can promote digital inclusion on the one hand while also meeting Indigenous community goals of maintaining language and cultural practices on the other. The project arose out of concern expressed by a number of linguists and Indigenous community members that the majority of digital resources available to Indigenous users are in English, even though English is not a first language for many. As Elizabeth Marrkilyi Ellis, Ngaatjatjarra linguist and elder, describes, "At the moment a lot of our young people spend time on iPads and computers, mobile phones, and iPods listening and playing games that are all in English. We need to be active and create apps in our languages. Language is part of our identity."[8]

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[7]Bluetooth functionality is a key factor (alongside cost and availability) in the choice of mobile phone platform in remote communities. The overwhelming preference is for Android phones which have an open file sharing protocol enabling phone-to-phone file transfer. In contrast to this, Apple phones and iPads require locally recorded content to be transferred via proprietary syncing software.

[8]https://open.abc.net.au/posts/the-next-step-for-Indigenous-languages-in-the-nt-19jl8lz.

The issue of English-dominance is relevant not only in the content of digital media, but also in the choice of language for interfaces, menus, and commands. The GIT project seeks to explore how new culturally situated digital literacy practices can be factored into the design of tools and resources that present Indigenous language content, building on existing local situated practices, and offering additional utility for community-based activities related to language documentation and conservation.

This project aims to identify new pathways to multimodal digital literacies in remote communities through a new generation of digital technologies tailored to meet needs and circumstances in remote Indigenous home, school, and community environments. By working within a framework driven by Indigenous needs, ideas, and processes of cultural production, the project aims to help realize "the possibilities of the creation of culture as an ongoing emancipatory project" (Ginsburg & Myers 2006:43). A further objective is to find practical ways to collaborate and share ideas by drawing on a wide range of technical expertise and matching this to different community situations. We are thus seeking ways to develop tools that can be adapted to the many different languages spoken across Indigenous Australia.

The lack of digital resources in Indigenous people's own first languages has an impact not only on the digital divide, but also the 'generational divide.' Featherstone (2013:30–31) notes that the "generational divide created by the rapid technological and ideological change is potentially a greater issue than the 'digital divide.'" At the core of this is concern that broadband and other forms of digital technology will "reduce the importance of traditional knowledge and values for young people, and subvert the cultural authority of old people." While older community members may use these technologies and participate to an extent with their younger family members to record and share cultural material, many are also troubled by the negative impacts of digital technology on the transmission of important cultural knowledge and values. A final important aim of this project is therefore to investigate how apps can facilitate cultural transmission in ways that follow cultural protocols surrounding rights of access to, and dissemination of, cultural information that support the "preservation, protection, and promotion of Indigenous knowledges" (Christen 2012:316).

3.1 DIGITAL RESOURCES FOR INDIGENOUS LANGUAGES IN AUSTRALIA. There are already many digital tools designed specifically for Indigenous languages that have been produced through collaborations between communities, linguists, educators, and software developers.[9] These include language learning apps and software for self-publishing of location-based content that combines audio, video, text, and photo content. For instance, in northern Australia, Indigenous ecological knowledge is supported by a desktop resource on Bininj Gunwok plants and animals.[10] In central Australia an online sign language dictionary provides a searchable, semantically organized dictionary of sign languages used in a range of communities (Green, Woods & Foley 2011; Carew & 2015).[11]

Projects such as the multimedia digital archive *Ara Irititja* are showing how "Indigenous ontologies are reshaping the technologies of information and cultural heritage management" (Thorner 2010:125; see also Christen 2005; Christie & Verran 2013; Hughes & Dallwitz 2007).[12] Digital databases of community knowledge using the *Ara Irititja* platform have been

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[9]See: http://www.rnld.org/languageapps, and First languages Australia (2015) for a review of existing apps for Indigenous Australian languages.

[10]Compiled by the Bininj Gunwok Project: http://mayh-dja-kundulk.bininjgunwok.org.au/.

[11]http://iltyemiltyem.com.

[12]See: http://www.irititja.com.

rolled out to a number of communities in the Northern Territory and Western Australia, via the Ngaanyatjarra Pitjantjatjara Yankunytjatjara Women's Council and the Northern Territory Library (Gibson, Lloyd & Richmond 2011), as well as the State Library of Western Australia. Users of *Aṟa Iṟititja* interact with the archive online via desktop or laptop computers rather than apps on mobile devices.

Many such tools and initiatives focus primarily on the documentation and archiving of Indigenous languages and cultural and historical material. There remains, nonetheless, a significant gap in the digital domain for Indigenous people who wish to interact with technology in other ways—such as playing games, communicating via text, and using social media—in languages other than English.

