He Whare Hangarau Māori

Language, culture & technology

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Edited by

Hēmi Whaanga, Te Taka Keegan & Mark Apperley

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Preface

Hēmi Whaanga, Te Taka Keegan & Mark Apperley

Nau mai ki te Whare Hangarau Māori.
Kua takoto tōna tūāpapa.
Ko ōna poupou nā ngā rauringa i whakatū,
he mea hanga ki ngā rākau i ōhākītia ai e Tā Apirana.
Whakairia ngā heke, riariakina tōna tāhuhu.
Houhia te whare nei!

He kupu whakataki — Introduction

As editors we had the idea of creating a volume of this type for some time before it became a reality. Its scope is both academic and practical. Its academic relevance contributes to on-going academic discussions and debates on relevant topics in information communication technology (ICT), and its practical relevance links to the many challenges faced by iwi, institutes, societies and communities involved in ICT initiatives on a local and global scale. The primary purpose is to collate and bring together the vast experiences of an eclectic group of innovators, scholars, industry and technology leaders who share a passion for ICT. Representing a wide range of disciplines and personal experiences, this collection of chapters provide valuable insights into the wide range of ICT initiatives, including etools, emedia and elearning, which have been used extensively across Aotearoa to support the goals and aspirations of Māori, their communities and organisations for language, cultural, social and economic sustainability. In the spirit of using new technology, we have made this publication available free on-line so that individuals, hapū, iwi, institutes, societies and communities involved in ICT initiatives can gain access to the many insights contained within these pages.

As a general guide, we asked that the contributors to this volume focus on an ICT initiative they have either worked with, developed, or implemented in their respective roles, paying particular attention to how that ICT initiative was applied in those contexts. We also asked them to consider some of its strengths, weaknesses and benefits, in addition to the area of mātauranga, tikanga or reo that it was applied to, as well as any other aspects of practice that it challenged, advanced, or explored. As the title of this volume suggests, *He Whare Hangarau Māori — Language, culture & technology*, covers three very broad areas arranged thematically covering 27 chapters. Each theme has an editor/ editors responsible for the collation, editing, and reviewing of each theme. In addition to introducing the respective authors, the theme editor/s have also provided a very brief introduction to the area of ICT in their section:

- *Māori language resources & Māori initiatives for teaching & learning te reo Māori*
  Edited by Hineitimoana Greensill, Hōri Manuirirangi and Hēmi Whaanga, this

theme brings together some of the leading exponents in the development of Māori language resources and initiatives for the teaching and learning of te reo Māori. This theme includes chapters written by Te Taka Keegan (two pieces: one on *Māori Language Interfaces* and another on *Machine translation for te reo Māori*), Hōri Manuirirangi (*A translation of Moodle into te reo Māori),* Tania M. Kaʻai (*Te Whare Matihiko o Te Reo - digital tools for the revitalisation of te reo Māori*), John C. Moorfield (*Te Whanake and Te Aka digital resources*), Dean P. S. Mahuta *(Building virtual language communities through social media – because we don't live the village life anymore*), Wahineata Smith (*Te Whanake animations: Development and implementation*), and Karaitiana Taiuru (*20 years of reflections using technology to compile Māori language dictionaries*).

- *Iwi, institutes, societies & community led initiatives*
  Edited by Hēmi Whaanga, Naomi Simmonds and Te Taka Keegan, this theme highlights the breadth of engagement in ICT. This theme includes chapters written by Māui Hudson, Tiriana Anderson, Te Kuru Dewes, Pou Temara, Hēmi Whaanga and Tom Roa (*"He Matapihi ki te Mana Raraunga" - Conceptualising Big Data through a Māori lens*), Hēmi Whaanga (*He mahi māreikura: Reflections on digitising of the Pei Jones' collection*), Karaitiana Taiuru (*Māori domains*), Michael W. Taiapa (*FamilySearch: Māori, Mormon & whakapapa*), O. Ripeka Mercier, Bruce McFadgen and Arama Rata (*Keep teaching this! Engaging Māori Studies students with digital cultural mapping tools*), Vincent Olsen-Reeder (*Mapping linguistic landscapes: Where geo-tagging meets geo-linguistics*), Hauiti Hakopa, Anne-Marie Jackson, Ngahuia Mita and Chelsea Cunningham (*Te Koronga: Mapping case studies*), Moka Apiti (*The Indigenous Mapping Waananga 2017*), Liliana Clarke and Pauline Harris (*Maramataka*), and Pauline Harris (*Portable planetariums in the teaching of Māori astronomy*).

- *GLAMS: Libraries, Archives and Museums in Aotearoa*
  The final theme, on GLAM (an acronym for the galleries, libraries, archives and museums sector) edited by Michelle Horwood brings together a range of contributions highlighting the variety of initiatives currently being undertaken in this sector. This theme includes chapters written by Michelle Horwood (*Going digital in the GLAM sector: ICT innovations & collaborations for taonga Māori*), Michaela O'Donovan and Zoe Richardson (*Navigating good practice image permissions for Māori collections held at Auckland War Memorial Museum - Tāmaki Paenga Hira*), Wayne Ngata (*Kanohi ki te kanohi: Face-to-face in digital space*), Paul Diamond (*Kōrero kitea: Ngā hua o te whakamamatitanga. The impacts of digitised te reo Māori archival collections*), Claire Hall (*Mukurtu for mātauranga Māori: A case study in Indigenous archiving for reo and tikanga revitalisation*), Chloe Cull (*Lisa Reihana: A continuum of Māori practice*), and Matariki Williams (*Tusk: Emergent Culture*).

As can be noted from the variety and range of topics covered in this collection, ICT has had and will continue to have a substantial impact on the fate of our Māori communities, our traditions, our lifestyle, our language and its associated customs. The contributions made by each of the authors in this volume highlight the tremendous progress that has been made so far in ICT but they also remind us that there is still a long way to go before we can achieve linguistic, cultural, social and economic sustainability.

He tuku mihi **- Acknowledgements**

There are a number of people we would like to acknowledge. Firstly, to each of the ICT innovators, scholars, computer scientists, programmers, historians, geographers, translators, linguists, te reo Māori experts, teachers, tohunga, industry and technology leaders of this generation, we are extremely grateful that you allowed us to share your words, personal experiences and ICT journeys with the readers of this book.

To the theme editors, Hineitimoana Greensill, Hōri Manuirirangi, Naomi Simmonds and Michelle Horwood, we would like to acknowledge your time and effort in collecting, editing and reviewing each of the themes. We were so fortunate and thankful that you all agreed to take on this important role.

To Paul Diamond and Conal McCarthy, many thanks for the reviews, guidance and leadership you both provided for the GLAM section of this book.

We would particularly like to acknowledge and thank Lynda Green for her editing expertise, keen-eye and grasp of language. Thank you for the long hours and hard work you put in to make this publication happen.

To our work colleagues in Te Pua Wānanga ki te Ao, Faculty of Māori and Indigenous Studies and the Department of Computer Science, Faculty of Computing and Mathematical Sciences as well as our institute, Te Whare Wānanga o Waikato, thank you for your collective support.

We would also like to thank David Wheadon from Wheadon Creative for designing the cover image and Dr Melanie Cheung for capturing the beautiful photo.

Finally, we would like to acknowledge our friends and whānau who have supported us during this long journey. Thank you for everything you do for us.

Mā pango mā whero ka oti ai te mahi.

Hēmi Whaanga, Te Taka Keegan & Mark Apperley (Editors)

Theme 1.

Māori language resources and Māori initiatives for teaching and learning te reo Māori

Hineitimoana Greensill, Hōri Manuirirangi & Hēmi Whaanga

General introduction

As the most southerly member of the Polynesian languages, a sub-group of the widespread Austronesian language family (Harlow, 2007), te reo Māori has been the subject of substantial analysis, documentation, and analyses of its structure since first contact with Captain Cook in 1769 (Whaanga & Greensill, 2014). The history, trials and tribulations of te reo Māori in Aotearoa have been well documented (see, for example, Reedy, 2000; Spolsky, 2005; Waitangi Tribunal, 1986, 2011). The various reasons for the language's decline has been an area of ongoing debate and critique by academics, researchers, linguists, language activists, parliamentarians and Māori in recent times (see, for example, Bauer, 2008; Benton, 2015; Higgins, Rewi, & Olsen-Reeder, 2014; Rata, 2007; Winitana, 2011).

Like other Indigenous languages of the Pacific, te reo Māori was passed from one generation to another through a rich oral tradition and a large unwritten literature of waiata (songs), pūrākau (narratives) that contain philosophical thought, kupu whakarite (metaphor), poetry, whakataukī, whakatauākī and pepeha (proverbs), that described their epistemological constructs and cultural codes (McRae, 2017). Prior to the arrival of Pākehā/European, and for sometime after "Māori was the language of communication in the intimate and public domains of Māori life. It was also the major language of communication for economic, cultural and religious exchange between Māori and the first group of non-Māori" (Hohepa, 2015, p. 245).

The early period of the nineteenth century was a period of profound change for te reo Māori, when our oral tradition began to take on a written form (Whaanga & Greensill, 2014). During this period, the collection and documentation of oral tradition, lifestyle and customs of Māori were a preoccupation for many early European missionaries, colonial administrators, ethnographers, linguists, explorers and politicians including, George Grey (1853, 1857); William Colenso (1844, 1868, 1878, 1879, 1884); Percy Smith (1898, 1910; Smith, Whatahoro, Te Matorohanga, & Pohuhu, 1913, 1915); John White (1887-1890); William Williams (1844) and Elsdon Best (1922, 1923, 1924a & b, 1925, 1942). This period also saw the introduction of Western print literacy and the proliferation of niupepa Māori (Māori newspapers) with more than forty niupepa being produced by and for Māori on a range of social, political and religious issues (see, for example, Curnow, Hopa & McRae 2002, 2006; McRae, 2007).

However, with the signing of the Treaty of Waitangi in 1840 and the subsequent onslaught of Pākehā/European settlers in the later half of the nineteenth century, the Māori world, traditions, lifestyle, language, customs and the mechanisms and institutions for

transferring these oral traditions was unequivocally transformed (Orange, 2011; Reedy, 2000; Walker, 2004; Winitana, 2011). Conflict and war between the government and Māori over the transfer of Māori land to the settlers soon followed and lasted for nearly three decades from 1845 to 1872 (see, for example, Belich, 1986, 2001, 2007; Keenan, 2009; Ryan & Parham, 2002). As noted by Reedy (2000, p. 157):

> In 1840 when the Māori people signed the Treaty of Waitangi with the British Crown, Māori was the main ethnic group, with a population numbering between 200,000 and 250,000. But by the turn of the century, swamped by land-hungry British colonists and the outbreak of wars and diseases, the Māori population had fallen to a low of 42,000.

The new government soon passed a series of policies and acts to establish an Eurocentric education system in order to move Māori speakers "from Māori monolingualism, through bilingualism, to being English monolinguals" (Spolsky, 2005, p. 69). The act of concerted assimilation, language domination, linguistic assimilation and hegemony was underway. This process began with the introduction of the Education Ordinance Act 1847 by the then Governor Sir George Grey. This Act outlined the principles for education in Aotearoa in which "religious education, industrial training, and the instruction in the English language shall form a necessary part of the system in such schools" (Simon & Smith, 2001, p. 160). The Native Schools Act 1867 then established primary schools in Māori communities whereby instructing them to teach in English and, later in 1877 the Education Act created a "national system of secular and compulsory primary schools" (Walker, 2016, p. 24). As Simon and Smith (2001, pp. 160-161) note:

> While the state sought English language schooling for Māori to fulfil its assimilation agenda, Māori sought it at this stage in an effort to maintain their sovereignty and ensure they would not be disadvantaged by the growing dominance of Pākehā. There is no evidence that Māori wanted to cease using their own language. Rather it would appear that they wished to become bilingual. Thus, in wanting to learn English they were seeking to extend and broaden their communication base by adding another language to their repertoire. The state, however, through the assimilation policy sought to eliminate Māori language and replace it with English.

This position is aptly described in the stance of the Director of Education, T. B. Strong, who stated that "the natural abandonment of the native tongue involves no loss to the Maori" (1931, p.193). By the turn of the twentieth century the majority of Māori still spoke te reo Māori with a steady shift towards bilingualism. This situation rapidly changed in the 1930s and following the Second World War, which resulted in rapid technological growth, development and the mass exodus of Māori from their rural strongholds to larger

urban cities in response to an increased demand for industrial labour (Chrisp, 2005). This together with the racial amalgamation, assimilation and integration policies of subsequent governments, such as the 'pepper potting' of the Māori urban population to prevent residential concentrations (Walker, 2004), assisted in the rapid decline in the proficiency and use of te reo Māori as a medium of everyday communication. By the mid-1970s, the perilous situation of te reo Māori was confirmed by Richard Benton's research (1979, 1997), noting that:

> Approximately half the Maori population is under the age of 15 years, but in our sample, at least, only 15% of this age group were able to speak Maori. On the other hand, those aged 45 and over, only 12% of the total Maori population, accounted for 38% of all the Maori speakers (1979, pp. 23-24).

For the first time, statistical evidence on the critical state of the language had been collected revealing the serious nature of affairs. It may be argued that the government's policies of assimilation, language domination, linguistic assimilation and hegemony had run its course culminating in the degeneration and loss of Māori cultural norms, collectivism, language and knowledge systems (Walker, 2004).

Spurred on by the disastrous state of affairs and inspired by the worldwide civil rights movement in the 1960s, a series of Māori-led campaigns, petitions, claims and initiatives were embarked upon by Māori to bring the language back from the brink of death. These protests and petitions in the 70s and early 80s set the scene for unprecedented changes in the educational settings in Aotearoa (Te Rito, 2008). Led by Māori activist groups like Ngā Tamatoa, Te Reo Māori Society, and the Wellington Māori Language Commission (Harris, 2004), the initial protests were founded "on the failure of the government to honour the Treaty of Waitangi, which guaranteed the recognition of Māori rights and protection of taonga (treasures), including te reo Māori" (Whaanga & Greensill, 2014, p. 10). The Te Reo Māori Petition, containing more than 30,000 signatures, was presented to parliament on the 14th September 1972. This event later resulted in the establishment of Māori Language Day, Māori Language Week, and in the official recognition of te reo Māori by the New Zealand government through the enactment of the Māori Language Act of 1987.

In the educational sector, Māori communities "were so concerned with the loss of Māori language, knowledge and culture that they took matters into their own hands and set up their own learning institutions at pre-school, elementary school, secondary school and tertiary levels" (Smith, 2003, pp. 6-7). This began with the first bilingual school in Ruatoki in 1978, followed by Kōhanga Reo in 1982, Kura Kaupapa Māori in 1985 and the establishment of Te Wānanga o Raukawa in Ōtaki in 1981, the first of many Wānanga Māori (see Winitana, 2011).

While significant gains have been made over the past 50 years, te reo Māori remains at risk, with the percentage of te reo Māori speakers declining from 25% to 21% between

2011 and 2013 (Statistics New Zealand, 2013). With the recent establishment of Te Mātāwai, a lead organisation tasked with spearheading te reo Māori revitalisation on behalf of iwi and Māori under Te Ture mō te Reo Māori 2016 (The Māori Language Act 2016) (Te Puni Kōkiri, 2017), there is now provision for a more balanced responsibility for te reo Māori between the Crown, iwi and Māori, and reo stakeholders. Consisting of 13 members (seven appointed by iwi; four appointed by reo tukutuku (Māori language stakeholder) organisations; and two appointed by the Minister for Māori Development), Te Mātāwai will play a significant leadership role in "promoting the health and well-being of the Māori language for iwi and Māori, . . .[and] support, inform, and influence the Crown's initiatives in protecting, promoting, and revitalising the Māori language" (Te Puni Kōkiri, 2017).

This short introduction of the history of te reo Māori has highlighted the winds of change which have blown over Aotearoa since the arrival of Pākehā/European settlers. Sadly, the decline of Indigenous languages throughout the world follows a similar path, driven by globalisation and a massive demographic shift towards linguistic and cultural homogeneity (Whaley, 2003). For the contributors to this section, the extinction of te reo Māori is not an option. Each author is committed to the ongoing vitality of te reo Māori and its longevity for future generations. Enter new technology! With the advances made in ICT and digital technology over the past two decades, further opportunities now exist in this burgeoning sphere for Indigenous language revitalisation and regeneration. In Aotearoa, a variety of online tools and other electronic resources have been harnessed to provide new domains for the use of te reo Māori and, with those domains, new possibilities for teachers and learners of the language. In the chapters that follow, the different authors describe a range of initiatives and resources which they have designed or implemented to enhance the availability and breadth of Māori language resources that can be ultimately used in the teaching and learning of te reo Māori through digital technology.

The first paper (*Māori Language Interfaces*) by Te Taka Keegan discusses the relevance, usability and significance of language interfaces alongside the roles and ramifications for te reo Māori. Here he poses a thought-provoking but rather important question that many of us who have worked in ICT have often asked ourselves: 'Why would we want to create software that has an interface in te reo Māori?'

