

Mobile Devices for Tertiary Study – Philosophy Meets Pragmatics for Remote Aboriginal and Torres Strait Islander Women

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This paper outlines PhD research which suggests mobile learning fits the cultural philosophies and roles of Aboriginal and Torres Strait Islander women who are preservice teachers in the very remote Australian communities where the research was conducted. The problem which the research addresses is the low completion rates for two community-based Initial Teacher Education (ITE) programs in South Australia (SA) and Queensland (Qld). Over the past decade, the national completion rate of Aboriginal and Torres Strait Islander students in teacher training was 36 per cent, and in these two community-based programs it was less than 15 per cent. This paper identifies the perceptions of the benefits of using mobile devices by Aboriginal and Torres Strait Islander women who are preservice teachers in very remote communities. They report ways in which mobile learning supports their complex roles and provides pragmatic positive outcomes for their tertiary study in remote locations. The paper describes the apparent alignment between mobile learning and cosmology, ontology, epistemology and axiology, which may underpin both the popularity of mobile devices and the affordances of mobile learning.

■ **Keywords:** Aboriginal and Torres Strait Islander, cultural philosophies, mobile learning, remote communities, women

This paper is based on PhD research conducted by the author. The study engaged participants in two community-based ITE programs which serve remote communities in Qld and SA. The study aimed to understand how program participants used mobile devices for their studies. The majority of the students were women. As such, the findings of the research presented here are not generalisable to all ITE students.

The case of Aboriginal and Torres Strait Islander female preservice teachers studying in very remote communities in Australia is considered in the global contexts of trends about the feminisation of the school teaching workforce, the demand for more teachers related to the goal of universal primary education, and the use of mobile learning for ITE. The world teaching workforce is becoming increasingly feminised—globally, 63 per cent of primary teachers in 2012 were females (United Nations Educational, Scientific and Cultural Organisation Institute for Statistics [UIS], 2015). The overall rate among all Aboriginal and Torres Strait Islander teachers is 77 per cent (More Aboriginal and Torres Strait Islander Teachers Initiative, 2014, p. 9).

If the goal of achieving Universal Primary Education is shifted to 2020, then about 12.6 million teachers will need to be recruited in order to have a ratio of 40 students for every teacher (UIS, 2014, p. 2). One can expect there will be encouragement from world agencies for large numbers of females from areas with low rates of female teachers to undertake training to become teachers. It is likely that the majority of new teachers being trained globally in the near future will be Indigenous females, and at least part of their training is likely to occur through the use of mobile devices. A range of international agencies and organisations endorse the potential of mobile technologies for education generally, and for teacher training in particular (Bokova, 2013; Danaher & Umar, 2010; Godfrey, Vos, Phillips, & Giusti, 2014; WorldBank, 2012): ‘There is a significant opportunity to more fully explore how mobile technology can support teachers and contribute to their

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training, motivation and retention within the teaching profession' (Vosloo, 2012, p. 35).

Background

Data for 2007–2011 for Aboriginal and Torres Strait Islander people studying ITE indicates that across all modes of study 36.3 per cent completed their courses (Patton, Hong, Lampert, Burnett, & Anderson, 2012, p. 24). One approach to off-campus study is community-based delivery, in which a support teacher lives in a community and provides daily assistance throughout the academic year at a study centre. This enables a student to complete a qualification while living in her own community.

This research examines two community-based programs. The Anangu Tertiary Education Program (AnTEP) commenced in 1984 in the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands of north-west SA. Study through the University of SA culminates in the Bachelor of Teaching (Anangu Education) (Edwards & Underwood, 2006; Gale, 1996). The Remote Area Teacher Education Program (RATEP) commenced in 1990 in Qld. James Cook University (JCU) in partnership with the Qld Department of Education and Training and Tropical North Qld Institute of Technical And Further Education (TAFE) offer RATEP. TAFE's awards enable a student to move into the second year of the primary teacher's Bachelor of Education at JCU (McGarvie, 1991; York & Henderson, 2003). Both programs indicate at least 85 per cent of graduates are female (AnTEP, 2013; Mitchell & Linkson, 2012). Data from RATEP covering the period 2007–2011 indicates a completion rate of 14.7 per cent (Mitchell & Linkson, 2012, p. 26).