4. THE GIT WORKSHOP. The GIT project began with a workshop in Alice Springs in Central Australia in April 2014.[13] Language teams from Indigenous communities, linguists, and technology specialists came together to discuss the development of digital tools for Indigenous language speakers and map out possibilities for future collaborations.[14] Alice Springs is a familiar hub for many, and accessible for Indigenous participants who came from across the Northern Territory, as well as Western Australia and South Australia, and also for representatives from the many Indigenous-focused organizations that are based there.

The purpose of the workshop was to engage Indigenous language speakers in discussions about the extent to which their needs and concerns were being met by existing digital tools, and to gauge interest in the development of other digital tools in Indigenous languages. The workshop provided a unique opportunity for different communities to come together to express their views and opinions, benefit from each other's ideas, and look for common ground.

The workshop focused particularly on participants from communities in which Indigenous languages are still spoken daily, and where intergenerational transfer of heritage languages still occurs. More than 70 people, including Indigenous community representatives, linguists, software developers, computer scientists, interpreters, educators, archivists, and media broadcasters attended. Figure 1 shows the participating communities and some of the languages spoken there: Burarra/Gun-nartpa, Murrinhpatha, Mawng, Kunwinjku, Kaytetye, Alyawarr, Central Anmatyerr, Eastern & Central Arrernte, Ngaatjatjarra, Ngaanyatjarra, Pitjantjatjara, and Warlpiri.[15]

The Indigenous language teams included people of different ages and backgrounds and varying levels of experience with digital technologies. Working with intergenerational groups provided a space for cultural authority and language knowledge to be central to the

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[13] The Getting in Touch workshop was held on the 8th and 9th of April 2014, at the Desert Peoples Centre (DPC), Alice Springs, Northern Territory. It was hosted by The Centre for Australian Languages and Linguistics (CALL) at Batchelor Institute (BI).

[14] These teams, in general, comprise a linguist and a number of Indigenous linguists, teachers, and/or language workers with a history of collaboration on language documentation projects.

[15] In addition to the Indigenous language teams, many universities and organizations were represented at the workshop, including: The University of Melbourne, Batchelor Institute of Indigenous Tertiary Education, Australian National University, University of Queensland, Charles Darwin University, Australian Institute for Aboriginal and Torres Strait Islander Studies, Aboriginal Interpreter Service, First Languages Australia, Victorian Aboriginal Languages Corporation (VACL), CSIRO, ABC Open, Indigenous Community Television, Indigenous Remote Communications Association, Northern Territory Department of Education, Central Land Council, Thoughtworks, AUSIL, Freedom games (Chicago) (http://www.freedomgames.org/), Aṟa Iṟititja Pitjantjatjara Council Social History Unit, Alice Springs Desert Park, Uti Kulintjaku Ngangkari Program, and ProDocLin - Museu do Índio (Program for the documentation of native Brazilian languages).
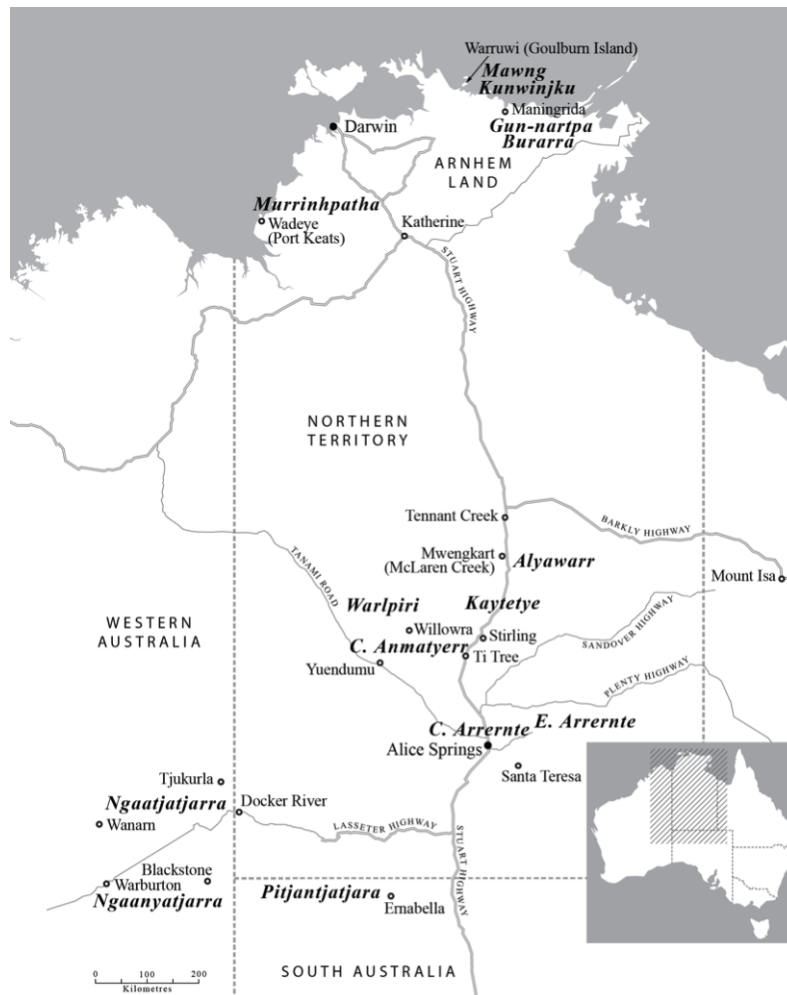
FIGURE 1. Map showing the communities who participated in the GIT workshop and some of the languages spoken there (in bold italics) (Map: Christopher Storey).