The second paper (*A Translation of Moodle into Te Reo Māori*) by Hōri Manuirirangi is an assessment of the processes involved in the translation of the Learning Management System 'Moodle'. This paper provides valuable insight into the process implemented by university staff of Te Ratonga Whakamāori (Māori Translation Service) and the university's WCEL team (Waikato Centre of E-Learning). This research also gives a detailed account, from the perspective of the translators, supplemented with anecdotal student feedback and concluding with a review of results collected from automated Moodle analytical results.

The third paper follows on from the work of Manuirirangi and a small team of dedicated te reo Māori teachers and translators that have spent the past decade providing language resources to this generation of te reo speakers and learners. In his paper (*Machine*

Translation for te reo Māori), Keegan discusses the relevance and usefulness of machine translations systems for te reo Māori. Although there remains some work to be done to enable these systems to produce accurate translations, the overall outlook looks promising with more and more digitised language data being made available all the time.

There follows a number of pieces from our colleagues at Te Ipukarea - The National Māori Language Institute and the International Centre for Language Revitalisation. The first by Tania M. Kaʻai (*Te Whare Matihiko o Te Reo - digital tools for the revitalisation of te reo Māori*), describes Te Whare Matihiko o te Reo, a Ngā Pae o te Māramatanga funded research project comprising four interrelated digital projects. The first project, Tomokanga Rauemi Reo Māori, details the development of an online digital te reo Māori language portal/advanced search engine that will act as a National Māori Language Data Base Portal for te reo Māori resources such as publications, iwi radio, television programmes, community initiatives, websites and social media. The second project, Tāmata Toiere, describes how digital technology can be used to preserve language and cultural knowledge; in this case a collection of waiata and haka that have not been previously published. The third project is a Māori thesaurus called He Punakupu Taurite. Its function is to provide a comprehensive list of synonyms for the Māori words in the Te Aka Māori-English, English-Māori Dictionary. The final project, He Pātaka Kupu, outlines the digitisation and development of an app for He Pātaka Kupu – Te kai a te rangatira monolingual Māori language dictionary. Kaʻai's paper provides the reader with valuable insight into Te Ipukarea's multi-pronged project that uses digital technology to support the ongoing preservation and revitalisation of te reo Maori in order to advance our knowledge and expertise in te reo Māori.

The second paper by John C. Moorfield (*Te Whanake and Te Aka digital resources*), describes the development of the Te Whanake and Te Aka digital resources. It discusses the advantages of these types of resources, which resulted in the development of the Te Whanake Animations, Te Whanake Podcasts, Te Whanake TV and Tōku Reo websites. He also outlines the nature and development of the Te Aka Māori-English, English-Māori Dictionary online. He concludes by noting that these types of digital initiatives involve some significant costs to develop, and also require regular updates and maintenance, which incur further expenses.

The third paper by Dean Mahuta (*Building virtual language communities through social media – because we don't live the village life anymore*), explores the role of social media in creating, developing, and sustaining virtual language communities. He presents a compelling discussion of the importance of engaging and inhabiting these new digital spaces to increase the number of domains in which te reo Māori is the language of choice. He posits that these types of virtual spaces create connectivity across an ever expanding virtual village.

The next paper by Wahineata Smith (*Te Whanake animations: Development and implementation*), details her involvement and recollections as an original team member in the development and implementation of the Te Whanake animations. In this paper she

outlines the development of the Te Whanake Animations, the research team, characters, modules, movies, exercises and songs, which form the basis of these language resources.

The final paper in this section is by Karaitiana Taiuru (20 years of reflections using technology to compile Māori Language Dictionaries). In this paper he reflects on his involvement in the development and creation of te reo Māori word lists/dictionaries, and te reo Māori software, over the past 20 years. He provides insights on the variety of issues associated with this endevour concluding that the impact of commercialisation, the numerous gatekeepers of mātauranga Māori and te reo Māori as well as a general fear of technology has seen te reo Māori development slow in the digital area.

Conclusion

Although the new millennium brings with it new challenges and growing concerns regarding the survival of te reo Māori, it is hoped that the hard work undertaken by the many Māori and non-Māori in ICT, including the significant contributions made by each of the authors in the following chapters, will provide the impetus and foundational material for inspiration and stimulus for future generations. As highlighted by Keegan and Cunliffe (2014, pp. 386-387):

> The younger generation today are growing up in a time of rapid technological change. While their parents may consider mobile phones, the internet, computers or even television as new technologies, as far as the younger generation is concerned, they have always existed. . . . These technologies are commonplace and ownership of and access to them is taken for granted by many young people . . . . Given young people's importance in language survival and the way in which their technology landscape has recently evolved, some serious questions need to be asked about how technology influences their attitudes towards and use of te reo Māori.

As pen, paper and literacy transformed the lives of our ancestors, so too will ICT for this and future generations.

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Māori language interfaces

Te Taka Keegan

Introduction

The decisions around the language of a software interface lie with the software engineer and their development team. The decisions are, or should be, based primarily on the likely target audience and how they will most easily be able to use the interface. That is to say, language decisions should be based on the usability of the interface. If this was applied for all cases it is unlikely that we would see interfaces in te reo Māori

From a computational perspective the language of an interface does not need to be in English, it can just as easily be programmed to display in Spanish, in French, in Māori or any other of the 1000 languages that are covered by the Unicode scripts. Ultimately the computer itself does not think, or compute, in a spoken language; all of its operations are undertaken in machine code based on the binary number system, which is then compiled onto various layers of assembly and high level programming languages which ultimately display human language messages in text boxes. What is displayed in those text boxes is quite arbitrary to running the computer, but it is everything to the usability of the interface, and subsequently, the usefulness of the software.

This paper considers the usability of the interface and the ramifications for te reo Māori if the interface language, the messages displayed in those text boxes, is written in te reo Māori.

An initial question that may arise is 'Why would we want to create software that has an interface in te reo Māori?' Studies have shown (see examples in this paper) that interfaces are more difficult to use in te reo Māori. The simple answer to this is Māori language survival. If opportunities are not created where Māori language can be used in modern technologies, then the language itself is dead in the water. For the Māori language to survive and be relevant it must be available in all avenues of life and in all avenues of communication. Modern technologies are increasingly important to our regular communications, but they are even more relevant to the young people who are the guardians of our languages in the future. For Māori language to survive, younger generations must perceive it as a language they want to use and it must be available in all avenues of their communications.

Historic Māori language interfaces

Computer interfaces in te reo Māori first appeared more than 30 years ago. The Kōhanga Reo National Trust, in 1986, developed its own in-house Māori language training system on computers that operated in Māori, English or a bilingual mode. 12 complete systems were built and distributed throughout the country (Laws, 2001). In 1987 a company called Reddfish produced a software suite that ran on MS-DOS, called Te Kete Pūmanawa, whose interface was totally in te reo Māori. The software included a clock (Te Karaka), an interactive story (Te Mahi Hangarau Ahi), an arithmetic challenge (Te Tatau), a take on

the game of Hangman (Kei Oha te Taniwha) and a traditional game (Mū Tōrere). The New Zealand Council for Educational Research (NZCER) set up a bulletin board in 1990 where all the menu items, system prompts and messages were in te reo Māori (Benton, 1996).

While the examples listed above were early endeavours into Māori language interfaces, little has been written on their actual usage, and in particular their usage in te reo Māori. Following are three examples of Māori language interfaces that have had some form of usability analysis undertaken on them.

Microsoft software in te reo Māori

Microsoft NZ has an extensive history of supporting initiatives for te reo Māori. In the early 2000s it commissioned the translation of Microsoft Windows and Office into te reo Māori, a substantial undertaking involving over 900,000 words in over 180,000 strings. The first release, Windows XP and Microsoft Office 2003 became available in 2005, and subsequent versions of Windows (Vista, 7, and 8) and Office (2008, 2010 and 2013) have also been released with te reo Māori interface options. *Figure 1* is an example of what this looks like to the user.

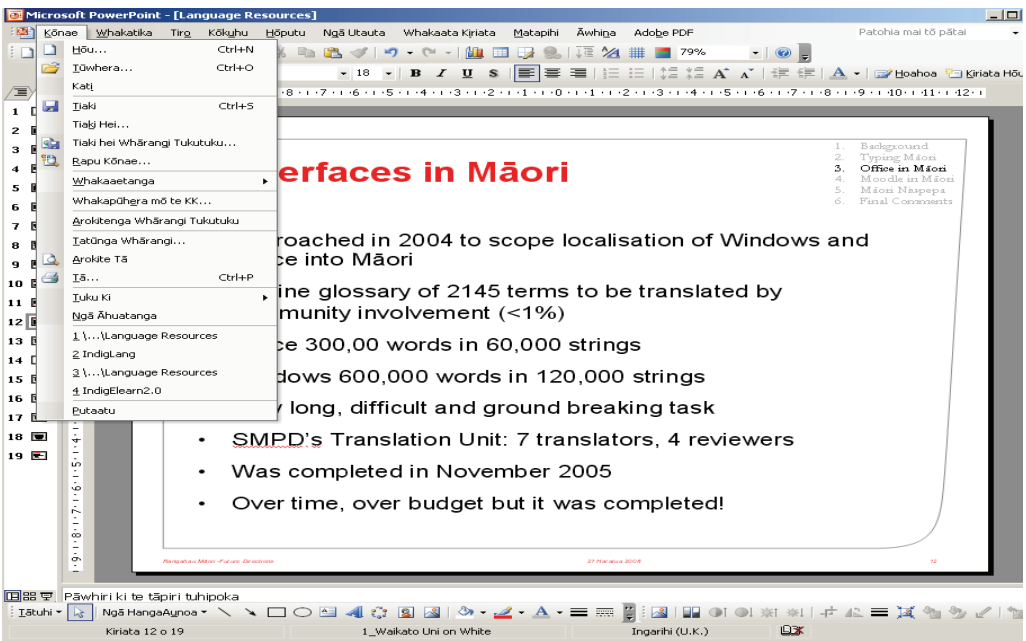

Figure 1: *Microsoft Office in te reo Māori*

In 2012 a usability survey was undertaken (Mato, Keegan, Cunliffe, & Dalley, 2012) with Māori medium schools of New Zealand, likely users of the Microsoft interfaces in te reo Māori. Principals of these schools were contacted and asked a number of questions regarding their and their school's use of products in te reo Māori and in particular the Microsoft products. The survey showed that less than one quarter of Māori medium schools were using these products, citing an inability to access the interface, a lack of awareness that

the interface existed and an unfamiliarity with the new terms in the interfaces as the biggest barriers to usage. However almost all the schools agreed the software should be available to their children in te reo Māori with some highlighting that 'it should be user friendly'.

Two Degrees smart phones in te reo Māori

Two Degrees has launched two versions of their Huawei smart phones in te reo Māori. In 2011 it launched a Huawei IDEOS X3 with an interface that could be switched between English and te reo Māori (see *Figure 2* for a screenshot of this phone) and then in 2017 it launched a Huawei P10 and P10+ with a similar bilingual-interface.

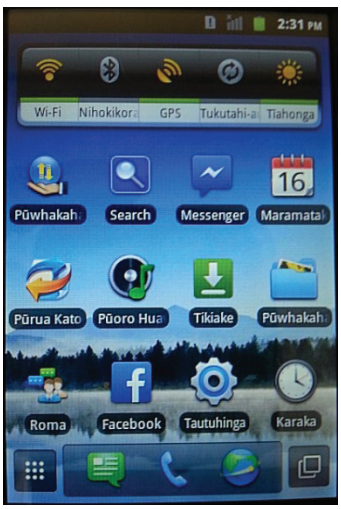

Figure 2: *Huawei IDEOS X3 Māori interface*

A usability study was undertaken on the IDEOS X3 phone with 12 participants that were either fluent or semi-fluent in te reo Māori (Mato, Keegan & Naera, 2016). None of the participants realised the phone existed and all were excited to use it. All the participants had difficulty with the new or unfamiliar words, all suggesting the English interface was quicker because they were more accustomed to using a smart phone in English. However, three quarters (9/12) stated they would prefer to use the interface in Māori, primarily to support and grow their language; "It was cool that somebody out there is trying to promote our language through technology".

3M library kiosks in te reo Māori

3M New Zealand (3M) manage a collection of library SelfCheckTM machines that are available in approximately 70 locations in New Zealand. Since 2003, 3M have been using an interface that includes an option for te reo Māori. While the interface does appear rudimentary, see *Figure 3*, it is nevertheless an endeavour by 3M to support te reo Māori.

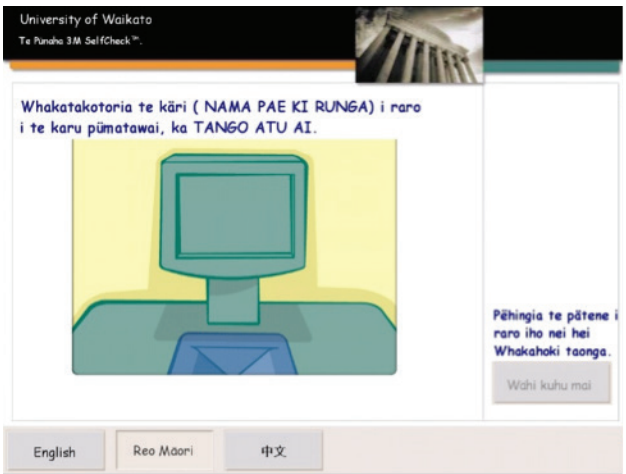

Figure 3: *3M Māori language Library kiosk interface*

A brief usability study was undertaken in 2013 where six Māori students were asked to use the 3M library kiosks to self-issue some books using both the English and te reo Māori interfaces (Mato, 2013). The students found the interface difficult to understand (in te reo Māori) primarily because of the new words. However, they did state that it would become easier to understand if they were to use it more often and that it did give them a sense of pride to see the Māori language as an option on the interface. While most of the group (4/6) felt it was more difficult to use in Māori, all of them (6/6) said they would prefer to use it in te reo Māori.

Other interfaces in te reo Māori

Aside from the three products mentioned above there are a number of other companies who have made their technology available with a Māori language interface. Google has translated their web search page into Māori, made available their translator toolkit for te reo Māori and have a Māori language option at Google Translate. The ATM terminals at BNZ banks have had a Māori language option since 2007, something that has also been adopted by Westpac in 2016 and ANZ in 2017. Westpac went one step further in 2017, developing an option for the Waikato dialect (Keegan & Mato, 2014; Mato & Keegan, 2013).

There are a significant number of smart phone apps, 30+ from Google Play and 25+ from Apple, that have some form of Māori language interface. There are also a significant number of websites that are now providing Māori language interface options. Far Cry 3 and Māori Pā Wars have examples of Māori language usage in the gaming industry.

Comment

Clearly the Māori language is beginning to get a foothold in language interfaces options used with technology in New Zealand. More research is needed to understand how useful

and how effective these interfaces are in te reo Māori. But the limited studies undertaken to date have highlighted some important points:

1. Interfaces in te reo Māori are more difficult to use. Even for those with a high fluency in te reo Māori or/and experience with using the technology.
2. Speakers of te reo Māori are (pleasantly) surprised to see interfaces in te reo Māori.
3. Users state they will use these interfaces in te reo Māori.

It is this third point that warrants further discussion. Without usage, even if at this stage it is 'stated' usage, there is no point in developing these interfaces. From a business perspective there is no economic benefit for creating a Māori language interface. There are not the numbers of users to justify the cost of development. To quote a business terminology; 'there is a negative return on investment' when creating Māori language interfaces. A further argument against the case is the fact that all speakers of te reo Māori are, at least, bilingual. They can all also speak English, so why is a Māori language interface necessary?

The usability studies above highlight that Māori language interfaces are harder for Māori language users to use. There is confusion and difficulty with the new words and if something is needed to be done quickly, it is easier in English. But users have expressed their excitement, their pride and their sense of identity to see Māori language interfaces and subsequently have indicated they would use the Māori language versions. Perhaps the biggest obstacle is getting the interfaces translated into Māori in the first place. Once a Māori language version is offered, strategies could be deployed to actively encourage its usage. Strategies such as Nudge Theory and Active Offer (Keegan & Evas 2012), and setting the default language to Māori (Keegan & Cunningham, 2008) are all approaches that could, and should, be used to encourage usage of Māori language interfaces.

However, one thing remains abundantly clear, if te reo Māori language interfaces are not created, and are not used, the chances of te reo Māori future survival as a language of everyday usage are diminished.

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A translation of Moodle into te reo Māori

Hōri Manuirirangi

Abstract

This paper is an assessment of the te reo Māori translation of the Learning Management System 'Moodle' which "is the primary online learning environment [used] at the University of Waikato" (WCEL, 2017), since 2008. Moodle stands for Modular Object-Oriented Dynamic Learning Environment (Pavri, 2004). It has an open code-base that allows users the ability to modify the software to suit their own needs. This particular feature is especially appealing for Māori and Pasifika peoples as it enables the development of the LMS to suit the user's unique cultural needs (Clayton, 2005, Costello, 2014). For the last 10 years, teaching staff and students of the University of Waikato have used Moodle consistently as an online teaching and learning platform to augment most of the university's papers and courses. This paper discusses the rationale for the translation of the LMS and gives insight into the process implemented by university staff of Te Ratonga Whakamāori (Māori Translation Service) and the university's WCEL team (Waikato Centre of E-Learning). This research also gives a detailed account from the perspective of the translators, supplemented with anecdotal student feedback and concluding with a review of results collected from automated Moodle analytical results.