Literature Review

Mobile Learning for Initial Teacher Education and Continuing Professional Development

Globally, there is a huge uptake of mobile technologies. By the end of 2014, it was expected there would be almost seven billion mobile-cellular subscriptions worldwide. The developing world accounts for 78 per cent of these mobile-cellular subscriptions (International Telecommunications Union, 2014, pp. 1–3). Naismith, Lonsdale, Vavoula, & Sharples (2004, pp. 2–4), presenting a review of the literature on mobile technologies and learning suggested there were 'six broad theory-based categories of activity' including behaviourist, constructivist, situated, collaborative, informal and lifelong, and learning and teaching support. A further survey from 2005 to early 2012 led Imtinan, Chang, & Issa (2014, p. 327) to propose three definitional perspectives: 'techno-centric, learner-centered and augmentation of mobile learning with learning theories'. Nevertheless, recently Bannan et al. stated 'there continues to be a distinct lack of definitional clarity about mobile learning' (Bannan, Cook, & Pachler, 2015, p. 2). They 'asserted a socio-cultural view of learning whereby mobile devices and services foster inter- and

intra-personal conversation-based processes of coming to know' (Bannan et al., 2015, p. 13).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) produced a series of working papers on mobile learning; one recommended 'Institutions providing pre- and in-service training for teachers, such as universities and teacher training institutes, should be encouraged to incorporate mobile learning into their programmes and curricula' (Vosloo, 2012, p. 35). Baran (2014) synthesised worldwide empirical research between 2000 and mid 2014 on mobile learning in preservice and in-service teacher education contexts. Six main findings emerged. Baran reported that while there is a trend toward including mobile devices into teacher education contexts, there are 'scant reports of theoretical perspectives integrated into mobile learning research in teacher education' (p. 23). She noted that patterns of usage and attitudes to the use of mobile devices were variable, but, despite this, mobile learning was seen as largely beneficial. The focus on benefits has meant the challenges of mobile learning have been largely ignored. Importantly, Baran noted that depending on the audience the use of mobile devices varied. Usage for learning purposes differs for teacher educators, teachers and preservice teachers.

Use of Mobile Devices by Aboriginal and Torres Strait Islander People in Remote Communities

Remote Aboriginal and Torres Strait Islander communities have generally been characterised by poor Information and Communication Technology (ICT) and telecommunication services (Australian Communications and Media Authority [ACMA], 2008; Regional Telecommunications Independent Review Committee, 2008, 2012). Despite this, Ganley (2014) comments 'mobile-based technology appears to be where the future is for remote Indigenous communities: community wifi, smartphones and tablets' (p. 15). There has been a rapid and extensive uptake of mobile phones in remote Aboriginal and Torres Strait Islander communities, regardless of mobile phone coverage or Internet access (Brady, Dyson, & Asela, 2008; Featherstone, 2011; Rennie, Crouch, Wright, & Thomas, 2011). Recent figures indicate that Australia wide, 70 per cent of Aboriginal and Torres Strait Islander people own a smartphone, and in remote communities 43 per cent of Aboriginal and Torres Strait Islander people own a smart phone (McNair Ingenuity Research, 2014).

The primary purpose for getting a mobile phone is for person-to-person communication with family, kin and friends. Six other key uses are (1) entertainment; (2) creating multimedia products; (3) using other Internet services; (4) emergency use; (5) work; and (6) study (ACMA, 2008; Brady & Dyson, 2009; Brady et al., 2008; Dyson & Brady, 2009; Kral, 2012, 2014; Kral & Schwab, 2012). Mobile devices may be used for positive cultural purposes, but cyber bullying, teasing and gossiping have contributed to community violence (Brady & Dyson, 2009;

Dyson & Brady, 2009; Kral, 2014; Vaarzon-Morel, 2014). Regardless, it may be that the uptake of mobile phones is prompted by alignment with aspects of culture.

Brady et al., (2008) suggest ‘the use of mobile phones fit with the strong oral tradition of the Islanders’ (p. 396). The use of icons aligns with Aboriginal and Torres Strait Islander people’s familiarity with using visual and spatial cues in daily life (Kral, 2011). People share both devices and content; these ‘communities of practice’ fit with existing learning styles of collaboration and cooperative learning (Kral & Schwab, 2012). Given the diaspora of people away from their home communities for schooling, work and training, use of mobile devices strengthens relationships and for those absent, it maintains their sense of locality and belongingness (Brady et al., 2008).

Donovan (2007) compares Aboriginal pedagogical systems and ICT pedagogical systems and notes similarities. He suggests that Aboriginal pedagogy based on ‘learning through experiencing concepts’ is similar to ICT pedagogy which is based on ‘learning through experimentation’ (p. 99). Further, Aboriginal pedagogy is built around peer or group learning, while information and communications technologies allow group space. He indicates Aboriginal pedagogies adapt to local contexts and ICTs allow for learning to be contextualised.