exploration of ideas about technology. Senior participants brought extensive experience as educators, curriculum designers, language consultants, researchers, and compilers of Indigenous language dictionaries. Many had years of practice and professional development in teaching in remote schools, experience in developing language resources for use in schools, and knowledge of what works with different age groups and levels of knowledge. Younger members were more familiar with new technologies and the ways in which they are being used by younger generations of Indigenous language speakers.

The workshop was designed in two parts. The first was a series of presentations of existing digital tools for Indigenous languages, including apps that had language learning and language documentation as their main purpose. They were modeled on long-standing and established linguistic practices, such as dictionary database building and publishing, oral language recording, and the transcription of language texts.

The *Ma!* app is available on iOS and Android platforms and has been used to develop a customizable dictionary of Iwaidja for phones and tablets (Figure 2). The dictionary is searchable by English and Iwaidja words and includes audio so that users can hear how to pronounce Iwaidja words. *Ma!* also has 'crowd-sourcing' functionality so that users can record new content on their mobile device and sync it to the online database for curation and publication. The *Ma!* architecture is available for other languages and is being customized further by a number of projects.[16] *Aikuma* is another example of an app for collaborative language documentation that facilitates recording and translation of oral texts using mobile phones (Figure 3). Designed for Android devices, the app enables a user to share audio over local networks, listen to recordings made by others, record translations, and add metadata (Hanke & Bird 2013; Gawne 2015).[17] The first sessions were open to the general public in order to maximize engagement from the broader Alice Springs community and other linguists and interested researchers from around Australia.

The second part of the workshop consisted of small group discussions attended by community teams. Indigenous participants had the opportunity for hands-on experimentation with video-editing tools, dictionary-making tools, and apps, including *Ma! Iwaidja* and *Aikuma*. Participants had an opportunity to design games for mobile devices as well. Indigenous participants then led discussions about the design of culturally and linguistically appropriate digital tools, with assistance from the software experts and linguists.
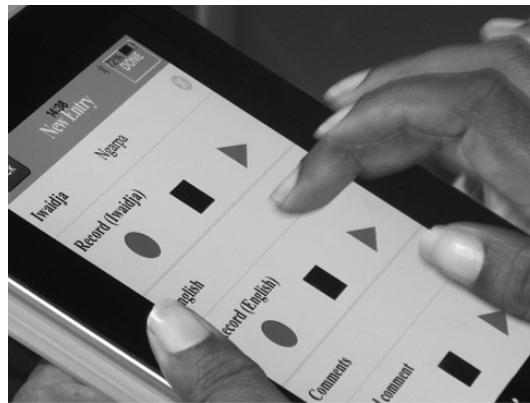
FIGURE 2. Using the *Ma! Iwaidja* app at the GIT workshop, Alice Springs (Photo J. Green).

5. APP DEVELOPMENT IN THE COMMUNITY CONTEXT: THEMES AND OUTCOMES. The GIT workshop provided an opportunity for Indigenous participants to engage with specific language-related digital tools and start thinking about the types of resources they would like to see developed for their communities. Most participants were already familiar with digital platforms for language and cultural material, but were interested to see what other digital tools were available. While each group came up with different ideas and approaches, some clear themes emerged. What became apparent was the valuable expertise among

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[16]For more information about *Ma!* see: (www.themaproject.org). The Ma! architecture has been implemented for the Gamilaraay language in New South Wales: https://itunes.apple.com/au/app/ma-gamilaraay/id935546616?mt=8; for an interpreter's app through the Northern Territory Government's Aboriginal Interpreter Service: https://play.google.com/store/apps/details?id=com.pollen.interpret&hl=en; and for other languages of the world including Somali and Mokpe.

[17]For more information about Aikuma see: http://lp20.org/aikuma/.

FIGURE 3. Steven Bird and Patrick Litchfield from Maningrida using the *Aikuma* app at the GIT workshop, Alice Springs (Photo J. Green).