Rationale and student feedback

Since the introduction of Moodle in 2008 the LMS has undergone regular maintenance and scheduled updates by the university's WCEL team, one of which was the Māori language localisation of Moodle for its resident Waikato users. This project was carried out as a small-scale translation pilot prior to 2009. In mid-2010 plans to translate Moodle completely into te reo Māori between staff of the Ratonga Whakamāori and the WCEL team began. After lengthy discussions and planning, translation work commenced in October 2010.

From the perspective of the teaching staff and students, the rationale for translating Moodle into te reo Māori was simple - create an online virtual learning environment for students that reinforces and encourages them to use te reo Māori. At introductory Level 100, te reo Māori papers are displayed bilingually in Moodle (See *Figure 1*). In doing so, second-language learners are introduced to new terms and concepts outside of the classroom to further enhance their language acquisition of te reo Māori.

Figure 1: *Typical Level 100 Reo Māori Moodle paper, displayed bilingually.*

By intermediate level 200, *ka rumakina te tauira ki roto i te reo,* the student is immersed in the language. This happens progressively throughout their learning. By this stage, their reo competency has grown to a level where they are able to understand more challenging formulaic expressions in the target language (te reo Māori). Moodle, which they were accustomed to seeing displayed bilingually, is then converted into te reo Māori (See *Figure 2*).

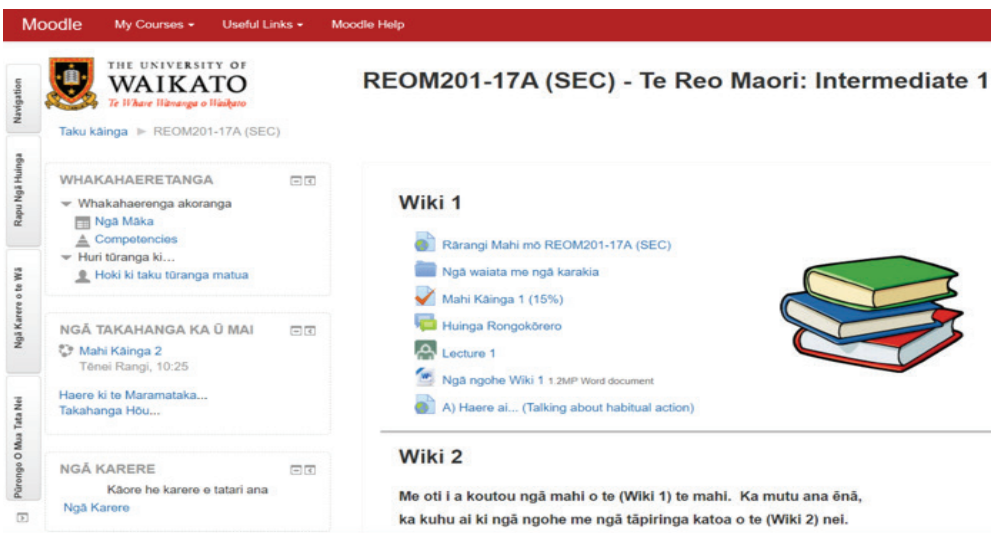

Figure 2: *Typical Level 200 Reo Māori Moodle paper, displayed in te reo Māori.*

Immersing users in the target language within Moodle, at this level, supported and complemented the students' language acquisition inside the classroom. This progression of language immersion is a way in which filtering Māori through English is avoided, as some believe it actually "hindered the acquisition of language" (Aikman-Dodd & Rātima, 2014, p. 8). When questioned about their experiences using Moodle, including the online activities, quizzes and language resources, the majority of feedback received from students was positive, and mostly given in te reo Māori.

> *"He hangarau tino āwhina mō te whakaraupapa i ngā mahi!"*
> The technology is very useful for organising/sequencing work!
> (Te Tohu Paetahi student feedback, 2015)

> *"Tino pai mo te ako whakataukī, reo ōkawa, kupu whakarite me ngaa kemu whakahahaki…"*
> It's very good for learning proverbs, formal language, metaphors and revision games…
> (Te Tohu Paetahi student feedback, 2015)

Transitioning from English to Māori in Moodle occurs seamlessly at level 200. Students were able to understand Moodle translations of functions, user interface content and commands because they were already familiar with some of these displayed in English in the bilingual version of Moodle at level 100. Even with certain translations they were initially unsure of, they soon grasped the meaning through context and use. The LMS soon became a reliable online learning platform whereby students were able to access information, teaching resources and engage with specific te reo Māori focussed activities relevant to their studies. From the perspective of the teacher, being informed by student feedback has actually prompted changes to teaching delivery.

> *"Me kaha ake te tuari rauemi whakaako mā Moodle i mua i ngā rangi aromatawai!"*
> Teaching resources should be shared via Moodle prior to assessment days!
> (Te Tohu Paetahi student feedback, 2015).

To address this matter, myself and other members of the Te Tohu Paetahi teaching staff who consistently used Moodle, made a conscious effort to ensure all relevant teaching resources were uploaded prior to assessment days.

Translation process

Following discussions with IT staff of the university's WCEL team, English text strings within the Moodle code were extracted and converted into 130 Excel spreadsheet documents. Due to the scale of the job and the timeframe for its completion, staff decided to isolate only the essential text strings that required translation into te reo Māori. Text

strings deemed essential were those that both the student and the teacher would view whilst using Moodle. As a result only 21 of the total 130 Excel files were isolated, and contained within these approximately 300 text strings with a word count of almost 30,000.

The translation of Moodle came about due to the collaborative efforts of the Te Ratonga Whakamāori staff, the WCEL team and support provided by Dr Te Taka Keegan. An experienced staff member in the Department of Computer Science, Dr Keegan was able to impart his knowledge and expertise in this area. For those of us translating the Moodle strings this proved invaluable, as he had recently returned from 6 months academic leave in America, where he had worked for Google as a visiting academic assisting with the development of the Google Translator Toolkit for te reo Māori. With his guidance, the Te Ratonga Whakamāori translators uploaded the files containing 300 strings of English source text to the Google translator toolkit. The Google Translator Toolkit itself is a free web application designed to allow translators the ability to save and edit translations under their own personal Gmail account. There were numerous advantages for using the Google Translator Toolkit, and one of the most beneficial for our Moodle translation team, was the ability to share documents between translators. This not only enabled our team to work more efficiently at translating the English source text into te reo Māori, but it also negated duplication of work as we were able to access the shared source text documents and co-edit simultaneously in real-time. Working collectively on shared Google documents via the Translator Toolkit meant that, providing we had an internet connection, we could access the translations from anywhere at any time. This proved particularly useful when carrying out verification work that required regular access to check and peer review the work of other colleagues. The freedom to work independently in this way, whilst collectively translating shared documents, really eased our combined workloads. This in turn made the job of translating 30,000 words more manageable.

As lead translator for the project, the task of translating and verifying the required Moodle strings into te reo Māori was left to myself and Awatea Patterson. Awatea, at the time, had just completed the postgraduate Tītohu diploma of translating and interpreting, and had proven herself a very skilled translator having contributed to the 2010 Microsoft Local Language Program contract. Over a 6 month period, we worked steadily to translate numerous English commands and user interface terms. At times, a large portion of the English source text seemed very similar and interchangeable with other various text strings we were translating. Maintaining quality assurance of our work meant not only ensuring that the translations were appropriate for display in the LMS, but that they were also distinct enough from other Moodle translations that the user could discern between different meanings. A simple example of this is the Māori translation for the command: 'choose', which is interchangeable at times with 'select' and 'pick'. Using the term *whiriwhiri(a)* for choose actually required us to become economical elsewhere with other vocab. This meant reserving *tīpako(hia)* for select and *kōwhiri(a)* for pick, as each needed to be unique to avoid reduplication and confusion.

Carrying out all the translation work through the Google Translator Toolkit

ensured consistency with the use of specific vocabulary, as the web application would automatically retrieve suggestions from its glossaries as we worked. The more we worked on translating and adding entries, the more the glossaries and translation memories grew, and so too did the application's ability to translate source text into the target language (Māori). If unable to fully translate, it would often give partial translations or highlight specific vocabulary it recognised and make suggestions for us to consider. Working alongside Awatea gave me helpful insight into the perspective of the student. As a teacher, sometimes my translations, although grammatically correct, did not always convey the intended meaning as effectively as Awatea's translations. When verifying each other's work daily, I would get the opportunity to read her te reo Māori translations, which prompted me at times to reconsider my own. It was helpful to take a step back, to view her work and really consider why she chose to translate the English source text the way she did. She was able to see the translations through the eyes of both the student and translator. Occasionally, having viewed her translations I would change my own to suit. An example of this was the word 'flag' that I had translated as 'haki', which can also be perceived to mean 'cheque' that in certain contexts has monetary connotations associated with it. Awatea chose to translate 'flag' with 'kara'. This word also worked particularly well when joined with the verb 'wete' as a compound to convey the antonym 'un-flag' = 'wete-kara'.

Click to un-flag this question = *Pāwhiritia kia wete-kara i tēnei pātai*

The most obvious translations were not always the best suited for the context. Peer reviewing our work in this manner provided an alternative vantage point with which to consider how others may perceive the translations. This served as a form of quality assurance for the project.

Moodle results

REOM201-17A was the first te reo Māori paper completely taught and assessed online via the LMS Moodle. Tracking student engagement within Moodle merely involved checking the enrolled users' details to see when they had last gained access. In this paper, specific te reo Māori focused assessments were prescribed through mahi kāinga (homework), kōrero-ā-waha (oral presentations) and whakamātautau (tests). Each activity generated access times and details of the duration a student spent engaged with each activity, and this was able to be tracked through users attempts. Although every individual learner inevitably possesses different strengths and weaknesses, what was obvious from the results of the assessment which followed, was a definite pattern that emerged correlating with grades awarded, the duration a student spent on the assessment and the times they logged in for their attempt (See *Figure 3*). Highlighted in the graph below are the results of the Mahi Kāinga 1 assessment completed by 23 of the 27 enrolled REOM201-17A cohort. The 2 red students that received 5 - 7.25 marks failed, and did not achieve a pass grade. Both logged in to attempt this assessment during the final 2 hours. The 17 orange students that scored in

the middle range, between 9 - 14 marks, logged in for their attempts 24 hours prior to the assessment closing. The 4 green students that achieved the highest marks spent the most time fulfilling the required tasks for this assessment, and had logged in for their attempts 48 hours in advance.

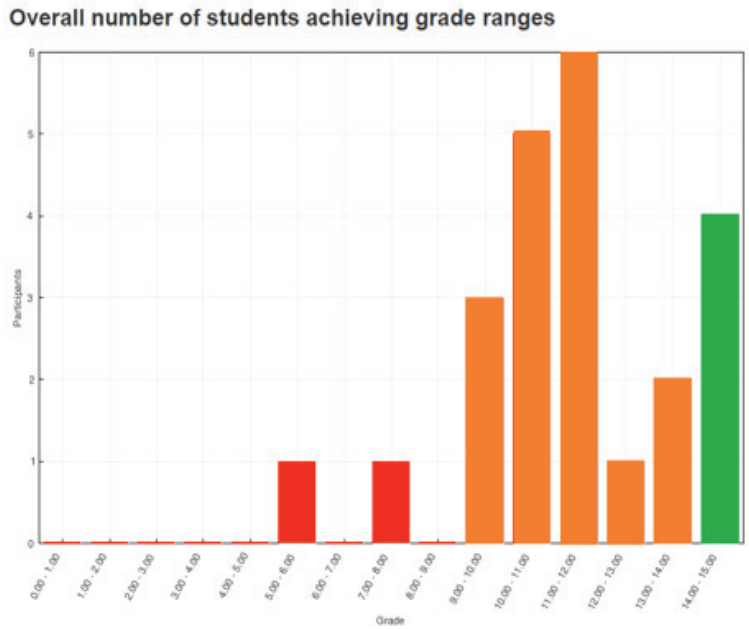

Figure 3: *REOM201-17A Mahi Kāinga 1 results*

Conclusion

How has the translation of Moodle been beneficial to the teaching of te reo Māori at Waikato University? By Level 200, students are encouraged to communicate in te reo Māori despite their varying abilities and degree of reo competency. The immersion approach is a well-known philosophy embedded within our teaching practice, and with the translation of Moodle, teaching staff can provide students with yet another domain in their lives where they are compelled to use their reo. This stands to enhance the students' learning outside of the classroom, giving them a virtual learning environment that further reinforces their language acquisition. "…[V]irtual worlds add much more than visual and auditory media, they provide instructors and students greater choices for collaboration, learner autonomy, creativity, and experimentation…" (Henderson, Huang, Grant, & Henderson, 2009, pp. 465-466).

Outside of the classroom, the translation of Moodle provides for a blended style of teaching that gives students the autonomy to learn te reo Māori at their convenience. They gain the flexibility to learn independently and set their own pace conducive to their personal needs. With Moodle software being continually developed, there are ongoing opportunities to further customise and enhance the student's virtual learning environment with translations.

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Machine translation for te reo Māori

Te Taka Keegan

Introduction

What is Machine Translation? Machine Translation (MT) is a process where computer software is used to translate texts from one natural (or spoken) language to another. Early research centred on two distinct approaches: Rules Based Machine Translation (RBMT) and Statistical Machine Translation (SMT). In simple terms RBMT makes use of large sets of linguistic rules that define languages whereas SMT uses statistical techniques to build language models from large language corpora. Increases in computing power and the amount of language corpora available has meant that SMT had become the preferred option with recent advances in neural networks also being applied to improve the accuracy of SMT. For commercial reasons, this is an area of research that has generated a lot of interest and funding support from some major international computer companies, including Google[1], Microsoft[2] and Facebook[3].

Why is Machine Translation important for te reo Māori? A te reo Māori purist may argue that it is not important to focus activities on having a machine undertake translations for te reo Māori; if people want to understand te reo Māori then they should put in the effort to learn the language. This line of reasoning is difficult to argue with. But, from a Māori language activist perspective the value of MT is not so much in the translation of te reo Māori to (say) English, but rather the translation of English to te reo Māori. If this translation can be done efficiently, with low costs, it will assist in the proliferation of te reo Māori into new contexts, new environments and will assist its normalisation in New Zealand's society.

At this time, two of the major international companies, Google and Microsoft, have invested significantly in MT for te reo Māori. This paper summarises their endeavours and reports on the quality of translations they have been able to generate.

Google's support for te reo Māori

Google's support for te reo Māori began in 2001 when it enabled the Māori language as one of the languages in its *Google in Your Language* programme. This programme was an avenue for local language communities to translate interface strings so that the Google Web Search home page could appear in a local language. As translations were undertaken part time, it took 7 years before the Google home page appeared in te reo Māori.

A year later, in 2009, the Māori language was enabled on the Google Translator Toolkit (GTT). The GTT is a Translation Memory tool to assist translators undertake translation work by placing at their fingertips dictionaries, word lists and previous translations. Testing was undertaken on this tool that suggested it could increase the productivity, quality and consistency of Māori language translations. If 70% of Māori translators used this tool ,a further 20 million words could be translated per annum

(Keegan & Evas, 2011). However, significant uptake of this tool by reo Māori translators is yet to be realised.

One of the issues with typing te reo Māori is the ability to type the macron character over a vowel to indicate that the lengthening of that vowel, which is important to indicate word meaning and pronunciation. In 2010 Google released a keyboard to allow the typing of the macron on its web search home page.

In 2017, Google worked with Vodafone to create a feature that allows for the entry of correct pronunciation of Māori place names[4].

While the above tools and features are important for the use of te reo Māori with Google tools, perhaps the most significant facility released by Google for te reo Māori was Google Translate. Google Translate became available in te reo Māori in December 2013. However, it is important to be aware that the significance and usefulness of Google Translate for te reo Māori clearly lies with the accuracy of translations that it can produce. A brief investigation on the usefulness of Google Translate in te reo Māori was undertaken and is described next.

Google Translate in te reo Māori investigation

In the New Zealand summer of 2013-2014, a Master's student at Waikato University, Whitiaua Ropitini, undertook a brief investigation into the support for the Māori language inclusion in Google Translate (Ropitini, 2014). Six Māori language participants were identified with mixed backgrounds: four had a high knowledge of te reo Māori, four had experience with Māori language translation, and four had experience using computers. The participants were introduced to Google Translate (see *Figure 1*) and asked for qualitative, somewhat anecdotal, feedback.