Johnson and Oliver (2013) discuss the use of smartphones and state ‘There is reason to infer compatibility between Indigenous learning style and life circumstances and web-based mobile applications’ (p. 4). Huijser and Bronnimann identify alignments between Yunkaporta’s ‘8 way’ model of Aboriginal pedagogy (Yunkaporta, 2009) and social media apps and software, including discussion forums, chatrooms, Collaborate, MS Lync, Skype, YouTube, Vimeo, Facebook, Twitter and Flickr (2014, p. 106).

Guenther and McRae-Williams (2012) suggest ‘it is possible to see a match between the ICT approaches (and teaching and learning processes more generally) used and elements of ontologies, epistemologies, axiologies and cosmologies’ (p. 92). There appear to be congruencies between cultural philosophies and the use of mobile devices. Thus, there is a possibility that cultural philosophies might promote the use of mobile devices for study purposes by female Aboriginal and Torres Strait Islander preservice teachers.

Aboriginal and Torres Strait Islander Cultural Philosophies

It is likely that cultural perspectives will affect both the attitudes and practices regarding mobile learning for tertiary study of preservice teachers. There is no such thing as one Aboriginal and Torres Strait Islander cultural philosophy. As Moreton-Robinson (2011) points out: “Aboriginal” signifies a commonality of shared conditions of colonisation but cannot fully capture our respective ontological, epistemological, axiological and cultural subjectivities’ (p.

414). Several Indigenous academics use these philosophical frames of reference to discuss their positions in relation to methodology in educational research. The terms cosmology (views of physical and spiritual realities), ontology (views of being and identity), epistemology (views of knowledge), axiology (views of values and ethics) can be applied to any culture. For the purposes of this paper, the use of these philosophical perspectives enables the exploration of cultural elements which provide a rich understanding of mobile learning.

Arabena (2008) suggests Indigenous philosophers around the world share a common cosmological perspective: ‘the Universe is known as inherently dynamic, constantly changing in a process of renewal, and profoundly interrelated’ (p. 1). Arbon (2008) uses a vernacular term, ‘Ularaka’, to express notions of cosmology when she writes ‘The Arabana Ularaka, like the worldviews of other Indigenous people, is fundamentally important in this effort to see the world from a position of relatedness’ [emphasis in the original] (p. 30).

A feature of an Aboriginal and Torres Strait Islander sense of being is that it is framed within a collective or corporate understanding. ‘In honouring the integrity of the Universe as a whole interconnected life system, Indigenous peoples have learned to be in the world in reciprocal relationships with all things in the Universe, through cooperation, complementarities and interdependence’ (Arabena, 2008, p. 1). Arbon (2008) notes that for her people, the Arabana:

The very core of what it is to be is an essence of origin — the *kurruna* — a primordial potency of energy which animates all entities. . . . From this beginning of *kurruna* tied with identity and consciousness, rises the fundamental ontologies of embodiment, reciprocity and relatedness [emphasis in the original] (p. 37).

Regarding Indigenous knowledge Nakata (2007) states ‘Indigenous peoples hold collective rights and interests in their knowledge’ (p. 185). Arbon (2008) indicates ‘Knowing is located, exists and has presence and is a component to our lived experience, engagement and interpretation in the world’ (p. 48). Ford (2010) points out the dynamic capacity of epistemology:

Our knowledge system is rich in abstracted theoretical understandings centred on metaphorical ways of thinking and understanding the world. [These] come to inform new practices for us in contexts that involve us with other knowledge systems but which position us according to our own interests and ways of knowing, and our own understanding of who we are (p. 24–25).

In general, matters that are important and valued determine action. In discussing the cultural interface of Islander and scientific knowledge, Nakata (2010) affirms ‘our storytelling teaches children that we know other things as well, that we do other things in particular ways for particular reasons’ (p. 55). Arbon (2008) asserts ‘Our

Indigenous societies are very clearly founded within and on the symbolic, performative and interpretational, where dialogue, mentoring and responsibility are critical to doing' (p. 53).

These comments illustrate foundational perspectives for Aboriginal and Torres Strait Islander people which influence daily life. These might also shape attitudes toward and behaviours with mobile devices for Aboriginal and Torres Strait Islander female preservice teachers in remote communities.