Indigenous users of information and communication technologies (ICTs). The knowledge and experience brought by some of the older workshop participants who previously worked in bilingual education programs was clearly evident. They quickly identified a number of app design concepts and activities that could implement situated language content by creating digital versions of well-established learning activities. In imagining this transfer of their knowledge and skills to the digital environment, they were supported by the younger people who applied their technological competence.

Many ideas were not explicitly driven by the paradigm of language documentation, but rather presented ideas about cultural learning mediated by language. For example, a young man involved in the highly popular local Australian Rules football competition in his community wanted a football app which would provide users with practical information about training times, match fixtures, results, and information about local teams in the competition. Local teams are aligned with clan, language group, and country affiliations and have team mascots drawn from traditional totemic associations. While the main function of a football app is not narrowly 'linguistic,' collaborative work on such an app potentially provides an opportunity for building digital literacy within a domain where the motivation is high among local youth. There is scope for Indigenous language content to be applied to other everyday domains such as workplaces, which may well inspire other local language app development projects. Such apps may contain predominantly English content yet have a focus on local themes, thus providing a matrix for the incorporation of Indigenous language words and phrases.

While a number of participants saw the value of apps for early childhood literacy education, a number of Indigenous-oriented semantic and cultural themes also emerged. These themes, outlined below, reflect areas of cultural salience and importance, and demonstrate

the need for community involvement in the app development process. Many of these were conceptualized as games and enjoyable learning activities through which important cultural concepts could be reinforced.

5.1 COUNTRY AND ECOLOGICAL KNOWLEDGE. A number of groups were interested in developing apps or interactive games that involved mapping their local area and associated information about place names, ancestral beings, stories, and songs (see Figure 4). A retired Indigenous teacher who had worked in the bilingual education program in her local community school for over two decades had previously developed a detailed clan and country map and produced this as a book and poster through the local literacy center. She saw the potential for the same content to be adapted as an interactive app for teaching local children.

FIGURE 4. Developing mapping ideas in Ngaanyatjarra at the GIT workshop, Alice Springs (Photo I. Kral).

Maps of local topographies were imagined as providing a context for games or apps that support Indigenous ecological knowledge, reinforcing knowledge of local flora and fauna. One group conceptualized a hunting game that would require the player to move through particular areas of country and correctly identify and locate edible plants or hunt for different animals. Another participant had the idea of using the template from the internationally popular game *Candy Crush Saga*, substituting the items of 'candy' with the fruits from local plants. This 'bush tucker' game would include local language names for edible foods and people playing the game would interact with language content as part of their quest to win. Other app development in the domain of Indigenous ecological knowledge presents Indigenous language names for birds and short texts about their cultural significance, behavior, and habitats alongside photos and audio recordings of bird calls. The *Thangkerne Kaytetye birds* app was released in 2015 (see Figure 5) and work is underway on Anmatyerr, Arrernte, Mawng, Burarra, and Murrinhpatha versions.[18] The app has the potential for

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[18] Batchelor Institute, Myfany Turpin, and Alison Ross have produced the Thangkerne Kaytetye birds app, based on open source software developed by Museum Victoria: http://www.museumsandtheweb.com/mw2012/papers/cre-

further innovations, by including videos of hand signs for birds and by developing games, such as those involving matching birds with their nests and calls.
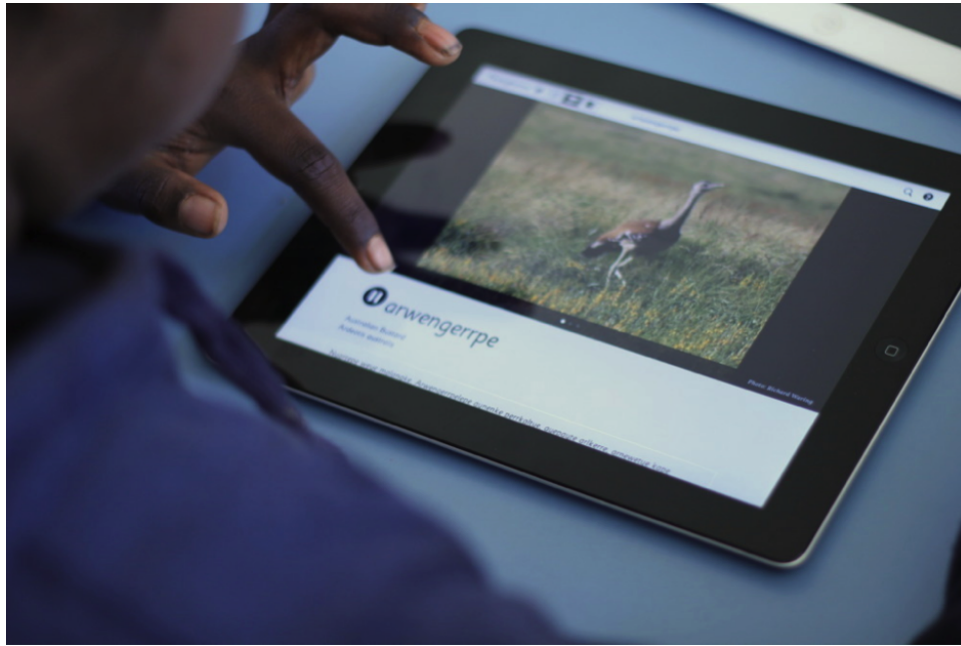

FIGURE 5. The *Thangkerne Kaytetye birds* app was launched at Neutral Junction school in Central Australia in August 2015 (Photo M. Carew).