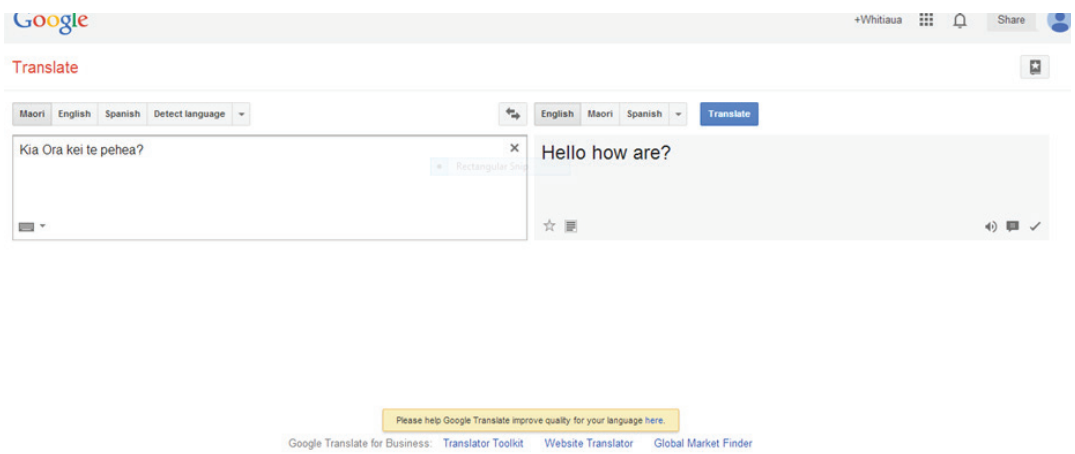

Figure 1: *Google Translate*

When asked how they felt about the inclusion of te reo Māori in Google Translate five of six were supportive, suggesting the mana o te reo Māori was uplifted by being available through this tool. When asked about the quality of translations all of the participants commented

that while the tool was able to translate (to/from Māori) there were errors. The participants questioned how these errors could be corrected. When asked if Google Translate could assist in the long term survival of te reo Māori, all six participants were positive in the benefits that this tool could provide with most participants suggesting improvements and corrections would be necessary, and suggesting these corrections should be driven by Māori language supporters.

Microsoft's support for te reo Māori

Microsoft's support for te reo Māori began in 1998 when it acknowledged an operating system keyboard was needed to produce the macron character. This was subsequently created and made available in 2003. It has been available in all subsequent versions of the Microsoft Windows operating systems.

Microsoft's next major milestone was the translation of Windows XP and Office 2003 into te reo Māori. This was, perhaps, the most ambitious Māori language IT project ever completed, involving the translation of over 900,000 words in 180,000 separate strings. Subsequent version of Windows and Office have also been translated into te reo Māori. The translation was significant because it now allows a computer (running Microsoft Windows) to be used totally in te reo Māori. One would expect that a key user of this software would be Māori medium education, however studies have shown that, for a number of reasons, the uptake in this sector has not been as high as expected (see Keegan & Mato, 2011; and Mato, Keegan, Cunliffe, & Dalley, 2012).

Microsoft has also supported the translation of Minecraft coding sessions into te reo Māori for the Hour of Code as part of 2016 Computer Science Education Week.

Pokapū Whitireo Charitable Trust

In 2013, Microsoft began discussions with some Māori language supporters to set up a trust whose functions include the gathering of a body of translated works that can be used for language research and revitalisation. This led to the registration of the Pokapū Whitireo Charitable Trust in 2015 that has three trustees and lists Professor Pare Keiha as the contact. While Microsoft do not have a member on the Trust, they provided legal support to set up the trust. It is envisaged that all resources collected by the Trust are available to all who are undertaking research on te reo Māori, including Microsoft and the Microsoft Translator Hub.

Microsoft Translator Hub

The Microsoft Translator Hub (MTH) is an extension of the Microsoft Translator service. It is an online service that provides the facility for language communities to create their own machine translation tool. This facility was made available by Microsoft to the Māori language community in 2013. Perhaps due to a limited capacity in the Māori language community the service was never activated until 2017, when a Waikato University undergraduate computer science student, Jasmin Cairns, created a translation system and

compared it with the Google Translation System.

Microsoft Translator Hub comparison study

The study undertaken by Jasmin Cairns (2017) had two components. First she built a translation system using MTH, then she compared the quality of Māori language translations produced by the MTH to those produced by Google Translate.

To build the MTH system, Cairns sourced data in the form of translated sentence pairs: English to Māori or Māori to English. She sourced this data from the Pokapū Whitireo Charitable Trust, from corpora that were gifted by the Faculty of Māori and Indigenous Development of Auckland University of Technology, and from corpora that were gifted by the Computer Science Department of Waikato University. In all she collected approximately 134,000 translated pairs. The data was uploaded to the MTH, and after a training process, the online system was created. It was made available for testing (see *Figure 2*), but was never deployed publically.

Maori	English
Mauria he hāmarara, kai te tīmata te kōua.	**Ref:** Take an umbrella, it's starting to spit. **MT:** Take an umbrella and start the kōua.
Ki te iwi o Ngāti Porou, he maunga rangatira a Hikurangi.	**Ref:** To the people of Ngāti Porou, Hikurangi is a grand mountain. **MT:** To the people of Ngāti Porou, a captain of the Sky.
Na nga pakeke i whakarato nga paraihe o te kura.	**Ref:** The elders gave out the school prizes. **MT:** The age of the prize of the school.
I tonoa mai māku e torō te nama wīni.	**Ref:** I was asked to draw the winning number. **MT:** Sent me draw a win.
E ngākau kore ana ahau ki te whai atu i tēnā ara.	**Ref:** I am disinclined to follow that course of action. **MT:** I have no heart to follow that path.

Figure 2: *Sample output from Microsoft Translator Hub (Māori to English)*

Cairns used two methods to undertake comparison translation quality. She used a machine translation evaluation software called Asiya which compared the translations over 9 metrics including BLEU, GTM, IO, WER and PER. She also had the 1,000 outputs manually checked by two human verifiers proficient in te reo Māori. The combined results showed that there were no significant differences in the output of the two systems, Microsoft Translation Hub and Google Translate.

The usefulness of machine translation for te reo Māori

For modern translations systems to translate with accuracy they require large amounts of language corpora, and in particular digitised translated pairs of data. The MT systems built by Google and Microsoft produce accurate translations for the largest languages of the world because there are large datasets available that these systems utilise to refine translation accuracy.

The amount of Māori language digitised data available for MT is not sufficient enough at this time for the MT systems to produce accurate translations. Consequently the publically available Google Translate in Māori MT system and the, yet to be deployed

publically, Microsoft Translator Hub system for te reo Māori should be used with that in mind. These Māori MT systems can perform translations in te reo Māori, but these translations need to be verified before being used with authority. This is something that Hamilton mayoral candidate James Cameron discovered, when in 2016 he used Google Translate to translate his personal profile into Māori and the resulting output was posted to every home in Hamilton (Smallman, 2016).

But the outlook is bright. More digitised Māori language data is being made available all the time. A recent web crawl for Māori language data found over 2,200 web pages with Māori language texts on them[5], an amount that would be inconceivable just a few years ago. This, coupled with the knowledge that neural networks in Machine Translation is constantly improving the quality of translations, and suggests there is a future for MT in te reo Māori. The question is not 'Will this happen?', but rather 'When will this happen and how can Māori language activists be aware of this so that it can have a positive impact on the normalisation of te reo Māori?'

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Te Whare Matihiko o Te Reo - digital tools for the revitalisation of te reo Māori

Tania M. Kaʻai

Abstract

Te Ipukarea - The National Māori Language Institute was established in 2008 partly to develop and advance a digital strategy for the creation, delivery, and assessment of Māori language curricula as well as the collection and dissemination of Māori knowledge across a range of domains. From online language tutorials and animations to digital recordings of interviews with native speakers of the Māori Language, Te Ipukarea provides a broad range of online resources free to access for our community to use and also as a commitment to supporting the revitalisation and rejuvenation of te reo Māori (see http://www.teipukarea.maori.nz/projects). Furthermore, we hope that these resources can be used by other Indigenous communities around the world as templates for their own work in the revitalisation of their endangered or minoritised languages.

Te Whare Matihiko o te Reo is a Ngā Pae o Te Māramatanga Māori Centre of Research Excellence funded research project over three years, comprising four interrelated digital components including:

1) an online digital te reo Māori language portal/advanced search engine;
2) a collection of waiata and haka that have not been published to be uploaded on to Tāmata Toiere (see http://www.waiata.maori.nz);
3) a Māori thesaurus (He Punakupu Taurite); and
4) a digital dictionary and app for He Pātaka Kupu (approved by Te Taura Whiri i te Reo Māori).

The project is designed to answer the question: 'Through the use of oral, visual, digital and written sources in, or about, te reo Māori, how can mātauranga and tikanga Māori be more easily accessed and applied to provide opportunities for Māori communities today including Māori language learning and teaching?' The objectives of the project are:

1) to understand how technology and new media can be utilised to revitalise and enable the teaching and learning of endangered and minoritised languages; including te reo Māori;
2) source and prepare appropriate sources of te reo Māori media for inclusion in the online portal;
3) develop corpora of te reo Māori from oral, visual, digital and/or written sources, and;
4) analyse te reo Māori corpora to enable the identification and documentation of

linguistic data and mātauranga Māori.

This paper will provide further insight into Te Whare Matihiko as a multi-pronged project using digital technology to support te reo Māori and add further value to Te Ipukarea's digital strategy.

Introduction

Any discussion and questions of technology and new media in endangered language contexts must be grounded and framed within the realities of access. Although the digital divide continues to exist, there is evidence, however, of increased access to new wireless media among endangered and minority language users, including Māori. Mediatisation of social interaction is already happening from the iPhone to Facebook and SMS text to Twitter (Scannell, 2012). In these new sites and spaces, language has become increasingly detached from its traditional, cultural and physical context. For minority and endangered languages, there is more material produced in the Internet than in traditional print or mass media. Rather than being mere consumers of mass media conveyed in a dominant majority language, minority-language users can, through the Internet and new media, become producers as well as consumers of media products in their own language (Kaʻai, O Laoire & Ostler, 2012). Over the years, technology from the tape recorder to digital archiving use has increased for the documentation and revitalisation of endangered languages, and is clearly useful. At the same time, many endangered languages appear to be making a successful transition to new media. This includes Māori. Very good sound recording equipment and secure storage of data have ensured that archives are now secured to provide important information for the preparation and preservation of language descriptions, grammars, dictionaries and edited collections of oral and written literature. Similarly, technology and digital archives are allies in preserving cultural knowledge (Kaʻai-Mahuta, 2012). For example, Tāmata Toiere, in the case of Māori waiata; Te Ipukarea, in the case of recording repositories of Māori knowledge in He Pātaka Mātauranga series 1 and 2 and Te Aka Māori-English, English-Māori Dictionary. These digital archives demonstrate the interface between recovering traditional knowledge and storing this knowledge through innovative technology for future generations. The use of technology in archiving and data storage has been well documented.

Historically, Māori have been quick to adopt new technology and skills they recognise can be of benefit to the advancement of their society. This is illustrated by Māori interest in literacy during the early period of the mission schools. These ancestors were quick to put their new skills to good use for the benefit of future generations. In the nineteenth century Māori wrote prolifically, adapting the oral arts for the press. This included documenting genealogy, tribal histories, cultural protocols, and waiata. In addition to the many Māori manuscripts is the significant collection of Māori language newspapers (Kaʻai-Mahuta 2012, p. 12).

While it is advocated that the oral tradition is essential to Māori cultural survival and that it should be defended and maintained, it is also viewed that Māori should utilise new technology in order to preserve their traditions. In *Something Torn and New: An African Renaissance*, Ngũgĩ wa Thiong'o (2009, p. 20) posits that, "to starve a people of its language is to kill a people's memory bank". Digital archives are tools for the revitalisation of the Māori language and the preservation of Māori culture; a digital memory bank of Indigenous Māori knowledge and an archive for future generations (Kaʻai-Mahuta, 2012).

Te Whare Matihiko o Te Reo Research Project

Te Whare Matihiko o Te Reo is a research project spanning three years. It is located within a digitisation and new media construct and methodology because all four components, which constitute the project, involve using digital technology as a tool for Māori language revitalisation. The four components are:

1) The creation of a portal / advanced search engine, as a National Māori Language Data Base Portal and other Māori language resources such as publications, iwi radio, television programmes, community initiatives, websites and social media. This will be called Tomokanga Rauemi Reo Māori and will be the umbrella, or matua, for the remaining three components;
2) A collection of waiata and haka that have not been published including lyrics with a detailed explanation of the lyrics, a biography of the composer, audio and video files to be called Tāmata Toiere;
3) An online Māori Thesaurus to be called He Punakupu embedded in Te Aka Māori-English, English-Māori Dictionary;
4) The digitisation of He Pātaka Kupu monolingual Māori dictionary linked to Te Aka Māori-English, English-Māori Dictionary and the creation of an app for smartphone devices.

All four projects will have synchronised development in order for the desired outputs to be achieved within the three-year period. This is made possible by the fact that each project component is led or co-led by a different person. The project will undertake the following:

- Determine how technology and new media can be utilised to revitalise and enable the teaching and learning of endangered and minorities languages.
- Source and prepare appropriate sources of te reo Māori media.
- Analyse te reo Māori corpora to enable the identification and documentation of linguistic data and mātauranga Māori.
- Collect relevant materials to populate the e-repository archive/portal.

Tomokanga Rauemi Reo Māori

Tomokanga Rauemi Reo Māori, an online digital Māori language portal, will be similar

to a library catalogue that has both basic and advanced search functions. It will have the capacity to bring up search results of pages that relate to Māori language groups, courses and resources. Each page will be tagged with several key words. For example, coffee group, Auckland, mums and bubs, and weekly. The user will be anyone searching for support in their Māori language journey, as well as researchers. Types of pages could include university courses, websites, coffee groups, Facebook groups, blogs, YouTube channels, immersion childcare, or any social media page where te reo Māori is the dominant feature. Only accessible print resources will be included to ensure that the portal is kept relevant and contemporary. Thus, this National Māori Language Portal will provide a much needed e-repository to disseminate critical material often created or produced by Māori language speakers which can empower other learners of the Māori language contributing to the preservation and survival of the language.

Tāmata Toiere

Tāmata Toiere is an example of technology designed to preserve language and cultural knowledge as in the case of Māori waiata and to, hopefully, arrest the loss of beautiful compositions. The repository demonstrates the interface between recovering traditional knowledge and storing this knowledge through innovative technology to make it more accessible to future generations. This component will assemble a collection of waiata and haka, which have not yet been published including, lyrics, a detailed explanation of the lyrics, a biography of the composer, as well as audio and video files. It is hoped that compositions and composers are obtained from a range of tribal regions to capture the variations in dialects, histories, political commentaries, and oral narratives. However, this will be contingent on the support of the composer/s. It will be important to capture new oral literature. As Kaʻai-Mahuta (2012, p. 27) states, "this is a form of publishing that not only acts as another resource of Māori knowledge and tradition, but also benefits composers who can reach a larger audience with their poetry". The repository will also improve access of Māori to waiata and haka, provide a resource for learning and will ensure Māori control of Māori knowledge. Prolific Māori composers will be recruited to participate in the project. One composer each year for five years will be selected (based on availability) and a selection of their compositions will be researched and recorded along with the relevant material to complete each section of the repository.

He Punakupu

He Punakupu is a Māori language thesaurus project. Currently, there is no comprehensive user-friendly thesaurus available for the Māori language. The project will deliver a comprehensive list of synonyms for the Māori words in the Te Aka Māori-English, English-Māori Dictionary. The synonyms will be added directly to the online version of Te Aka (http://maoridictionary.co.nz) where they will be available to the users immediately. Once the synonyms have been added to all relevant words on Te Aka, a hard-copy will be produced.

He Pātaka Kupu

The digitisation of He Pātaka Kupu – Te kai a te rangatira monolingual Māori language dictionary linked to Te Aka Māori-English, English-Māori Dictionary and app will give immediate access to the 1.85 million plus users of Te Aka Māori-English English-Māori Dictionary. Therefore, it will be made more accessible and potentially increase its reach into Māori speaking contexts such as Kura Kaupapa and other Māori-medium educational contexts where Māori is the first language.

The integration of technology to supplement Indigenous language education has been overlooked and underutilised (Grenoble & Whaley, 2006). Many speech communities, language activists and researchers are seeing new technologies as crucial catalysts in language revitalisation initiatives as it allows communities to create their own representations in culturally appropriate materials (Warschauer, 2006). Furthermore, the ongoing popularising of the internet has led to a new generation of mediated communication with message boards, chat rooms, internet sites creating a new space for the exchange of information and a new public arena in which minority and endangered languages, such as Māori, can have a real presence (Kaʻai, Moorfield & OLaoire, 2013).

Endangered languages require urgent attention to reverse language shift and prevent language death, therefore it is critical to build research capacity. Cultivating a cohort of skilled researchers is crucial to the future development of Māori language revitalisation. This project and its related components will attract new researchers to the field, encouraging the development of research skills, and cultivating a robust research environment in order to support new and emerging researchers to become high performing. This will lead to a high-end product and will attract Māori language users.