Methodology

A Mixed Methods Research approach was used for my PhD research project (Creswell & Plano Clark, 2011; Teddlie & Tashakkori, 2010). This paper reports only on issues arising from initial qualitative data. All the participants were Aboriginal and Torres Strait Islander people, most of whom were preservice teachers from two community-based programs, as well as some Aboriginal and Islander Education Workers not enrolled in an ITE course. As a non-Indigenous male, I recognise that my research with female participants may be problematic – I cannot claim to take the position of a female or the position of an Aboriginal or Torres Strait Islander. Martin cautions outsiders to 'please knock before you enter' (Martin, 2008). By this she affirms the agency of Aboriginal and Torres Strait Islander people to regulate their interactions with outsiders, and that researchers are called upon to operate within a paradigm of relatedness. This requires the researcher to demonstrate cultural respect. Deliberately sustaining a self-reflective and reflexive standpoint enables researchers to 'come amongst' and 'come alongside' research participants. Taking this caution into account, I was mindful of my need to listen carefully, be respectful and not presume that my own cultural philosophies should direct the research process.

I discussed the research proposal with the Director of my university's First Nations Centre: Yunggoendi, who is an Aboriginal woman. Subsequently I sought advice from other Aboriginal women academics, including Karen Martin and Veronica Arbon, whose work I cite here. I also consulted other academics who had experience working with Aboriginal and Torres Strait Islander people. Ethics approval was obtained from universities (Flinders University and JCU), state departments of education (Qld and SA), Tropical North Qld Institute of TAFE, and the Pitjantjatjara Yankunytjatjara Education Committee. Permission was also obtained from the principals of the schools visited.

I made nine field trips to establish relationships with people in host institutions, schools, and potential participants, and also to collect data: I made six trips to central Australia and three to Qld. I obtained data from fifteen sites: five in SA and ten in Qld. Overall, there were 64 volunteer participants (SA: 34 + Qld: 30; 55 females

and nine males). I conducted semistructured face-to-face interviews (27 individual interviews, four focus groups and 18 joint interviews). I used a set of 13 questions in the interviews to focus on four objectives. Participants could choose not to answer questions and could also withdraw their consent to participate at any time. Interviews were conducted in English with audio recording from which transcripts were made. Occasional comments were made in vernacular by participants in the APY Lands. Interview transcripts were analysed using a phronetic constructivist Grounded Theory approach, which 'can help legitimise the experience of Aboriginal people as a source of knowledge and facilitate the development of theory directly interpreted from Aboriginal people's own words' (Bainbridge, Whiteside, & McCalman, 2013, p. 278). I used Grounded Theory as a way of allowing themes and patterns to emerge from the data, rather than using a predetermined analysis framework as an overlay through which to interpret the data. A phronetic stance was adopted as an ethical decision to valorise the voices and views of the Aboriginal and Torres Strait Islander participants.

The intent of this research was to understand perspectives of remote and very remote stakeholders. For this reason, participants were sought from regions that the Australian Bureau of Statistics (ABS, 2011) classifies as 'Remote' or 'Very Remote'. In Qld, following publicity about the research, some preservice teachers from 'Inner Regional' and 'Outer Regional' areas indicated their willingness to participate, and were included. Respondents in both states were categorised using the ABS Remoteness Structure.

Findings

Preservice Teachers' Usage of Mobile Devices for Study Purposes

Of the 64 participants, 42 were students in community-based ITE programs (AnTEP, 15; RATEP, 27). Participants in Qld across Inner Regional, Outer Regional and Very Remote areas used mobile devices for their tertiary study. In Very Remote sites none of the 15 AnTEP students used mobile devices for study purposes, but all 11 RATEP students did (all of whom were female).

Given that none of the preservice teachers in AnTEP were using mobile devices for study purposes, the rest of the Findings and the Discussion section are based on responses from RATEP students. This paper focusses on the perceptions of benefits of using mobile devices for study purposes by Aboriginal and Torres Strait Islander women preservice teachers.

Research Objective Findings

Interview questions were designed to respond to four research objectives. A brief summary of the objectives and the key findings is presented below.

Objective 1: The research will reveal ways in which the use of mobile devices in the preservice training of Aboriginal and Torres Strait Islander people in remote communities could affect professional learning within an ITE qualification.

The key finding here is that participants believed there was a benefit to using mobile devices with regard to time: both the speed of completion of individual assignments, and the time to complete a qualification.

Objective 2: The research will identify the characteristics of the use of mobile technologies in the training of Aboriginal and Torres Strait Islander preservice teachers in remote communities which have andragogical impact on the delivery of training, as perceived by the students themselves.