5.2 KINSHIP.   Another popular idea was the development of games and other digital resources that draw on aspects of Indigenous kinship systems (see Figure 6). These systems underpin many aspects of social behavior and interaction in Indigenous Australia, and partly determine people's roles, responsibilities, and obligations in relation to one another, to ceremonial business, and to the land. While some of the structural principles of these systems are shared across the continent, there are also some fundamental underlying differences. These may be reflected in variations in kinship terms in the spoken language and in the ways that terminological distinctions are distributed across possible relational categories. Knowledge of kinship systems—kin terms and the appropriate ways to use them, the calculus of section and subsection names ('skin names') and moiety divisions, and the ways that these group-ings are related to places and the ancestral creation spirits that inhabit these places—are a valued, yet endangered, aspect of everyday Indigenous life. The matrix of kinship provides a foundation for language learning and cultural transmission, embodied in relationships between elders and younger people, and it is elemental to language and culture programs in remote Indigenous schools.

     A kinship app could thus have a wide range of uses, including private learning about user-centric kin relationships, and broader investigations of kinship through the elicitation

ating_a_mobile_app_ecosystem_the_genera_pro.html (Sherin & Wallis 2012). Subsequent flora and fauna apps will use Jila, a template for a Yawuru language app developed by Thoughtworks with Mabu Yawuru Ngan-ga, the Yawuru language center in Western Australia: https://www.thoughtworks.com/clients/yawuru-jila. See: http://central.batchelor.edu.au/thangkerne-kaytetye-birds/.

of kinship-related language data. Such an app has the potential to record and present kinship content, and to include interactive visual representations of kinship names and relationships within locally defined kinship networks. For example, a user could identify their position within the system and then perform tasks that involve correctly recognizing the kin relations they hold with others in the community. The ability to import/export data for use in other software such as existing genealogy software could be an additional feature. We also see the potential for such an app to provide a useful resource for non-Indigenous staff working in Indigenous organizations, many of whom have difficulty understanding the complex kinship systems that they encounter on a daily basis.

FIGURE 6. Discussing the development of a kinship app, *Ti Tree*, May 2015 (Photo J. Green).

5.3 MENTAL HEALTH. The GIT workshop had a direct outcome for a mental health literacy project called *Uti Kulintjaku* (a Pitjantjatjara term meaning 'to think and understand clearly'). The Ngaanyatjarra Pitjantjatjara Yankunytjatjara Women's Council is coordinating this project with Indigenous people from across a number of central Australian communities. Senior language consultants, *ngangkari* 'traditional healers,' artists, mental health professionals, and interpreters have researched and documented the semantic domain of mental health from a Western Desert language perspective, and this work has resulted in a rich set of language terms for emotions, mental states, and related behaviors. This forms the basis for a "shared understanding and language for talking about mental health" from an Indigenous perspective (*Uti Kulintjaku Project: Fact Sheet* 2014).[19] Inspired by the possibilities of the *Ma!* App discussed earlier, these women have adapted this concept using the *Ma!* architecture. They aim to use their app to enable language speakers to present a set

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[19]This work had already been published as a poster illustrating people in a community scene enacting various emotional states and behaviors, labelled with the corresponding language term. See: http://www.npywc.org.au/2014/06/uti-kulintjaku-mental-health-literacy-project_1/.

of mental health concepts researched and documented through the Uti Kulintjaku project, update it with new material, and share it with others.

The development of digital technologies in the health domain which reflect Indigenous epistemologies may help facilitate the transmission of cultural knowledge and contribute to people's health and well-being (Anderson & Kowal 2012:438). Such devices have the potential to improve communication practices and lead to "mutual understanding, collective agreement making, and bottom-up changes in remote Aboriginal health policy and practice" (Christie & Verran 2014:256).[20]

6. CONCLUSIONS. The 2014 Getting in Touch workshop confirmed the value of a model of digital outreach in which Indigenous communities are directly involved with app development from its very inception. The workshop revealed the potential that lies in harnessing people's enthusiasm for digital technologies in a manner that helps to bridge the digital divide by providing meaningful and culturally relevant applications for digital technologies. It contributed to the objective of raising awareness of technologies and existing networks of support and laid some foundations for on-going collaborations.