There is an ever-increasing amount of Māori language material available, not only in print resources, but also in a range of sources using new and developing technologies, including apps for digital devices, websites, and other avenues discussed earlier. Some have been designed specifically for learning the language. For example, the Te Whanake apps, the Te Aka Māori-English, English-Māori Dictionary website and the Te Reo Māori dictionary app. Others are focused on using the language for a range of purposes, such as sharing information and discussing issues, for example, He Pātaka Mātauranga and He Papa Huia on the Te Ipukarea website. These resources all have the potential to aid learners and speakers of te reo Māori. However, because these sources are quite disparate, many people are unaware of what is available and where to access them.

The online portal will provide easier access informing people of the full range of materials available to aid and enhance Māori language learning and teaching. The portal will also be of benefit to those doing research into te reo Māori using Māori language materials. It will provide easy access to material in te reo Māori relating to tikanga Māori, Māori history and contemporary issues in the full range of source types. The portal could be used by learners of the language as well as by researchers who know te reo Māori and will therefore be able to delve into aspects of tikanga Māori, waiata, haka, karakia, Māori history, etc. The portal will also be a valuable tool for researchers and academics seeking to

locate various digitally accessible material and information quickly.

Conclusion

We know that, for minority and endangered languages, there is more material produced on the Internet than in the traditional print or mass media. Rather than being mere consumers of mass media conveyed in a dominant majority language, minority-language users can, through the Internet and new media, become producers as well as consumers of media products, in their own language. Te Whare Matihiko o Te Reo is a project, which seeks to do this through the development of several digital tools as resources to aid in the preservation and revitalisation of te reo Maori and to advance knowledge and expertise in the Māori language.

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Te Whanake and Te Aka digital resources

John C. Moorfield

Introduction

Since 1985, the primary focus of the author's research and writing has been on developing the Te Whanake collection of textbooks, study guides, teachers' manuals, audio resources and, a dictionary. More recently, digital resources have also contributed to the collective effort towards Māori language revitalisation nationally, with the intention that Māori remains a vibrant language used in a wide variety of contexts. In the last twelve years, the print texts of the Te Whanake series have been complemented by a range of digital resources. Part of this development has been the desire to make learning te reo Māori more accessible and less expensive through the use of modern technology.

This case study will describe these digital resources, focusing on the process of their development. It will discuss the advantages of these types of resources, which include the Te Whanake Animations, Te Whanake Podcasts, Te Whanake TV and Tōku Reo websites. It will also discuss the nature and development of the popular Te Aka Māori-English, English-Māori Dictionary online. All of these websites are free and accessed from http://www.tewhanake.maori.nz

As well as these websites, the Te Whanake and Te Reo Māori apps for Apple and Google devices will be described, with the reasons for their development. The Te Whanake apps provide a very structured course making maximum use of the range of rich resources available in the Te Whanake suite of websites. These apps also have direct access to the Te Aka online dictionary. The added advantage of the Te Reo Māori dictionary app for increased mobility will also be highlighted. Recent research by Te Ipukarea, the National Māori Language Institute, has delved into how users are benefitting from these resources. Information gleaned from this research will be included.

Te Whanake Resources website

This website was developed to enable people overseas, as well as locally, to buy the Te Whanake resources. It also describes what each hard copy resource contains. Readers who are not familiar with these Māori language learning resources should view this website.

Te Whanake Podcasts website

Developed in 2008, this website was to enable students to use the listening and speaking exercises of the four Te Whanake textbooks, tapes and CDs online. They can also be downloaded to iTunes on Microsoft Windows and Apple computers for use on television screens and portable media devices such as mp3 players, iPods, iPhones and other smart phones, iPads and tablets.

Adapting the taped audio and video exercises and activities for online use has other benefits for not only the learners, but also the staff and institutions involved in delivering

the teaching, e.g.,

- Learners can access all the exercises and activities online at no cost, thus avoiding the expense of purchasing audio and videotapes or CDs and DVDs.
- Learners can record their responses on their computer with an Internet connection. They are also able to submit their exercises for assessment by their teachers who can mark and give quick feedback to their students. All this can be done from anywhere in the world.
- This development meant that language laboratories were no longer required for teaching and learning Māori, thus freeing institutions from a major expense.

The Te Whanake Podcasts website was developed by AUT University staff and students in collaboration with VO2 Digital Design the developers of all the Te Whanake websites.

Te Whanake Animations website

This contains animated movies for all four levels of Te Whanake from Te Kākano to Te Kōhure. Each of the four levels has between 10 and 15 animated movies tied closely to the content of the chapters in the textbooks. Complementing each animated movie are up to 16 exercises giving practice in the new language material introduced in the particular animated movie or in the corresponding chapter of the relevant textbook. This website is designed for independent learning and complements the textbooks of the Te Whanake series.

The Te Kākano Animations began in 2005, while the author and colleagues were at the University of Otago. A substantial grant from e-Learning Collaborative Development Fund enabled teams from Te Tumu and Computer Services at Otago to complete the animations and exercises for Te Kākano. The funding for the completion of the other three stages, Te Pihinga, Te Māhuri and Te Kōhure was from the AUT Foundation and with Capex grants from AUT University. Because animated movies are quite expensive to produce, it took some time to obtain sufficient funding to produce these animated movies. Consequently, this project was not completed until 2016.

Te Whanake TV website

This website of streamed videos consists of two series of TV Māori language programmes for listening comprehension exercises produced in the mid- 1990s. As a result of a partnership between TVNZ Education Television (eTV) a colloquial Māori language course, called Te Kai a Te Rangatira, was designed to complement the Te Pihinga textbook and resources. This first, took the two courses based on these materials into homes and institutions throughout the country in the second semester of 1995. These courses were aimed at people throughout Aotearoa/New Zealand unable to attend regular classes, because of their remote location, family ties or work commitments, and who, under normal circumstances, would not have access to learning the language or the chance to improve

their Māori language skills.

Te Kai a Te Rangatira was the first Māori language television series created as part of a tertiary level language course and screened on eTV. The project was an initiative for Māori Language Year by both The University of Waikato and TVNZ. The production funding support of $1 million came from Te Māngai Pāho and the Ministry of Education. Support in the planning of the venture also came from a variety of people and organisations including Te Taura Whiri i te Reo Māori, Longman Paul (now Pearson), Kōtuku Productions, Te Reo Television, Te Māngai Pāho, and the Ministry of Education.

Each programme in the 13-part television series includes a 12-minute drama based in a city restaurant run by the whānau that own the restaurant land as a result of a land claim. Each episode also includes archive or documentary illustration of the course's main themes. Students enrolled in the courses were permitted to videotape the televised programmes.

Five Māori speakers wrote the drama scripts with former Māori Language Commissioner, Sir Tīmoti Kāretu, and the author of the series as language advisers. The emphasis is on modern colloquial Māori. The story centres on themes that come from the textbook.

However, experience of using the Te Kai a Te Rangatira videos with classes has shown that they are more suited to the Te Whanake 3 Te Māhuri level learners. It was recommended these video programmes, along with the exercises designed for them, be used at the Te Māhuri level.

As a result of the success of this venture, a similar television series for beginners called Te Kākano was completed for broadcast in mid-1997. Each 30-minute programme contained a 12-minute drama series, explanations of grammar and usage points, and discussions about cultural aspects. All of these are related closely to content in each chapter of Te Whanake 1 Te Kākano. Learners will benefit most from the 12-minute drama series if their use is delayed until well into the Te Whanake 1 Te Kākano course. In addition, there are exercises on the website for each episode of both TV series to ensure that learners develop listening skills and are guided into extracting as much benefit as possible from viewing and hearing the language of each episode. Both of these are also available free on this website.

Tōku Reo website

Tōku Reo is a series of half-hour programmes developed and produced by Kura Productions. They complement Te Whanake 1 Te Kākano, the beginner Māori language textbook. There are 300 episodes. Learners of Māori are able to view these episodes online from the Te Whanake website, at http://www.tokureo.maori.nz/ or from Māori Television on demand. Every so often people email me to express their appreciation for the Te Whanake websites and the Te Aka dictionary website. The following email was sent this year by someone who uses the Tōku Reo programmes:

I am watching Toku Reo on demand--I'm on lesson 55 in series one and I wanted to let you know how much I'm enjoying your course. I came to Whangarei about ten years ago from the States and tried to learn Maori as soon as I arrived using a set of tapes. I found it difficult.
Your course is so well set out and well executed down to the presenters wearing new outfits each day, it has opened a new world for me.
My PhD is in Adult Education.
Your work is appreciated.
All the best,
Rita Shelley

Te Aka Māori-English, English-Māori Dictionary website

Print and online dictionaries are important tools for both second language learners and fluent speakers of a language. Dictionaries clarify meanings, parts of speech, usage, spelling, macrons, diacritics, etc. For learners, dictionaries help them learn new words, enabling them to express themselves more clearly and improve their comprehension of the language. Some advantages of online dictionaries are that:

- A printed dictionary is restricted in size and entries are often small and dense on the page. There is less restriction on size for online dictionaries and therefore can be presented in a more readable and attractive format, using colour and space. Online dictionaries have the potential to contain all information a user may need such as usage notes, example sentences, illustrations, audio and video clips. This facility is especially useful in helping identify plant and animal species or entries where a description is inadequate.
- The mobility and convenience of an online dictionary is one of its major advantages.
- An online dictionary can be continuously and easily updated, not delayed by publication dates.
- An online dictionary can be an aid to pronunciation with the inclusion of audio files.
- With a bilingual interface, it is much quicker to find a meaning for a word or the equivalent in the other language. Search engines are usually much faster than manually searching a hard copy print dictionary. They can even accommodate misspellings and diacritics, such as macrons.
- Photographs of important people help with identification. Even recordings of people renowned for their oratory, or the sounds of traditional musical instruments, can be included.
- Production costs are less and distribution is much easier, inexpensive and faster.
- No disc space is required to store the online dictionary on your computer.
- Producers of an online dictionary can have multiple authors working on the

administration site.

- Users can determine the kind of data and indicate what is missing from the online dictionary, e.g., the Te Aka administration website has a feature that lists data about recent unsuccessful searches.
- With online dictionaries, cross-referencing can be done, linking to other entries very quickly and easily.
- Google analytics provides valuable information about usage, while online surveys for research can be conducted quite easily on the website.
- Being free, the online dictionary has a major advantage for users over the cost of a hard copy dictionary (Te Ipukarea, 2016, p. 23).

After the second edition of the Te Aka Māori-English, English-Māori Dictionary was published in 2005, it was decided that it would benefit Māori language learners and increase accessibility if the dictionary was also available free online. After Te Aka went live in December 2006, the author continued to add new entries, to expand existing ones, including subentries for separate meanings and parts of speech. In the last five years, he has also added example sentences, with English translations, for each subentry. The dictionary now has 22,800 headwords, each having a number of subentries. The dictionary has more than doubled the number of entries that it contained in 2011.

Te Aka comprises selected modern and everyday language useful for those learning te reo Māori. It is broader than the traditional Māori dictionary, as Te Aka also includes: encyclopaedic entries, explanations of key concepts central to Māori culture, explanations for grammatical items, idioms and colloquialisms, photographs, audio recordings for pronunciation and to help identify the sounds of fauna, example sentences in Māori from quality Māori language texts and sources for most entries, together with translations. These are all important in helping learners communicate in a Māori language context.

The example sentences contribute to the understanding of how to use a particular word appropriately. Finding suitable example sentences has been greatly assisted by the availability of quality online texts in Māori. These include Te Taura Whiri's corpus of online texts, called Te Mātāpuna, the online versions of the five volumes of Ngā Tāngata Taumata Rau, the Māori language newspapers at http://www.nzdl.org/ and https://paperspast.natlib.govt.nz. Other online dictionaries have also been valuable, including Paekupu, Te Papakupu o Te Marautanga o Aotearoa at http://paekupu.co.nz/ and the Microsoft Language Portal at www.microsoft.com/. Te Aka builds on the dictionaries already available, including specialised dictionaries.

Not only is Te Aka a collection of Māori words and their meanings; it also contains information useful for learners and speakers of the language to enable more effective communication in both oral and written forms of the language. Te Aka has been designed as a free resource that helps any learner become more fluent and literate in te reo Māori. This dictionary continues to be developed. Recording of each headword, using the voices of Te Wharehuia Milroy and Te Haumihiata Mason was completed, for 18,000 headwords, in

2015. The interface has also been adapted for smaller devices, such as iPhones, iPads, iPods Touches, Android smart phones, and tablets.

Google Analytics tells us that each year the number of visits to the online dictionary has increased by about a third. For the year ending on 13 July 2017 there had been 4,790,234 visits to the dictionary, a 33.11% increase on the previous year. The number of unique users during the year was 1,859,189, an increase of 29.17% on the previous year. While 82.57% of visits to the website were from Aotearoa/New Zealand, there were visits from most countries of the world, with Australia having the next largest number at 8.66% of the total.

Te Whanake apps

The Te Whanake app is a container app and within that are in-app purchases for each of the four Māori language-learning levels. They are available in the Apple and Android versions for iPads and tablets. Each of these apps brings together the textbooks, podcasts and streamed videos, animated movies and exercises, the Te Kākano, Te Kai a Te Rangatira and Tōku Reo TV series in a structured programme. When students and teachers are working on a particular part of the textbook, if there is an exercise or relevant material to augment the learning of a particular grammar point or topic, by clicking on the button beside the text it will take them directly to the relevant exercise, podcast, animated movie, and/or streamed video. This recent development provides a very structured course, making maximum use of the range of rich resources available in the Te Whanake suite of websites. These apps also have direct access to the Te Aka online dictionary.

These four apps are a major development in making the range of Te Whanake resources less expensive and more useful. It has overcome what had become a problem for teachers and learners. Because of the plethora of useful resources developed in the Te Whanake textbooks, study guides, teachers' manuals, podcasts and TV programmes, it was difficult for both teachers and learners to make the maximum use of those resources. By developing a matrix of all the content of the resources, we are able to use a particular exercise or activity at the appropriate time. Teachers are advised to use these four apps in structuring their programmes to make maximum use of these rich resources.

Te Reo Māori app

The launching of the Te Reo Māori app for smart phones and tablets (Apple and Android) in 2010, added even more mobility and accessibility for the Te Aka dictionary. Te Reo Māori is the app version of the Te Aka dictionary. The app has two main advantages over the website:

1. When wifi or 3G/4G are available the app automatically accesses the online dictionary, but if these are not accessible the app has a recent version of the dictionary stored on the device. Thus, it can be used anywhere in the world.
2. The app has a feature, called Favourites, which enables the user to store any words

searched for. This helps the learner to revise new words.

Recent research by Te Ipukarea, the National Māori Language Institute, has delved into how users are benefitting from using the Te Aka dictionary and the Te Reo Māori app. Results of the research show that as well as using the dictionary to find meanings, they also use it to find how to use the word in a sentence. Nearly half of the users (48.6%) use the digital dictionary for this purpose, with the beginner and intermediate level learners having the highest percentage of their number using the dictionary this way. This result shows that example sentences are being used to help improve users' Māori language ability (Te Ipukarea, 2016, p. 5).

Conclusion

This case study on the benefits of the digital resources developed for the teaching and learning of Māori has focused on the Te Whanake and Te Aka websites as well as the Te Whanake and Te Reo Māori apps. Shown are the benefits of these not only as stand-alone utilities, but also to complement other resources in the suite, including the hard copy print resources.

However, to conclude on a cautionary note, websites and apps such as these do involve some significant costs to develop. They also need regular updates and maintenance, which incur further expense. Many other websites and apps charge fees and/or lease out advertising space to defray these costs. We have managed to resist both of these intrusions for all of the Te Whanake websites, while charging only a small fee for the apps. Profits from the apps are used to help defray these maintenance and development costs.

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Building virtual language communities through social media – because we don't live the village life anymore

Dean P. S. Mahuta

Abstract

This paper explores the role of social media in creating, developing, and sustaining virtual language communities to aid in the revitalisation efforts of Indigenous language groups who are struggling to sustain physical language communities. The Māori language faces a major challenge in the form of globalisation, which has been likened to colonisation in terms of the resulting homogenisation and language dominance (Kaʻai-Mahuta, 2012). The majority of Māori live outside of their tribal regions residing in urban centres across New Zealand. Furthermore, there is a growing Māori diaspora overseas, particularly in Australia. To survive, a language must survive in the home (Fishman, 1991). However, traditional bastions of the Māori language, such as small rural Māori communities, now have unprecedented English language content present as a direct result of digital technology. Whilst major steps have been taken to save the language, like many Indigenous languages the Māori language, remains endangered (Moseley, 2010). In order to survive, endangered languages must begin to inhabit traditionally English dominated spaces, particularly digital spaces, thereby increasing the number of opportunities for speakers of the language to hear, use and 'see' the language. That is, normalising the Māori language in digital spaces.