The key finding here is that the use of mobile devices enhances adults' abilities to make decisions which reflect the multiple demands they face. Use of mobile devices gives students access to and control over the device, as well as time, place and pace of learning.

Objective 3: The research will generate new knowledge about the alignment of Aboriginal and Torres Strait Islander philosophical perspectives and features of mobile learning.

The three key findings relating to mobile learning are: (1) it accords with the primacy of relationships in Aboriginal and Torres Strait Islander culture, as people use mobile devices to communicate with each other in a variety of ways, which enhances relationships when people are separated by distance; (2) it fits with the informal, continuous and spontaneous nature of Aboriginal and Torres Strait Islander learning as people carry mobile devices all the time and they can be accessed instantly to create, share or access learning resources; and (3) it aligns with the collective and collaborative style of much Aboriginal and Torres Strait Islander learning because a mobile device can be shared cooperatively by several people at once, as well as facilitating data sharing and knowledge co-creation between users on multiple devices.

Objective 4: The research will enable Aboriginal and Torres Strait Islander preservice teachers to voice which elements of content material, administrative support and personal encouragement for their ITE study they wish to see provided through mobile devices.

The key findings in these three areas are that students wish the university to (1) make videos available for mobile device formats of all on-campus lectures/seminars so RATEP students are confident they are receiving the same content; (2) send administrative matters, such as calendar reminders about assignments and other events, direct to students' personal mobile devices; and (3) give frequent personal praise, sympathy or emotional support as appropriate through the changing circumstances of a student's life directly to students' mobile devices to ensure a student remains engaged in study.

This section has summarised findings from the research. The following section identifies two major benefits of using mobile devices and explores the alignment of mobile learning and cultural philosophies.

Discussion

The discussion focusses on the perceptions of benefits of using mobile devices for study purposes by Aboriginal and Torres Strait Islander women preservice teachers in very remote communities. These benefits are considered through the constructs of agency and collaboration. I will also explore motivation for the usage of mobile devices due to alignment with cultural philosophies.

Agency

The primary benefit emerging from the data is that of agency. The use of mobile devices for tertiary study purposes by female Aboriginal and Torres Strait Islander preservice teachers empowers these women by fostering their ability to actively control their lives and make decisions about their daily lives and their futures. This agency is expressed regarding place, time, and pace of study. First, these women experience freedom of location for study. They can continue studying in a variety of places if they are unable to attend the study centre. Work, family commitments or poor health may prevent a student attending the study centre, and community and cultural responsibilities may mean a woman might leave her own community for several days or even months for example attending sports competitions, going to funerals and mourning rituals, assisting a relative getting medical treatment (e.g., dialysis), or attending meetings for various organisations. In these situations, mobile devices enable a preservice teacher to continue with study activities wherever she might be — she is not restricted to the desktop computers in the study centre in her own community.

Another expression of agency is with regard to flexibility of time. Most study centres have limited business hours after which they are shut and preservice teachers generally do not have keys for after-hours access. However, with mobile devices, these women can study at any time. They are not confined to the opening times of the study centre. Rather, they can choose when to study, at their convenience. One preservice teacher reported she studied 'Every night until about three o'clock in the morning.' Others mentioned working on weekends. Use of mobile devices gives preservice teachers autonomy over the time they choose to study.

A further aspect of agency occurs with respect to pace of study. Students suggested there might be times when they decide other areas of their lives require priority and so will choose to cease study temporarily. On resumption, with the use of a mobile device, they are able to adjust the speed at which they study. They can decide to invest more time per day or per week in study than previously, as having a mobile device facilitates their study. In this way,

students are able to accelerate their study, and catch up on the period when they withdrew from study. This can enable a person to remain on target for yearly goals.

This pragmatic benefit accords with comments by Kearney and associates about mobile learners experiencing a high degree of agency: ‘They may have control over the place (physical or virtual), pace and time they learn, and can enjoy autonomy over their learning content’ (2012, p. 9).

Collaboration

A second major benefit emerging from the data is that of collaboration. Mobile devices enable female Aboriginal and Torres Strait Islander preservice teachers in very remote communities to communicate with others for study purposes through various modes, including talk, text, email and social media. This fosters both sharing of data and creative output between two or more people. Some respondents initiated an informal online or digital community. Such groups are also termed communities of learning or communities of practice, as noted by other researchers with Aboriginal and Torres Strait Islander preservice teachers (Hall, 2015; Hall & Maughan, 2015). The digital community is expressed in three functions: academic support, administrative procedures and personal encouragement.