Nevertheless, the diversity and number of Australian Indigenous languages raises particular issues for app development. Particularly in settings where languages have only small numbers of speakers, achieving best value in the design and dissemination of digital resources requires further attention. One concern is that the transfer of traditional languages into the digital domain may present some lexical challenges. A related issue is how to design apps for multilingual communities, accurately reflecting linguistic diversity while at the same time respecting language identities. While it is not economical to create a plethora of unique apps in many different languages, implementing a principle of "build once, use often" (First Languages Australia 2015:8) is a way to explore cost effective ways to develop generic apps that can be adapted for local uses. A number of tasks involved in app development—assessing the best app architecture for specific purposes, accessing audio and visual material, and negotiating copyright and licensing for their use—can be approached in a collaborative way while aiming to keep the specific content of local apps unique. The development of app 'templates' that can be easily adapted for different languages and communities is one way to make the best use of limited resources. The 'kinship app,' 'bird app,' and 'mental health app' discussed earlier are examples of thematic domains that could lend themselves to such an approach.

The relevance of digital technologies needs to be measured against the extent to which they contribute to meeting the needs and local practices of a language community. If we are to reach beyond understandings of 'digital inequality' based simply on availability of and access to technologies, then we must move towards models where relevant technologies are developed and used "to engage in *meaningful social practices*" (Warschauer 2003:38, emphasis in original). App designs therefore need to clearly target a group of users and be embedded within activities that are structured, purposeful, and locally relevant.

While the lack of availability of digital resources in Indigenous languages may present a barrier to digital inclusion, engaging with the issues discussed in this paper represents an opportunity to support learning of Indigenous languages in ways that are fun, as well as culturally grounded, recognizing "unique social and cultural worldviews and values" (Featherstone 2013:46). Indigenous languages apps can provide alternatives to the more

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[20] For another example of a language tool developed to assist health professionals working in Indigenous communities across the Northern Territory see: http://www.ntgpe.org/commdoc/. The Commdoc tool provides audio translations in a selection of languages of common terms used in medical consultations.

readily available commercial English language apps. Initiatives that combine good design with participatory development and implementation may prove a useful contribution to language documentation and conservation and sit alongside other strategies for resource development in Indigenous languages. The key to future success will, however, lie in being able to turn the many good ideas generated throughout the Getting In Touch project into apps and games that are not only technically clever and engaging, but also cost-effective and follow community-defined language and culture maintenance aims.

References

Anderson, Heather & Emma Kowal. 2012. Culture, history and health in an Australian Aboriginal community: The case of Utopia. *Medical Anthropology: Cross-cultural Studies in Health and Illness* 31(5). 438–457.

Auld, Glenn, Ilana Snyder & Michael Henderson. 2012. Using mobile phones as placed resources for literacy learning in a remote Indigenous community in Australia, in "Digital literacies," special issue, *Language and Education* 26(4). 279–296.

Boyle, Alice & Ruth Wallace. 2011. Indigenous people and e-nabling technologies: An analysis of recent experiences in northern and central Australia. Kulumun. *Indigenous Online Journal* 1. 1–14.

Bird, Steven & Gary Simons. 2003. Seven dimensions of portability for language documentation and description. *Language* 79(3). 557–582.

Cameron, Deborah, Elizabeth Frazer, Penelope Harvey, Ben Rampton & Kay Richardson. 1993. Ethics, advocacy and empowerment: Issues of method in researching language. *Language & Communication* 13(2). 81–94.

Carew, Margaret & Jennifer Green. 2015. Making an online dictionary for Central Australian sign languages, in "Sign Language," Special Issue, *Learning Communities: International Journal of Learning in Social Contexts*. 16. 40–55.

Christen, Kimberly. 2005. Gone digital: Aboriginal remix in the cultural commons. *International Journal of Cultural Property* 12(3). 315–345.

Christen, Kimberly. 2012. Balancing act: The creation and circulation of Indigenous knowledge and culture inside and outside the legal frame. In Sean A. Pager & Adam Candeub (eds.), *Transnational culture in the internet age*, 316–344. Cheltenham: Edward Elgar Publishing.

Christie, Michael & Helen Verran. 2013. Digital lives in postcolonial Aboriginal Australia. *Journal of Material Culture* 18(3). 299–317.

Christie, Michael & Helen Verran. 2014. The Touch Pad Body: A generative transcultural digital device interrupting received ideas and practices in Aboriginal health. *Societies* 4(2). 256–64.

Corn, Aaron. 2013. Sustaining Australia's Indigenous music and dance traditions: The role of the National Recording Project for Indigenous Performance in Australia. *Musicology Australia* 35(2). 268–284.

Crystal, David. 2008. *Txtng: The Gr8 Db8*. Oxford: Oxford University Press.