Introduction

What does it mean to build a virtual language community? Using the Māori language as an example, this paper will attempt to answer this question by showing examples of social media being used to build, maintain, and strengthen Māori speaking communities. For many years now, the focus of the language revitalisation movement has been to teach the Māori language to as many people as possible in order to give birth to a new critical mass of speakers of te reo Māori. However, in the last few years what we have started to see is that, when it comes time for students of te reo Māori to step out of the classroom, they find they have no one to talk to. Eventually, this leads to a weakening of their language development. The question then becomes, when the birds are ready to leave the nest, 'Where do they go to find other birds who sing the same song?' This highlights the important role social media is playing in building virtual language communities.

As my title suggests, 'We don't live the village life anymore', and I make this statement on purpose. The Māori language faces a major challenge in the form of globalisation, which has been likened to colonisation in terms of the resulting homogenisation and language dominance (Kaʻai-Mahuta, 2012). The majority of Māori live outside of their tribal regions residing in urban centres across New Zealand. Furthermore, there is a growing Māori diaspora overseas, particularly in Australia (Kaʻai-Mahuta, 2012).

As Fishman (1991) said, for a language to survive it must survive in the home,

which is a fact that many stalwarts, and champions of Māori language revitalisation, have supported over the years. However, traditional bastions of the Māori language, such as the marae, the homestead, or even, small rural Māori communities, now have unprecedented English language content present as a direct result of digital technology. Furthermore, those families who strive to create a home where Māori is the primary language, are also in a constant battle with digital technology as it continues to undermine their efforts. Here is where we see the true power of digital technology, irrespective of the quality or quantity of the Māori language used in 'your' home, wherever technology is found, so too is the English language.

As such, social media platforms have drilled their way into our homes, bringing with it an unprecedented level of English language content. However, in recent years, we have seen the emergence of virtual communities whose main goal is to infiltrate the mighty interwebs, carving out a te reo Māori space in a predominantly English language domain. These are the devoted, the enthusiastic, the zealots of the Māori language who understand that these social media domains must be penetrated.

In the past five years, the internet has seen an increase in the establishment of virtual Māori language communities. At the forefront of this increase are platforms like Facebook (Pukamata), Twitter (Pae Tīhau), Instagram (Paeāhua), and YouTube (TiriAta). These digital powerhouses dominate this modern age, and I believe, similar forms of digital media will be long into the near future. Therefore, if te reo Māori is to survive it needs to be a part of this new world. As Sorrell (2013, p. 166) states, the role of social media is "… to facilitate intercultural connections among friends and intimate partners to meet, develop friendships, and maintain contact particularly at great geographical distances."

It is worth adding here that, of all the communities on social media the ones that survive, really making a difference, are those groups at the grass roots where participants have a vested interest in the success of the community, and have a true passion for the language. I liken it to the establishment of Kōhanga Reo and Kura Kaupapa Māori. Both kaupapa were initiatives that came about because our Aunties and Uncles saw the decline of our language. Furthermore, they were witness to, and products of the language dominance of the education system of that time. They re-purposed that tool of colonisation, education, to bring the language back to the people.

The greatest challenge to speakers of te reo Māori, is the fact that the Māori speaking community is fragmented. The majority of Māori live outside their tribal areas, and despite all obstacles, it is the nature of Māori people to make connections with others; it is part of our very being. We need to be part of a collective in order to feel whole. The context of te reo Māori is no different. Therefore, the best role that social media can play is that of a builder, with the ability to build a digital house where all speakers of the Māori language can come together. Gajjala (2012), comments on the increased use of social media by Indigenous communities, saying that it continues to grow exponentially.

Social media example: Facebook

There are four main groups I wish to draw your attention to, the first being Te Mana o Te Reo Māori. This is a public group, which has been going for the past five years. Only the Māori language is allowed to be used, and it is a domain for discussion mostly related, but not limited to, the Māori language. The group's administration also encourage debate on topical issues of the time, which, in most cases, are political. It is also worth noting, that the use of the Māori language is not the only positive, it is also a place that reinforces cultural principles based on respect and understanding. In a heated online debate you can sometimes forgive people for perhaps taking some comments too far. Comments, such as these, are quickly reined in by reminder members. Even though the discussion is being held in a virtual space, it does not mean that our cultural principles are left aside, and should reflect for example, when we Māori meet on the marae ātea.[1]

He Tamariki Kōrero Māori and Māori 4 Grown Ups, are public groups dedicated to supporting parents who are raising their children in te reo Māori, sharing resources, and organising days out where families can meet and hang out in te reo. Māori 4 Grown Ups in particular is a group established almost nine years ago, and has grown into a community that spans the entire country.

Finally, there is Kapa Kōrero, a language student led initiative where any learners of te reo Māori, no matter the level, can meet over a few drinks at a local pub or restaurant using te reo Māori. This particular group was established as a support network for early learners of the Māori language. The founder set this group up in order to find others with which to converse in Māori as she was a wife, and mother of three, and had no one at home to help her practice. Kapa Kōrero is based in Auckland City, meets regularly every month, and provides a safe space for language learners to come and talk with each other.

Social media example: Instagram and Twitter

Instagram and Twitter, the homebase of the hashtag, has become popular over the past five years with common hashtags like #tereo and #kōreromāori. However, within the last two years, as more and more attention is given to Māori, we have tags like #TeWikiOTeReoMāori, #arohatiatereo, and #MahuruMāori.

Māori instagram accounts in particular have become more active recently in using the Māori language. Te Huia Kaimanawa, for example, posts images combined with kīwaha or Māori idiom to express an idea, in a similar style to those seen when creating memes.

Social media example: YouTube

Then we have the example of YouTube. When I first looked at the use of YouTube about four years ago, I found that it was a hugely untapped digital space for te reo Māori. The only real channels that used Māori language were connected to production studios or tv shows. However, general user channels were few and far between. There were only two active channels at the time (from what I could find). One belonged to a university student vlogging her everyday life, and my own channel known as Te Māwhai, which mainly covers

video game reviews, tv show reviews, and movie reviews. Recently, more channels have started appear as more users begin to add to this space. For example, Tamariki Tākaro is a channel that focuses on creating content for children, primarily around a popular YouTube genre known as unboxing videos. These videos of course would display the unboxing of different children's toys, followed by a short review.

Conclusion

To reiterate, it is important that Māori start inhabiting these digital spaces in order for te reo Māori to infiltrate, what we know as, an English dominated area. Social media in particular is a tool that enables Māori, and other Indigenous peoples, to stretch our cultural muscles and connect with each other across greater distances in order to come together as a community. Māori do not need to give up their traditional spaces, but they do need to inhabit the new spaces that are being created. Furthermore, it is important to stay connected, and in that sense, it is not as though 'we don't live the village life anymore'. It is more like our village has become a different one, a virtual one.

Endnotes

[1.] Marae ātea is a public forum in the courtyard in front of the ancestral meeting house of the marae complex. It is a formal space where oratory is used, usually to discuss and debate issues pertaining to Māori.

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Te Whanake animations: Development and implementation

Wahineata Smith

Abstract

The development of Te Whanake Animation resources began in 2005. The aim was to complement the Te Whanake 1 Te Kākano textbook (Moorfield, 2001), and provide another learning resource, specifically a digital resource, for second language learners of te reo Māori to access. The age of digitisation is fully upon us, and at the time of development, Te Whanake Animations were definitely ahead of its time. It is easily accessed online and available free to users. A small team of research assistants were employed to bring the concept to life, develop the animated characters, write scripts for the animated movies and modules, develop interactive exercises as well as compose songs to reinforce learnings, all whilst aligning with the content in Te Kākano textbook. As an original member of that research team, I will use this paper to discuss this process to provide an insight into the development and implementation of the Te Whanake Animations within my own teaching practices.

Introduction

It has been 30 years since te reo Māori became an official language of New Zealand. In that time, there have been numerous efforts and initiatives with the aim to increase the use of te reo Māori and to improve proficiency levels of te reo Māori speakers. Furthermore, te reo Māori is protected under the Treaty of Waitangi and can be referred to as a taonga or treasure, yet, fluent speakers of te reo Māori have continued to decline (Mathieson, 2010). The proportion of te reo Māori speakers has declined markedly over the last century, particularly following rapid urbanisation.

Māori, for years, have had to adapt to a new way of living due to many factors, including colonisation and being forced to homogenise and assimilate through legislation such as the Tohunga Suppression Act of 1907 (Stephens, 2001). The digitisation era is well upon us and this era is no different for Māori, who need to adapt in order to progress and survive. New technology has reorganised how we live, how we communicate, and how we teach (Siemens, 2014). New ways of thinking and doing things are needed using such technologies, and in this instance reference is being made to the digital space. Initiatives need to be constantly developed and utilised for the survival of Māori; the people, the culture and the language. This paper will expand on one of those initiatives, the development of Te Whanake Animations, based on John Moorfield's research and writings published in Te Kākano, from the Te Whanake series of textbooks, study guides, teachers' manuals and other digital resources.

Development of Te Whanake Animations

The inception of Te Kākano Animations happened in Dunedin, at the University of Otago.

A collaboration between teams from Te Tumu, School of Māori, Pacific and Indigenous Studies and the Educational Media, Higher Education Development Centre (HEDC) resulted in the completion of the animations, modules and interactive exercises for Te Whanake 1 Te Kākano. The intention of the animations project was to develop a resource to assist second language learners of te reo Māori and to complement the learnings from Te Kākano. A total of 15 animated movies were developed, aligning with the learning content of each chapter within the Te Kākano textbook. Each animated movie was the beginning of a 'module', and each 'module' contained up to 16 interactive exercises or activities to help reinforce and complement the learnings found in Te Kākano. The interactive exercises allowed the user to not just sit there to read and hear te reo Māori, but also provided the opportunity to type what they thought the answer was and receive immediate feedback. This would prompt them to move on or keep trying. There was an emphasis on using the correct grammar including macrons, full stops and capital letters where applicable. If they were not included, the user would be instructed to keep trying. There was mixed feedback about this feature, however, the main goal, other than developing a resource to assist second language learners learn te reo Māori, was to make sure that the reo they are using is grammatically correct and not to fall into bad habits acquiring te reo Māori.

Research Team

L-R: *J Grant, T Metuamate, A Jordan, W Smith, M Houpapa (Moorfield, 2017)*

I was one of five Research Assistants employed by Te Tumu to create and sketch the characters for the animations, whilst the team from HEDC brought those sketches to life through a very precise, complex and expensive process. Each of the research assistants were students at the University of Otago, all studying in different disciplines but all having a commonality through te reo Māori. The research assistants had the task of creating six

characters initially, and the process was much more in depth than first anticipated. For each character, several factors were considered in order to construct their gender, approximate weight and height, age, occupation, background and relationships, iwi (tribal) affiliation and even going as far as fabricating and developing their physical appearance. The aim was to have the animations available online and free to the user. Therefore, the characters needed to be relatable as it was anticipated a range of ages, ethnicities and backgrounds would be the users of such a resource.

Characters

L-R Mīria, Moe (Dog), Te Hererīpene, Eruera, Neihana, Tarati, Wiremu (Moorfield, 2017)

The six characters ranged in age from a young boy (Neihana) to an elderly woman (Mīria). A range of ethnicities included Eruera who is Chinese and Tarati who is Pākehā. Diverse backgrounds ranged from Wiremu, a farming father and Te Hererīpene, a young urban university student. The attributes and characteristics of each character was well debated and discussed, a date of birth was created and so too was a list of likes and dislikes. The research team anticipated that this information would be relevant to the user. Not only to enable them to make connections and relate to specific characters, but also to help explain how each character connected with each other, in an attempt to make the storylines of the animated movies realistic. The voices of the characters were those of the research team, with the inclusion of another Te Tumu student. I have included an example of what a character's biography looked like in the development phase.

> ***Wiremu***
> *Born in Gisborne 8th November 1964, raised in Gisborne and is the youngest of his family. Is married to a Pākehā woman, Tarati and they have two children, an 8 year*

old son Apirana (Api) and a 5 year old daughter Ngāwai. He owns a house on a farm, that has cows, sheep, horses, pigs, chickens, goats, dogs and cats.

Wiremu is getting back in touch with his Māoritanga after leaving home for the city life, which sees him picking up mau rākau and re-learning te reo Māori. He is respectful, a good story teller, diligent, humorous and practices Ringatū.

Wiremu has a big body composition, approximately 6ft 3, has tattoos on his arms, and wears a vest, button up shirt, jeans, and brown boots on most days. His interests and hobbies include shearing, rugby, league, playing the guitar and going to the pub to have a couple of beers after a hard day at work. Reggae is his favourite music, specifically The Herbs, he also loves pork bones and fish heads. Wiremu can't stand snow and frosts because of what is does to his crops and farm life, he also dislikes violence, with his favourite saying being "I'm a lover not a fighter"

The biographies for the remaining five characters were of a similar nature and, a relationship was formed with at least one other character. The physical appearance of the characters was created on real people known to the research team and photos were also taken of these people to assist with the animation process for the characters. The photos' details were, at the request of the animation team, to include side profile shots, full body shots, front and back views, close up facial shots mouthing the vowel sounds, and also, if possible, having them wear the clothes, jewellery and moko that we had mentioned in the character's biography.

Modules

The term module was used to differentiate the sections that were developed. All modules included an animated movie, up to 16 interactive exercises with immediate feedback and some modules had a song. There are 10 chapters in Te Kākano, and 15 modules were developed to highlight and reinforce the learning structures found within those 10 chapters. Each user is encouraged to study the relevant chapter either before or concurrently whilst using the Te Whanake Animations. Although still used throughout the website, the term module was soon translated and replaced with Te Wāhanga as a heading.

Movies

Each movie was used to introduce the new language of the module. When scripting the animated movies, the research team would align the sentence structures, content and learnings found within the Te Kākano textbook. A time limit of around 1min 30 secs was the brief given in order to showcase and use as many learning patterns as we could from that chapter, using the animated characters. When writing the scripts, we provided these in te reo Māori and English, primarily for the animators benefit, however, they were introduced later as subtitled options for the user. The user had the opportunity to use the

subtitles, to not only hear te reo Māori but to also read it. They had an additional option to read the English translation whilst listening to te reo.

Exercises

Interactive exercises were also developed based on the learning patterns and content found in each chapter. Up to 16 exercises were developed for each module. The interactive nature was developed with the aim to make the learning enjoyable, interesting and current, whilst continuing to keep alignment with content from that chapter. By employing this learning technique, including interactive exercises, it was believed and hoped that the language acquisition and retention of the user would be high. Although there is no tangible way to measure this, it provides the user with an added resource to assist with learning te reo Māori.

Songs

There was primarily one member of the research team responsible for composing a song, with a catchy tune and easy lyrics not only incorporating the learning that was presented within that module, but also to help the user remember and retain the learning structures and content. Every module had a song composed for it, however, a few were removed mainly due to the tunes being too similar to other songs. No further songs were composed to replace the removed ones.

Implementation of Te Whanake Animations

There are many positives to why one would use Te Whanake Animations. This part of the paper will focus on those positives and how I use the animations website in my own teaching. The majority of my te reo Māori teaching is based on the Te Whanake Series. Whilst teaching from Te Kākano, reference is always made to that website, because of my experience and knowledge of Te Whanake Animations. I direct my students to the website, specific modules, exercises and songs to help reinforce a learning point that I have covered in the class. The complementary nature is great for the teacher as it allows extra practice to take place outside of the classroom, and the interactive exercises provide immediate feedback. Even when my teaching pedagogy is not based on Te Whanake, I have found the website still to be of relevance. The alignment of the content may be a little altered, however, relevant content for learning te reo for beginners could still be found.

The movies that begin each module are very useful and beneficial for a learner to watch. Although on average the movies play for approximately 1 minute 30 seconds, they provide a snapshot of the content covered within that module. The movies also provide the user with the option to play it using subtitles in English or te reo Māori. The positive is that not only is this allowing the learner to hear te reo Māori, but also to read it if they prefer. I found the subtitles option valuable when playing for beginners, they seem to enjoy and benefit from reading the English whilst hearing te reo Māori. As they progress in their learning acquisition and understanding, they are able to switch to te reo Māori subtitles,

and eventually turn them off all together.

Another positive when using the website is the availability of songs to help reinforce the learning patterns covered. Not being a seasoned singer personally, therefore squashing stereotypes that all Māori can sing, the songs are used to provide yet another avenue that will assist with learning acquisition and retention of the learning patterns and/or vocabulary. When directing my students to the website, recommendations to look at the other resources on that website are made, particularly the Māori dictionary, Te Aka. The 'one stop shop' provides a valuable resource, free to users, that can be accessed at any time and best of all, anywhere.

Conclusion

It has been 12 years since the inception and creation of Te Whanake Animations. For its age, Te Whanake Animations is still very much relevant and utilised by a diverse range of people, all with a common goal, to learn te reo Māori. Acknowledgment needs to be made to Adjunct Professor John Moorfield for his continued commitment and dedication to the development and advancement of te reo Māori, for continuing to allow such a resource to be available online and free to users whilst upholding the mana of te reo Māori. John Moorfield also needs to be acknowledged for his passion and foresight to adapt te reo Māori to enable it to thrive in a new age, in the Information Age, within the digital space. Furthermore, since the development of the animated movies and associated exercises and activities for Te Whanake 1 Te Kākano, similar resources have been developed at Te Ipukarea for the other three textbooks in the series. These are all free and accessible at http://animations.tewhanake.maori.nz/

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20 years of reflections using technology to compile Māori language dictionaries

Karaitiana Taiuru

Introduction

Personal reflections of compiling multiple digital and Information Technology genre based te reo Māori word lists/dictionaries, over the past 20 years. In addition, numerous te reo Māori software, has given me a great insight into how technology can assist te reo Māori revitalisation/ retention and how technology could be used to create a new comprehensive and authoritative Māori dictionary. It is important to clarify that compiling dictionaries does not require language expertise, rather it merely requires collating the works of language experts. In particular, those works that were sparsely published and hard to access, thus applying technical skill sets to bring the works together.