Students reported seeking academic assistance from other students, and cooperating with study: ‘They all get on to Facebook . . . when they’re collaborating with each other and exchanging ideas’. Several participants mentioned they had customised their mobile phones to deal with administrative procedures about their study. They reported rerouting emails to come directly to their mobile phones. One student said: ‘I use my mobile to access emails to see if I have passed a subject.’ Mobile devices were used to share personal encouragement and develop a support network between students. A preservice teacher remarked ‘I use Facebook and other alternatives to get in contact with my mates and see how they’re going and [they] see how I’m going’. This second pragmatic benefit of using mobile devices for tertiary study aligns with remarks by Kearney and colleagues who note ‘M-learners can enjoy a high degree of collaboration by making rich connections to other people and resources mediated by a mobile device’ (2012, p. 10).

Agency and collaboration are two pragmatic benefits of using mobile devices for study purposes in a tertiary degree for female Aboriginal and Torres Strait Islander preservice teachers in very remote communities, which contribute to enhanced engagement with study. Using mobile devices empowered women in this study to simultaneously fulfil family, community and cultural responsibilities as well as study requirements. Through the use of mobile devices, they are able to both meet their existing complex roles in the community and pursue additional learning and employment aspirations. Collaborative relationships

formed through digital communities via mobile devices provide pedagogic (or, more strictly speaking, andragogic) benefits within the demands of studying towards a professional qualification.

Alignment with Cultural Philosophies

At the time the research commenced, neither provider of the community-based programs for ITE had integrated mobile learning as a key platform in their teaching and learning approaches. Nevertheless, the majority of the Qld research participants used mobile devices on a daily basis. What motivates these preservice teachers to buy and use mobile devices? I suggest the uptake of mobile devices occurs at least in part due to alignment between the affordances of mobile devices and mobile learning with cultural philosophies. In doing so, I highlight the perspectives of two Aboriginal academics. Karen Martin has written about the place of cultural philosophies in the research process and Veronica Arbon has written about the place of cultural philosophies in tertiary education. I acknowledge their views are not necessarily representative of all Aboriginal and Torres Strait Islander peoples.

Cosmology

How might the use of mobile devices fit with Aboriginal and Torres Strait Islander cosmology? Arbon characterises cosmology as whole, renewing and interrelated. She points out ‘For the *Arabana*, relatedness is where time and space is collapsed and organised’ in effect, ‘bringing the ancient and today together’ [emphasis in original] (2008, pp. 35–36). Martin notes

‘relationships within the relational humanist tradition are anchored across time and space, and are experienced as more contexts are engaged. However, an Indigenist research paradigm is served by an ontology [worldview] that anchors all experiences to relatedness, no matter what the contexts’ (2008, p. 81).

Martin thereby suggests that time and space are secondary and subservient to relatedness. Kearney and colleagues suggest ‘m-learning offers a variety of alternatives including ‘virtual’ or non-geographical spaces, such as virtual world environments’ (2012, p. 4).

Aboriginal and Torres Strait Islander cosmology generally views time as quasi-cyclical and it serves to fuse the past and the present. Arbon explains ‘Knowing is about experience as generations cycle through generation levels and yesterday becomes today in experience which locate and define responsibilities’ (2008, p. 41). Kearney et al. state ‘fixed notions of linear time are increasingly making way for a softer version of what some authors have termed “socially negotiated time”’ (2012, p. 4). These ‘malleable’ or ‘softer’ views of time are congruent with perspectives of time within Aboriginal cosmology. Fluid notions of space and time occur within the mobile learning environments of ITE. Participation in web-based seminars, listening to

podcasts, making video clips, using Skype as well as talk, text, emails and social media on mobile devices are all ways in which rigid boundaries of space and time are dissolved. Mobile devices enable proleptic embodiment. This means that a person in Place A can 'be' with a second person in Place B. The second person has a 'foretaste' of the presence of the first.

Aboriginal and Torres Strait Islander cosmology encompasses the transcendent and variable nature of space and time. Mobile devices utilise the multidimensionality of Aboriginal and Torres Strait Islander cosmology. I suggest the female Aboriginal and Torres Strait Islander preservice teachers experience pragmatic benefits from using mobile devices for study purposes because there is alignment with the strengths of their Aboriginal and Torres Strait Islander cosmology.