Dyson, Laurel E. & Fiona Brady. 2013. A study of mobile technology in a Cape York community: Its reality today and potential for the future. In Lyndon Ormond-Parker (ed.), *Information Technologies*, 9–26.

Edmonds Fran, Christel Rachinger, Jenny Waycott, Philip Morrissey, Odette Kelada & Rachel Nordlinger. 2012. *'Keeping intouchable': A community report on the use of mobile phones and social networking by young Aboriginal people in Victoria*. Institute for a Broadband-Enabled Society (IBES), University of Melbourne, Melbourne.

Featherstone, Daniel. 2011. *IRCA submission to the DBCDE Convergence Review: Response to the Emerging Issues paper*. Alice Springs: Report prepared for Indigenous Remote Communications Association. http://www.irca.net.au/images/stories/documents/Convergence_Review_IRCA_response_28Oct11.pdf.

FFeatherstone, Daniel. 2013. The Aboriginal invention of broadband: How Yarnangu are using ICTs in the Ngaanyatjarra Lands of Western Australia. In Lyndon Ormond-Parker, Aaron Corn, Cressida Fforde, Kazuko Obata & Sandy O'Sullivan (eds.), *Information Technology and Indigenous Communities*, 27–52. Canberra: AIATSIS Research Publications.

First Languages Australia. 2015. Angkety map Digital resource report. http://first-languages.org.au/projects/digital.html.

Gawne, Lauren. 2015. Language documentation and division: Bridging the digital divide. *Digital Studies / Le champ numérique*. http://www.digitalstudies.org/ojs/index.php/digital_studies/article/view/290/355.

Gibson, Jason, Bryan Lloyd & Cate Richmond. 2011. Localisation of Indigenous content: Libraries and knowledge centres and the Our Story Database in the Northern Territory. In Jacques Steyn, Jean-Paul van Belle, & Eduardo Villanueva Mansilla (eds.), *ICTs for global development and sustainability: Practice and applications*, 151–175. Hershey and New York: Information Science Reference.

Ginsburg, Faye & Fred Myers. 2006. A history of aboriginal futures. *Critique of Anthropology* 26(1). 27–45.

GGreen, Jennifer, Gail Woods & Ben Foley. 2011. Looking at language: Appropriate design for sign language resources in remote Australian Indigenous communities. In Nick Thieberger, Linda Barwick, Rosey Billington & Jill Vaughan (eds.), *Sustainable data from digital research: Humanities perspective on digital scholarship*, 66–89. Melbourne: Custom Book Centre, The University of Melbourne.

Hanke, Florian & Steven Bird. 2013. Large-scale text collection for unwritten languages. *Proceedings of the International Joint Conference on Natural Language Processing*, Nagoya, Japan. ACL Anthology 2013, 1134–1138.

Hughes, Martin & John Dallwitz. 2007. Ara Irititja: Towards culturally appropriate IT best practice in remote Indigenous Australia. In Laurel Evelyn Dyson, Max Hendriks & Stephen Grant (eds.), *Information technologies and Indigenous people*, 146–158. London and Melbourne: Information Science Publishing.

Hull, Glynda A. 2003. Youth culture and digital media: New literacies for new times. *Research in the Teaching of English* 38(2). 229–233.

Hull, Glynda A. & Mark Evan Nelson. 2005. Locating the semiotic power of multimodality. *Written Communication* 22(2). 224–261.

InfoXchange & ATKearney. 2009. *Assessing the economic impacts of digital inclusion*. InfoXchange Australia. https://www.infoxchange.net.au/sites/default/files/Assessing%20the%20economic%20benefits%20of%20digital%20inclusion_0.pdf.

IRCA. 2010. *Joining the dots: Dreaming a digital future for remote Indigenous communities*. Indigenous Remote Communications Association (IRCA) submission to the Indigenous Broadcasting and Media Sector Review. http://arts.gov.au/sites/default/files/pdfs/irca.pdf.

Kornai, András. 2013. Digital Language Death. *PloS ONE* 8(10). doi: 10.1371/journal.pone.0077056.

Kral, Inge. 2012. *Talk, text and technology: Literacy and social practice in a remote Indigenous community*. Toronto: Multilingual Matters.

Kral, Inge. 2013. The acquisition of media as cultural practice: Remote Indigenous youth and new digital technologies. In Lyndon Ormond-Parker, Aaron Corn, Cressida Fforde, Kazuko

Obata & Sanday O'Sullivan (eds.), *Information Technologies and Indigenous Communities*, 53–73. Canberra: AIATSIS Research Publications.

Kral, Inge. 2014. Shifting perceptions, shifting identities: Communication technologies and the altered social, cultural and linguistic ecology in a remote indigenous context. *The Australian Journal of Anthropology* 25(2). 171–189.