Personal reflections

Presently, there are between 60 and 180 te reo Māori dictionaries available in academic libraries (many of which have previous editions) to cater to the estimated 50,000 to 125,000 te reo Māori speakers.[1] In addition to this, there is a plethora of Māori lesson books and grammar books continually being published. The ease and use of technology is attributed to these numerous dictionaries. Surprisingly, social issues, and not technical issues, have created barriers, preventing collaborative projects among all te reo Māori creators of terminology to create a comprehensive dictionary, similar to what we would expect from an Oxford or Collins English language dictionary.

New terminology that is created in te reo Māori has traditionally been kept private and had restrictions applied to it. In 2002, Te Taura Whiri created and coined new terminology that greatly enhanced te reo Māori revitalisation by making te reo Māori relevant in a modern and evolving society. Though this took place within the commission, the public did not have access to the database of words until they were published in a commercial dictionary, Te Matatiki. Likewise, the large volumes of new terminology that was created for the information technology sector, including by Huawei smart phone makers and up until recently the 2Degrees corpus, are kept private and not shared in public.

It has become usual practice for translators to protect their creations, especially in their industry where automation is more and more common, thus removing the need for many human translators. This exclusivity makes it impossible to learn new words and to look up new words. It also restricts rangatiratanga of our language, our taonga by allowing commercial entities to withhold our taonga from the public. The commercial argument is that the entity invests a large sum of money to create the words and seeks to protect their investment. The flip side to the argument is that if more people could access and learn the terminology, then the number of users would increase, generating demand and profit.

A student of the English language requires one dictionary and maybe a thesaurus. A student of te reo Māori requires multiple dictionaries by different vendors. Many

Māori dictionaries are genre specific such as modern Māori, classic, loan words and other specialised topics such as Health, ICT and plant names. One possible reason for this silo approach to te reo Māori terminology development and dissemination is that there is no collaborative entity with an interest in te reo Māori. If there was, the entity could merge all of the published dictionaries together, and access the plethora of specialised word lists that are created by organisations and individuals, to build one large database with free access on the Internet. This could also be replicated to create one authoritative paper based te reo Māori dictionary. The nearest resource to this was the CD-Rom Te Reo Tupu Māori dictionary published in 1997. The CD-Rom resource was a compilation of multiple dictionaries that could be searched simultaneously. Seeking cooperation and agreement from the dictionary owners was time intensive and extremely challenging. The royalty costs to use each dictionary was also prohibitive.

The act of commercialising te reo Māori is holding all speakers of te reo Māori and the tax payer to ransom for what is our birth right. Our language is a recognised taonga under Te Tiriti o Waitangi. The trend in the late 1990's and early 2000's was to commercialise Māori language via paid software that would spell check in te reo Māori. Te Reo Tupu evolved into a paid subscription online te reo Māori dictionary endorsed by the kaitiaki of te reo Māori at Te Taura Whiri. A user will pay from $960 to almost $10,000.00 plus GST per annum to access the dictionary, which is simply a collection of other works that can largely be searched, separately, online. This in stark contrast an original online te reo Māori dictionary that is free to use at http://www.maoridictionary.co.nz .

Te reo Māori spell checkers only required a text based file of te reo Māori words to be installed into a specific folder for it to work. Despite this, the commercialisation of spell checkers was becoming dominant. In 1998, I developed a unique Ngāi Tahu spell checker called Te Aua Kupu that would spell check any standard te reo Māori word that replaced a ng with a k. It also replaced ng with an underlined k. This was the first free Māori spell checker produced. Then in 2001, I developed a free standard te reo Māori spell checker called Te Ngutu Kura which matured into three versions. These three iterations were, and remain, the most comprehensive spell checker on the market. It grew to accommodate most software editing applications. There were no commercial restrictions and no one to justify the time to create and enhance it. Hence, why it was so widely used. Today, popular Windows based word processing software has te reo Māori built in as a default, removing much of the need for such add-ons.

Compiling multiple te reo Māori word lists and dictionaries over a 20 year period, to produce and maintain the Māori spell checkers, provided a database of te reo Māori with over 480,000 unique entries. The words were quickly extracted out of the database for use in Te Ngutu Kura. Many of the words were tagged by genre in the database. This allowed the ability to quickly extract datasets and create specialised te reo Māori dictionaries for genres such as personal names. If an authoritative entity was established, the database could then be used to create a large authoritative Māori Language Dictionary similar to an English Language Dictionary.

While creating free te reo Māori resources, I identified the need for a license that considered Traditional Knowledge/Indigenous ownership. No one person could own te reo Māori or a word unless a word is TradeMarked as was the case with the word 'Moana' in Germany. The solution was to take a freeware license and modify it to acknowledge that words cannot be owned and, if shared, an acknowledgement should be made. The Freeware community did not agree with this at the time and one academic stated that it was unethical to make such a statement.

Eventually the Creative Commons license was offered in New Zealand, which technically did not recognise traditional knowledge, but it offered enough protection with an Indigenous perspective to be useful. It was important for Creative Commons Aotearoa to have a Māori voice as non-Māori were making decisions that would impact upon Māori. At this time, I took up the opportunity to become a Creative Commons advocate. As a Creative Commons Advisory Board member, I implemented a strong recommendation for a Māori role on all future advisory boards.

The Creative Commons Aotearoa license was only in English, despite the name inferring it was bilingual and bicultural. It was my opinion at the time that there was a trend of te reo Māori only resources, both digital and hard copy, being produced and it would not be appealing to use a Creative Commons License in English when the rest of the resource was in te reo Māori. As an advisory member, I advocated for the Creative Commons Licence to be translated into te reo Māori. This was completed by Ian Cormack. The te reo Māori version is one of 15 licenses to be fully translated with another 16 languages yet to be completed.[2] A Traditional knowledge license was discussed as an add-on to the Creative Commons Aotearoa License. The project never eventuated in New Zealand due to a number of reasons. It is still a project that is urgently required, at both a national and international level, to promote and encourage more Indigenous resource development in order to have legal protection.

Conclusion

Commercialisation, gatekeepers of te reo Māori/knowledge and a fear of technology has seen te reo Māori development slow in the digital area. The lack of legal protections and hurdles for te reo Māori to be recognised in the technology area, by corporate service and resource providers, has also hindered this process. A major shift in attitude is required that allows non-Māori language experts to collate and produce digital products from established resources, which can be freely distributed for the benefit of all people to use the taonga Māori that we call te reo Māori. If government agencies, who use tax payer money to create and distribute te reo Māori resources, offer those resources freely to the community with licenses such as Creative Commons, it would likely see a flourish of innovative and creative resources that promote and make te reo Māori cool in the digital area.

Publications list

A list of te reo Māori publications created by the author:

1. A Dictionary of Māori and Social Media terms, English – Māori. Edition 3 (2016).
2. Word list and analysis of te reo Moriori (2016).
3. Baby names: Christian, Mormon and non religious Māori first names and their equivalent English name (2016).
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Endnotes

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Theme 2.

Iwi, institutes, societies & community led initiatives

Hēmi Whaanga, Naomi Simmonds & Te Taka Keegan

General introduction

With the rapid evolution, innovation and incredible growth of ICT, the avenues to exchange, access, manage, create, disseminate, display and research Indigenous data and Mātauranga Māori have increased at astounding rates. This generation, often referred to as 'digital natives', 'homo zappiëns', 'Net generation', 'millennials', 'i-generation' (see, for example Akçayır, Dündar, & Akçayır, 2016; Kirschner & De Bruyckere, 2017; Prensky, 2001; Yong & Gates, 2014), have been raised, immersed and exposed to a myriad of digital technologies, video games, computers, digital music players and cellular phones during their brief lifetimes. Technologies have dramatically transformed how each generation access, communicate, share knowledge, distribute and view information. Social networks like Facebook, YouTube, Instagram, Twitter, Reddit, Pinterest, Tumblr and social networking apps such as Messenger, WhatsApp, WeChat, QQ Chat, QZone, Viber, LINE, and Snapchat, with billons of active users per month, are as familiar to this generation as was the radio, television and landline telephones to the Baby Boomers who grew up with pre-cellphone mobile technology.

During this decade, "the amount of digital information created and replicated in the world will grow to an almost inconceivable 35 trillion gigabytes as all major forms of media – voice, TV, radio, print – complete the journey from analog to digital" (Gantz & Reinsel, 2010, ¶1). A paper on forecasting global IP traffic suggests that by 2012 the annual global IP traffic would reach at least 3.3 Zettabyte, an astounding 127- fold increase from 2005 (CISCO, 2017, ¶1). Current estimates from The World Bank on ICT access and use suggest that there are:

> more than 7.3 billion mobile-cellular subscriptions worldwide ... 3.5 billion people [are] using the Internet, of which 2.5 billion were from developing countries. Mobile-broadband subscriptions have risen constantly to reach 3.6 billion, while the number of fixed-broadband subscriptions reached more than 884 million during the same period. (The World Bank, 2017, p. v)

In an Aotearoa context, the World Bank estimated that out of every 100 people there were 121.8 mobile-cellular telephone subscriptions; 40.2 had fixed-telephone subscriptions; and 31.5 fixed-broadband subscriptions. 82.3% of households had a computer with 82.8% of households having Internet access at home (The World Bank, 2017, p. 159). All of these figures highlight the scope and impact of ICT and digital technologies into our daily lives.

In the past 20 years many iwi, institutes, societies, communities and language

activists have sought out digital technology as a pathway to linguistic, cultural, social revitalisation and economic sustainability. Numerous individuals, hapū, iwi, academic institutes, innovators, communities, industry leaders, computer scientists, programmers, historians, geographers, translators, linguists, te reo experts and tohunga have engaged in and lead the creation of software, web resources and Māori content as another mechanism to connect Māori to their reo, whakapapa, whānau, culture and identity. A number of these key developments for te reo Māori and Māori content in ICT were outlined by Keegan and Cunliffe (2014, pp. 388-391). These highlights include:

- 1993 – the Computer Science Department at the University of Waikato teach a computer science paper 'Ngā Tautono Rorohiko' in te reo Māori. Many of the computer terms developed in this paper later form the basis of many te reo Māori interface translations.
- 1995 – Greg Ford of Reddfish produces 'Te Kete Pūmanawa', the first interface produced that is solely in te reo Māori comprising four tools (a system clock that displayed dates in te reo Māori, an interactive story called 'Te Mahi Hangarau Ahi', a counting exercise called 'Te Tatau' and a board game called 'Mū Tōrere').
- 1998 – 'Te Reo Tupu', a comprehensive Māori-English-Māori CD-ROM dictionary is released by Wordstream. It enabled full-text searching of the Williams, Ngata and Te Matatiki dictionaries.
- 1998 – 'Toi Te Kupu', a database of published Māori-language teaching and learning materials is released online by Te Pūtahi-a-Toi, the School of Māori Studies at Massey University.
- 2000 – 'Niupepa: Māori Newspapers collection' of 17,000 pages of Māori content is released by the Computer Science Department at the University of Waikato.
- 2003 – Microsoft release a keyboard definition to type macron characters without having to resort to non-standard fonts.
- 2004-2011 – Learning Management System (LMS) Moodle is translated to te reo Māori by the Waikato Institute of Technology in 2004 and further revised editions are done by the University of Waikato in 2006 and 2011.
- 2004 – PLACE LMS is translated by the University of Waikato.
- 2005 – eWānanga LMS is translated into te reo Māori by Te Whare Wānanga o Awanuiārangi.
- 2005 – Microsoft fund te reo Māori translation of Windows XP and Office2003.
- 2008 – Google Web Search interface is made available in te reo Māori.
- 2009 – Microsoft fund te reo Māori translation of Windows Vista and Office2007.
- 2009 – Google translator toolkit is made available for translators of te reo Māori.
- 2011 – Microsoft fund te reo Māori translation of Windows 7 and Office2010.
- 2013 – Microsoft fund te reo Māori translation of Windows 8 and regional language support for mobile phones running Windows 8.

To this list we can add other language resources such as the 'He Pātaka Kupu' mono-lingual dictionary, Ngata's English-Māori dictionary, 'Te Wakareo' (the online version of 'Te Reo Tupu'), and 'He Pātaka Kupu Ture / Legal Māori Archive' from The Legal Māori Archive New Zealand Electronic Text Centre (see www.nzetc.org). In the research paradigm we have projects like 'Te Ataakura' the digital repatriation, revalidation and reclamation of taonga held overseas back to Te Aitanga a Hauiti (Lythberg, Hogsden, & Ngata, 2017; Ngata, Ngata-Gibson, & Salmond, 2012), Te Papa's digital databases of approximately 16,000 Māori treasures held in overseas museums, art galleries and allied institutions (Hakiwai, 2012), and the 'Donald McLean letters' (Colquhoun, Jones, & Young, 2008-2009), leading the way in reconnecting Māori to a broad genre of mātauranga, taonga and history.

A quick glance of the scope and nature of projects funded through the Puni Kōkiri's and the Ministry of Business, Innovation and Employment's contestable 'Ka Hao: Māori Digital Technology Development Fund', we can see a plethora of amazing ICT initiatives for rangatahi, whānau and communities. Here is a $30 million Government initiative spread over six years, up to 2021, that has been established to support Māori economic development, participation in the ICT sector, and access to te reo Māori content and culture through ICT (Te Puni Kōkiri, 2017). These include projects on:

- Digital apprenticeships (Ariki Creative);
- Coding book camps (Online Education Ltd t/a Code Avengers);
- Gaming ecosystems and STEM related programmes (Digital Natives Academy);
- Digital cartoon content in te reo Māori (Nige, Dreamweaver. Ltd);
- Academic scholarships for web developers and entrepreneurs (Enspiral Academy Ltd);
- Māori Internet of Things using Weightless (First Tree Growing Ltd);
- An iOS focused app development accelerator programme (Kia Ata Mai Educational Trust);
- Parent and child technology workshops (Kidscoin Ltd);
- Development of a multi-platform action-adventure stealth video game (Koi Digital Ltd);
- Development of Tākaro an online gaming experience to teach rangatahi spatial awareness skills and strategies to build confidence in STEM (Metia Interactive Ltd);
- Establishment of an ICT Computer Club in Wairoa and Napier (Ngāti Pahauwera Development Trust);
- Facilitation of a young animators workshops for rangatahi in 12 rural schools (Nikora Ngaropo Motion & Design Ltd);
- STEAM workshops and resources for rangatahi and tamariki (Pam Fergusson Charitable Trust t/a OMGTech!);
- 3D scanning and point cloud visualisations of taonga tūturu and marae/wharenui of iwi and hapū throughout the country (PointCloud Visualisation Ltd);
- Trialling of the University of California's C-Stem programme in five South

Auckland primary and secondary schools (Smart Fish Partnership);
- The development of speech recognition and natural language processing of te reo Māori (Te Reo Irirangi O Te Hiku O Te Ika);
- The creation of a human-centred Internet of Things for asset management (Tuia Group Ltd);
- Development of visualisations and analyses of cultural and environmental data relating to freshwater quality (Waiora Pacific Ltd);
- Establishment of a Digital Natives Academy in Ōpōtiki (Whakatōhea Māori Trust Board); and
- The building of whare sensors that measure temperature and humidity (Whare Hauora).

Geographic Information Systems (GIS) have largely been used as a tool to 'map' Indigenous lands and territories for settlement, occupation, survey and ownership. To this end it has been utilised as part of the colonial project. Early cartographic maps were "tools were indispensable for the sea passage itself and for any colonizing that was to follow" (Probasco, 2014, p. 245). Cadastral boundaries are still utilised to demarcate and allocate land use, rules and policies that continue to impact Māori relationships to place and involvement in decision making (Simmonds, Kukutai & Ryks, 2016).

Calls to decolonise GIS, cartography and geography have been sustained over many decades. In 1987 Evelyn Stokes put Māori geographies on the map, calling for geography to open its borders and consider Māori relationships to place and space (Stokes 1987). Indigenous and Māori geographers, cartographers, planners and GIS practitioners have taken up this call and are engaged in critical and diverse projects that serve to resist colonial representations of Indigenous places (see the recent publication *Kanaka Hawai'i Cartography - Hula, Navigation, and Oratory* by Renee Pualani Louis (2017) as a particularly powerful example).