Ontology

In what ways might the use of mobile devices fit with Aboriginal and Torres Strait Islander ontology? A sense of being for Aboriginal and Torres Strait Islander people is framed within a collective or corporate understanding. Cultural ontology, as described by Arbon, emphasises that a sense of identity is formed through being related. Arbon asserts 'Relatedness is central to being as *Arabana*' [emphasis in original] (Arbon, 2008, p. 34). She stresses 'For the *Arabana*, becoming who you are is accomplished by knowing your reciprocal relationships' [emphasis in original] (Arbon, 2008, p. 34). Martin affirms 'the ontological premise of relatedness' (Martin, 2008, p. 71), and explains 'Ultimately, Ways of Being hold for us processes for fulfilling relatedness with respect, responsibility and accountability' (Martin, 2008, p. 78).

In the context of being a tertiary student in an ITE course, a student develops her sense of being through the reciprocal relationships she has with fellow students in her own community, the supervisory teacher in the same place, other students in various locations, and also the administrative personnel and lecturers at the training institution. Research participants say these relationships are enhanced through the use of mobile devices to handle academic, administrative and personal matters. Cooperative and respectful interactions enabled by the use of mobile devices build a preservice teacher's identity through reciprocity.

Kearney et al. note 'Shared conversational spaces mediated by mobile devices are conducive to timely, personally tailored feedback from instructors as well as rich peer interactions' (2012, p. 10). This comment fits well with the reciprocal relationship base of Aboriginal and Torres Strait Islander ontology. A preservice teacher's sense of being is based on identifiable professional relationships formed by being part of a year cohort, member of compulsory or elective topics, and for teaching practicum, assignment to a certain school site and a designated class of children for particular subjects. The spontaneous cre-

ation of a digital community with frequent calls, texts and social media messaging through mobile devices facilitates the development of a professional identity.

Aboriginal and Torres Strait Islander ontology assumes a sense of identity or being is predicated on a fundamental premise of relationships expressed through interdependence, and cooperation. Mobile devices facilitate the development and maintenance of relationships. I suggest the female Aboriginal and Torres Strait Islander preservice teachers experience pragmatic benefits from using mobile devices for study purposes because there is alignment with the strengths of their Aboriginal and Torres Strait Islander ontology.

Epistemology

In what ways might the use of mobile devices fit with Aboriginal and Torres Strait Islander epistemology? Many Aboriginal and Torres Strait Islander nations are structured on two main classificatory groups, and also identify people according to age and gender. Arbon emphasises these 'are critical to organisation for knowing' and affirms 'both entities and knowledge are organised in order to move to one's potentiality' (2008, p. 43). Martin notes 'Some [Stories] are gender specific being either for women or for men. Some [Stories] are related to lifehood phase' (2008, p. 74). An ITE course is based on the organisation of schools with regard to pupils' age, subjects, and in some cases, children's ability levels or gender. Arbon points to another aspect of epistemology: 'Knowing is controlled to ensure appropriate access to some areas of knowledge and knowing' (2008, p. 48). Martin similarly states 'some Stories are respected and are not made public' (2008, p. 74). She further avers

The need to 'know' becomes secondary to sustaining and avoiding damage to relatedness. It [a Story] belongs to another Entity and that is all that is needed to be known ... ultimately it is not possible, nor necessary for any one Entity to know all that can be known (Martin, 2008, p. 75).

Universities and schools use various groupings of students to control knowledge acquisition, with some elements of knowledge prohibited to other groups. As preservice teachers use mobile devices to fulfil the requirements of the syllabus of their course, their learning will reflect these epistemological characteristics of knowledge as both organised and controlled. Indeed the nature of learning management systems, apps and software, including search engines and web browsers also demonstrate these same features.

Arbon states 'Knowing concerns experience in life and ceremonies' (2008, p. 41). It includes both spontaneous and planned learning, much of which is context specific. An ITE course is designed to foster learning and comprises elements of performance and ceremony with rituals enacted daily. Authentic learning happens in a participatory environment with relevance to progress towards

qualification. Kearney et al. discuss authenticity: ‘M-learning episodes potentially involve high degrees of “task and process authenticity” as learners participate in rich, contextual tasks . . . involving “real-life” practices’ (2012, p. 10).

Aboriginal and Torres Strait Islander epistemology has features of authenticity, spontaneity, context specificity, organisation and control of access to knowledge. Mobile devices facilitate and are characterised by such affordances. I suggest the female Aboriginal and Torres Strait Islander preservice teachers experience pragmatic benefits from using mobile devices for study purposes because there is alignment with the strengths of their Aboriginal and Torres Strait Islander epistemology.