Kral, Inge & Robert G. Schwab. 2012. *Learning Spaces: Youth, literacy and new media in remote Indigenous Australia*. Canberra: ANU E-Press.

Kress, Gunther. 2010. *Multimodality: A social semiotic approach to contemporary communication*. London and New York: Routledge Taylor and Francis Group.

Leung, Linda. 2014. Availability, access and affordability across 'digital divides': Common experiences amongst minority groups. *Australian Journal of Telecommunications and the Digital Economy* 2(2). Article 38.

Mansfield, John. 2014. Polysynthetic sociolinguistics: The language and culture of Murrinh Patha youth. Canberra: Australian National University PhD thesis.

Marmion, Doug, Kazuko Obata & Jakelin Troy. 2014. *Community, identity, wellbeing: the report of the Second National Indigenous Languages Survey*. Canberra: Australian Institute of Aboriginal and Torres Strait Islander Studies.

Nathan, David. 2006. Proficient, permanent, or pertinent: Aiming for sustainability. In Linda Barwick & Nick Thieberger (eds.), *Sustainable data from digital sources: From creation to archive and back*, 57–68. Sydney: Sydney University Press.

Ormond-Parker, Lyndon, Aaron Corn, Cressida Fforde, Kazuko Obata & Sandy O'Sullivan (eds.). 2013. *Information technologies and Indigenous communities*. Canberra: AIATSIS Research Publications.

Reinhardt, Jonathan & Julie M. Sykes. 2014. Special issue commentary: Digital game activity in L2 teaching and learning. *Language Learning & Technology* 18(2). 2–8. http://llt.msu.edu/issues/june2014/commentary.pdf.

Rennie, Ellie, Andrew Crouch, Julian Thomas & Peter Taylor. 2010. Beyond public access? Reconsidering broadband for remote Indigenous communities. *Communication, Politics and Culture* 43(1). 48–69.

Rennie, Ellie, Andrew Crouch, Alyson Wright & Julian Thomas. 2011. *Home internet for remote Indigenous communities*. Sydney: Australian Communications Consumer Action Network.

Rice, Keren. 2010. The linguist's responsibilities to the community of speakers: Community-based practice. In Lenore A. Grenoble & N. Luanna Furbee (eds.) *Language documentation: Practice and values*, 25–36. Amsterdam: John Benjamins.

Sherrin, Simon & Elycia Wallis. 2012. Creating a mobile app ecosystem: The Genera Project for iOS. Paper presented at Museums and the Web conference, April 11–14, 2012 in San Diego, CA.

Stebbins, Tonya. 2012. On being a linguist and doing linguistics: Negotiating ideology through performativity. *Language Documentation & Conservation* 6. 292–317. http://hdl.handle.net/10125/4501.

Tangentyere Council & Central Land Council. 2007. *Ingerrekenhe Antirrkweme: Mobile phone use among low income Aboriginal people, A Central Australian snapshot*. Alice Springs: Tangentyere Council and the Central Land Council.

Thieberger, Nicholas. 2004. Documentation in practice: Developing a linked media corpus of South Efate. In Peter Austin (ed.) *Language documentation and description* 2, 169–178. London: SOAS.

Thorner, Sabra. 2010. Imagining an indigital interface: Ara Irititja indigenizes the technologies of knowledge management. *Collections: A Journal for Museum and Archives Professionals* 6(3). 125–146.

Uti Kulintjaku Project: Fact Sheet. 2014. NPY Women's Council (Aboriginal Corporation). Alice Springs.

Vaarzon-Morel, Petronella. 2014. Pointing the phone: Transforming technologies and social relations among the Warlpiri. *The Australian Journal of Anthropology* 25(2). 239–255.

Warschauer, Mark. 2003. *Technology and social inclusion. Rethinking the digital divide*. Cambridge: The MIT Press.

Wilkins, David P. 1992. Linguistic research under Aboriginal control: A personal account of fieldwork in central Australia. *Australian Journal of Linguistics* 12(1). 171–200.

Wyman, Leisy Thornton, Teresa L. McCarty & Sheilah E. Nicholas (eds.). 2014. *Indigenous youth and multilingualism: Language identity, ideology and practice in dynamic cultural worlds*. Abingdon, UK and New York: Routledge.

Yamada, Racquel-Maria. 2007. Collaborative linguistic fieldwork: Practical application of the empowerment model. *Language Documentation & Conservation* 1(2). 257–282. http://scholarspace.manoa.hawaii.edu/handle/10125/1717.

Margaret Carew
margaret.carew@batchelor.edu.au

Jennifer Green
jag@unimelb.edu.au

Inge Kral
inge.kral@anu.edu.au

Rachel Nordlinger
racheln@unimelb.edu.au

Ruth Singer
rsinger@unimelb.edu.au