Axiology

In what ways might the use of mobile devices fit with Aboriginal and Torres Strait Islander axiology? Arbon talks about ‘right action’ and that people have a responsibility to ensure ‘the appropriate outcome — outcomes that ensure sustainability and continuity . . . The responsibility of doing concerns correct understandings. It is from there that the correct behaviour or actions or intent are initiated’ (2008, pp. 51–52). She also stresses that doing life requires active engagement: ‘Engagement concerns all senses and more as one engages spiritually, mentally, physically and in a social context. In this way, all energies are engaged to understand. . . . Engagement is dialogic activity with all entities in our world’ (Arbon, 2008, p. 49). Martin emphasises ‘The processes of Ways of Doing, . . . is “coming amongst” the Entities and “coming alongside” them in relatedness . . . to be self-reflexive while at the same time being dialogic’ (2008, p. 79).

These perspectives have parallels with the frequent, engrossed and highly dialogic way in which preservice teachers use mobile devices to pursue their needs as participants in a tertiary course — seeking and offering academic support, meeting administrative requirements and sharing personal encouragement. Schuck, Aubusson, Kearney, & Burden (2013) discuss the importance of teacher educators’ use of mobile devices with preservice teachers: ‘Teacher education programs, therefore, have an important role to play in supporting beginning teachers to use new technologies as appropriate’ (p. 3). Use of the word ‘appropriate’ points to ethical considerations and axiological issues.

Aboriginal and Torres Strait Islander axiology pivots on the notions of shame and respect in relationships, and as indicated in the literature review, disrespectful communication through mobile devices is seen as a shameless transgression of social norms. Mobile devices have been embraced for the ease in which relationships can be enhanced through frequent multimodal communication. I suggest the female Aboriginal and Torres Strait Islander preservice teachers experience pragmatic benefits from using mobile devices for study purposes because there is

alignment with the strengths of their Aboriginal and Torres Strait Islander axiology.

In summary, I have proposed that the popular uptake of mobile devices for both social and study purposes by Aboriginal and Torres Strait Islander female students in remote communities is based on congruence with the strengths of their cultural philosophies. Features of mobile devices and the purposes for which they can be used align with elements of cosmology, ontology, epistemology, and axiology.

Conclusion

This paper has presented research which highlights the perceptions of female Aboriginal and Torres Strait Islander preservice teachers about the use of mobile devices for their tertiary study in very remote Australian communities. Their experience is an example of mobile technology empowering women, and so fits with the overarching theme of the 2015 UNESCO Mobile Learning Week. A subtheme for Mobile Learning Week was ‘Gender-sensitive content and pedagogy’. The use of mobile learning in a community-based ITE program can be considered a gender-sensitive aspect of teacher training because the ability to study anytime, anywhere with mobile devices recognises the complex roles of women and privileges the priorities they set on fulfilling family, community and cultural responsibilities ahead of study requirements. So too, the provision of a community-based ITE program and the endorsement of mobile devices within that would be an example of a method to increase the recruitment of female teachers from what UNESCO terms ‘disadvantaged communities’. In this study, the implementation of a community-based ITE program enabled female students to remain living in their own communities and not have to relocate for a training period of four or more years. The appeal of this design of program to women is evidenced by the overwhelming majority of female enrolments and graduates in both programs investigated in the research. The use of mobile devices has created opportunities for women from sites where there is no designated study centre, nor resident supervisory teacher, to also study toward a teaching qualification. This approach aligns with international trends regarding the feminisation of the school teaching workforce, and the endeavour to increase the number of female teachers from Indigenous marginalised peoples.

This research is limited as it was conducted within a short time frame. Further longitudinal research could examine the effect the use of mobile devices has on engagement, success in grades and completion rates in community-based programs. Moreover, such longitudinal research could also investigate the effect of the use of mobile devices in contributing to the number of Aboriginal and Torres Strait Islander community-based program ITE graduates who are employed in remote and very

remote schools, and also the effect on the parity of Aboriginal and Torres Strait Islander teachers – particularly women – in the school workforce.

This paper reports ways in which learning through mobile devices supports the complex roles of Aboriginal and Torres Strait Islander women preservice teachers by providing pragmatic positive outcomes for their tertiary study in very remote locations. It also describes alignments between mobile learning and cosmology, ontology, epistemology and axiology which may underpin both the popularity of mobile devices and the affordances of mobile learning.

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