Further, Indigenous peoples have been 'mapping' their lands and landscapes in diverse and nuanced ways for generations. Johnson (2012, p. 1) argue that "Our landscapes are the storied histories, cosmogonies, philosophies and sciences of those Indigenous knowledges". The chapters in this section demonstrate the old and new ways that GIS technologies are being utilised to both resist and reclaim 'mapping' that position Indigenous representations of place and space at the centre. There is a political imperative in doing so, "tangata whenua are here to stay and have intergenerational responsibilities as mana whenua and kaitiaki" (Simmonds et.al., 2016, p.104) the use of spatial technologies, when utilised in a critical way and keeping tikanga and mātauranga at the fore, can provide important mechanisms to protecting, maintaining and sustaining these relationships to place.

In the 10 chapters that follow, we bring together a broad group of innovators, scholars, industry and technology leaders who share a passion for ICT. The authors in this section share a range of personal experiences, as well as technical and cultural challenges

they encountered during their ICT journey.

The first paper (*"He Matapihi ki te Mana Raraunga" - Conceptualising Big Data through a Māori lens*) by Māui Hudson, Tiriana Anderson, Te Kuru Dewes, Pou Temara, Hēmi Whaanga and Tom Roa conceptualises Big Data through a Māori cultural lens. This area of growing significance and concern for many iwi, institutes, societies, communities, hapū and whānau, encapsulates the growing discourse on Indigenous Data Sovereignty, digital ethics, cultural and intellectual property rights, as well as issues of the governance, assessment, use and management of Indigenous data. This paper presents 'Te Mana o te Raraunga Framework', a framework that incorporates core Māori concepts to assess data, its use, and potential users of the data.

The second paper (*He mahi māreikura: Reflections on the digitising the Pei Jones' collection*) by Hēmi Whaanga is a personal reflection on the digital journey of the works and collected taonga of one of Māoridom's prominent scholars, the late Dr. Pei Te Hurinui Jones. It discusses the ongoing transformation of this collection from its current physical location to its digital manifestation.

The third paper (*Māori domains*) by Karaitiana Taiuru discusses how Māori domains have not only created a mechanism for Māori representation on the Internet, but also as a catalyst for other Indigenous Peoples to ensure representation in their countries. He notes that it was the work of a small group of passionate Māori individuals from the Internet community who were responsible for this significant change to occur in Aotearoa.

This paper is followed by *FamilySearch: Māori, Mormon & whakapapa* a paper by Michael W. Taiapa. In this compelling paper on whakapapa, Michael describes FamilySearch (FS), a whakapapa programme developed by the LDS Church, and some of the current issues associated with the current framework for general users and its impact on Māori members of the LDS Church.

Following are four papers on mapping and Indigenous mapping. The first by O. Ripeka Mercier, Bruce McFadgen and Arama Rata (*Keep teaching this! Engaging Māori Studies students with digital cultural mapping tools*), outlines a Te Kawa a Māui Atlas project at the Victoria University of Wellington to incorporate mapping assignments and activities into their Māori Studies courses. Here an overview of the project is provided, alongside student responses and the variety of mapping strategies and software that students have used in their courses. The second paper from Victoria University of Wellington by Vini Olsen-Reeder (*Mapping linguistic landscapes: Where geo-tagging meets geo-linguistics*), describes linguistic landscaping and its relevance to their Indigenous Language Planning and Policy paper. An intriguing account shows the potential for geo-tagging tools and cultural mapping tools to aid in language reclamation and revitalisation. There follows a paper by Hauiti Hakopa, Anne-Marie Jackson, Ngahuia Mita and Chelsea Cunningham on the *Te Koronga: Mapping case studies.* Three mapping case studies are presented in this paper. The first case study, by Dr Hauiti Hakopa, details his research and practice as a surveyor working for his iwi of Ngāti Tūwharetoa. The second by Chelsea Cunningham discusses the research she undertook as a Ngā Pae summer intern, which she later used

as a pre-cursor to her doctoral studies with her whānau of Ngāti Kahungunu. The third case study is drawn from Dr Anne-Marie Jackson who led the National Science Challenge Sustainable Seas research, in collaboration with Ms Ngahuia Mita and Dr Hauiti Hakopa, focussing on one example of how to utilise mapping for engaging in Mātauranga. The final paper on mapping is by Moka Apiti on *The Indigenous Mapping Waananga 2017*, held in Hamilton from 15-18 May. This paper describes an initiative that sought to engage iwi and Indigenous communities with GIS and 'new' state of the art geospatial tools through the form of wānanga.

The final two papers in this section are on Māori astronomy by Liliana Clarke and Pauline Harris (*Maramataka*), and Pauline Harris (*Portable planetariums in the teaching of Māori astronomy*). The first paper describes how technology has enabled an enhanced experience within the maramataka research and education space. This chapter outlines the various digital technologies including GIS, Google Maps API, Heliacal Star Rising and Moon Phase Calculator and Stellarium that have been used to research the maramataka. The second paper highlights the work of the Society for Māori Astronomy Research and Traditions (SMART) who is at the forefront of revitalising Māori astronomical knowledge. In this paper Harris discusses some of the technology, avenues and projects that SMART have used to transfer this knowledge back to our communities.

Conclusion

This brief introduction has highlighted the scope and power of ICT for Māori. However, it must be noted that ICT not only has the power to make changes in Māori communities it also has the power to reinforce social disparities as Māori continue to be overly represented in the 'digital divide'. Māori continue to suffer from a lack of internet access in their homes, make-up less than 2.5% of the ICT workforce, are more likely to be employed in the lower skilled ICT occupations, and are underrepresent in training for computer-related subjects (less than 1% of Māori are studying towards an ICT qualification) (Figuracion & MBIE, 2015; Sylvester, Toland & Parore, 2017; Whaanga & Wehi, 2015). The ongoing challenges of representation of Indigenous peoples through new ICT platforms remain as they are still operating within ongoing colonial contexts. Therefore issues of power, control, definition and representation remain pertinent to ensuring new technologies do not perpetuate marginalising discourses. Notwithstanding these challenges, the opportunities for this technologically savvy generation to lead and engage in the development of future technologies like machine learning, deep learning and artificial intelligence, edge computing and shared and mixed reality environments, to inform, enhance, reclaim and revitalise linguistic, cultural, social and economic futures is enormous. It would be advisable for these future leaders to draw from the personal experiences and ICT journeys shared by each of the contributors of the following chapters, many of whom are the ICT innovators, scholars, industry and technology leaders of this generation. In this way, the traditional tuakana/teina relationship is sure to be maintained for future generations.

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"He Matapihi ki te Mana Raraunga" - Conceptualising Big Data through a Māori lens

Māui Hudson, Tiriana Anderson, Te Kuru Dewes,
Pou Temara, Hēmi Whaanga & Tom Roa

Introduction

Advances in computer technology and analytical processes create an environment where data becomes the raw material mined to create valuable information and insights. The idea of Big Data emerges from the collation of increasing vast amounts of data enabled by the shift towards an increasingly open data environment. How this changing context alters the relationship between Iwi/Māori collectives and their mātauranga, cultural information and data has yet to be fully explored. However, the concept of Māori Data Sovereignty, which anticipates Māori governance over Māori data, has a natural appeal. This chapter outlines some of the Māori concepts and presents a framework which may be used to inform how data and data use may be conceptualised through a Māori cultural lens.

Data and sovereignty

Ko te pūtake o te Māoritanga ko te Reo Māori, he taonga tuku iho nā Te Atua.[1]

Mana has always been a central component of Māori self-determination and since the signing of Te Tiriti o Waitangi in 1840 issues of sovereignty continue to be debated. The purpose of the agreement between Māori chiefs and the British Resident Governor William Hobson was to ensure Māori retained control over taonga (e.g., land and resources) and maintained rangatiratanga (rights of self-determination) across their communities (Belich, 2001; Orange, 2011; Walker, 2004). While the context has changed significantly over the past 177 years, the aspiration for self-determination remains and sovereignty as a concept continues to resonate with Iwi across the country albeit with a different focus.

The language of sovereignty as it relates to the world of data has a different way of being conceptualised. Data Sovereignty is a relatively new concept which generally refers to a spectrum of approaches adopted by different states to control data generated or passing through national internet infrastructure (Peterson, Gondree & Beverley, 2011; Polatin-Reuben & Wright, 2014). As data is subject to the laws of the nation within which it is stored, it has been necessary to establish data location with sufficient granularity for placing it within the borders of a particular nation-state (Peterson, et al., 2011). Data Sovereignty has become a significant issue globally with the growth of cloud computing services and concerns about securing sensitive national data from foreign surveillance.

Indigenous Data Sovereignty has also emerged as a significant issue for indigenous peoples as a means to exert control over their data resources. Indigenous Data Sovereignty perceives data as subject to the laws of the nation from which it is collected (Kukutai & Taylor, 2016). This establishes a frame of reference that expects Indigenous involvement

in the governance of data and raises questions regarding the proper locus of ownership and management of data that are about Indigenous peoples, their territories and ways of life (Harding, et al., 2012; Taylor & Kukutai, 2015). Indigenous Data Sovereignty brings together discourses on Indigenous research ethics, cultural and intellectual property rights, nation-building, and Indigenous governance, within a frame of tribal sovereignty and self-determination (Kukutai & Taylor, 2016). Many of the features of indigenous data sovereignty are evident in the First Nations' principles of ownership, control, access and possession (OCAP) in relation to research data in Canada (Schnarch, 2004; First Nations Information Governance Centre, 2014). Indigenous Data Sovereignty reflects a desire for protecting collective interests in data which centre on access to data for governance (e.g., to realise Indigenous community aspirations), and governance of data (e.g., to control access to and use of Indigenous data).

Māori Data Sovereignty recognises that Māori data should be subject to Māori governance and that Māori organisations should be able to access Māori data to support their development aspirations (Hudson, Farrar, & McLean, 2016). In New Zealand, Iwi and Māori organisations face a number of key challenges in accessing timely, relevant and accurate data in order to meet their development aspirations (Kukutai & Taylor, 2016). Māori data refers to data produced by Māori or that is about Māori and the environments we have relationships with. Māori Data includes but is not limited to:

- Data from organisations and businesses;
- Data about Māori that is used to describe or compare Māori collectives; and
- Data about Te Ao Māori that emerges from research.

Māori Data Sovereignty draws on discourse from Te Tiriti o Waitangi, Māori research ethics and cultural intellectual property to inform contemporary challenges around the use of data (Boulton, Hudson, Ahuriri-Driscoll & Stewart, 2014; Hudson, et al., 2016; Waitangi Tribunal, 2011). Collective interests may be constructed at different levels, leading to the use of the terms Indigenous Data Sovereignty, Māori Data Sovereignty and Iwi Data Sovereignty. Iwi Data Sovereignty reflects the operationalising of Indigenous Data Sovereignty and Māori Data Sovereignty principles within tribal data boundaries (Hudson, et al., 2016).

Data and the Waitangi Tribunal

Whaowhia te kete mātauranga.[2]

Māori interests in data have been expressed through a number of claims to the Waitangi Tribunal, a permanent commission of inquiry that looks into Crown actions that Māori feel have breached the principles of the Treaty of Waitangi. Its foundation is the Treaty of Waitangi Act 1975 and the Tribunal has made a number of important recommendations on issues relevant to data including te reo Māori (Waitangi Tribunal, 1986), the allocation of

radio frequencies (Waitangi Tribunal, 1990), and Law and Policy affecting Māori Culture and Identity (Waitangi Tribunal, 2011). While these claims have not been directly related to data they have a primary interest in mātauranga Māori, which is comprised of data. The latter report titled '*Ko Aotearoa Tēnei (This is Aotearoa)'*, is commonly known as the Wai262 claim or, the flora and fauna claim. The claim was lodged in 1991 and was based around concerns pertaining to the collection and use of Indigenous plants, and Māori being denied their tino rangatiratanga (absolute authority) over the use of these natural resources. The report included sections on genetic and biological resources of taonga species, intellectual property rights and bioprospecting (Waitangi Tribunal, 2011).

The key issue relating to data within a Treaty of Waitangi context is whether Māori data can be considered as taonga and therefore subject to treaty principles. Kahui Legal (2016) suggest that while the Waitangi Tribunal has not specifically considered whether Māori data is a taonga, it is clear from the Tribunal's reports that for something to be classified as taonga, it must be valued and treasured by Māori, and it must be significant and important to Māori. The issue of data is likely to be context specific and Māori data held by the Crown could be classified on a spectrum with a sliding scale of Crown obligations and Māori rights and interests. A common thread that emerges from the Tribunal Reports is that taonga are subject to Treaty principles and the Crown correspondingly has Treaty obligations and responsibilities. In particular, the Crown is obliged to actively protect taonga, consult with Māori in respect of taonga, give effect to the principle of partnership and recognise Māori rangatiratanga over taonga (Kahui Legal, 2016).

Data as a taonga

Not everything that can be counted counts, and not everything that counts can be counted.[3]

Dewes (2017) interviewed key informants as part of a pilot project that explored the question "Is data a taonga?" The informants identified that data is the way humans describe the world around them, that data is merely representative of a source of information, and that the context of the information determines whether or not the data should be regarded as taonga. As taonga varies between contexts, thought should be given to examples that have been previously considered or defined as taonga, such as airwaves and customary fisheries. How data is derived emerged as an important consideration for informants. Personal data, which relates to the individual, carries a high level of sensitivity and should therefore be considered as a taonga. Utility also influences perception when contemplating whether data is a taonga. The example of a tree was used to illustrate that both firewood, a canoe and a carving can come out of the same tree. The use can determine how the object is viewed and that "all data is potential taonga it is related to its utility, through technology or usefulness to the collective" (Dewes, 2017, p. 14).

The informants also discussed protections associated with taonga. In terms of data management, levels of protection are tied to levels of sensitivity. One of the key themes, which emerged from participant interviews, was the emphasis on the sensitivity

of data which carries information about an individual or their family. When discussing the assignment of protections to data, "information collected about individuals that identify the individuals, or their whānau, or their circumstances that might enable them to be identified, definitely needs to be protected" (Dewes, 2017, p. 15). The study identified provenance, opportunity, and utility as the three key aspects that determine whether data is or could be a taonga.

Data and tikanga

E koekoe te tūī, e ketekete te kākā, e kūkū te kererū[4]

While context determines the nature of the taonga, it also identifies tikanga to determine how to look after it. Tikanga are customary practices which are pertinent to a group and remain relevant to that group. Anderson (2017, p. 8) identified, through a pilot project, a range of Māori concepts relevant to discussions about the management of big data including *tapu/noa, mauri, pukenga, tika, pono, whakapapa, kaitiaki, wānanga,* and *mana*. As one of his informants stated, "if you don't understand the Tikanga, context and history then you cannot interpret the data or information". The relevance of Māori concepts guiding the management of data, was reiterated by Dewes (2017) and, reflected in 'Te Mana Raraunga Charter (2016)'.

Te Mana Raraunga (Māori Data Sovereignty Network) was established in 2016 to advocate for Māori rights and interests in relation to data, ensuring data for and about Māori is safeguarded and protected, and that data is utilised to advance Māori aspirations for collective and individual wellbeing. Through its charter, Te Mana Raraunga asserts that;

- Māori data is subject to the rights articulated in the Treaty of Waitangi and the UN's Declaration on the Rights of Indigenous Peoples;
- Data is a living taonga and is of strategic value to Māori; and
- Māori data refers to data produced by Māori or that describes Māori and the environments they have relationships with.

The Charter recognises the need to consider both governance and operational levels, and outlines guiding principles to support the realisation of Māori Data Sovereignty according to the 'Mana-Mahi Framework' based on Māori values (*Figure 1*).

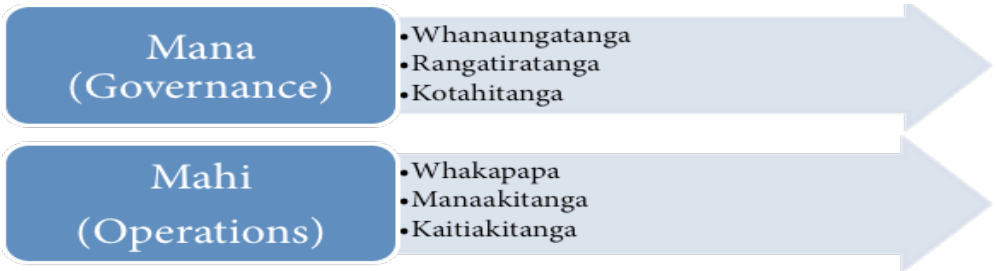

Figure 1: *Mana-Mahi Framework*

- **Whanaungatanga and Whakapapa:** Whanaungatanga refers to the philosophical relationships between man, Te Ao Tūroa (the natural world) and Te Taha Wairua (spirit world). Whakapapa establishes those linkages and identifies the nature of the relationships.
- **Rangatiratanga** speaks to the hapū, iwi/Māori aspiration to be in control of their own affairs and to influence those taking place within iwi boundaries.
- **Kotahitanga** relates to a collective vision and unity of purpose while balancing the mana of rangatira from hapū and iwi.
- **Manaakitanga** can be expressed through the responsibility to provide hospitality and protection to whānau, hapū, iwi, the community and the environment.
- **Kaitiakitanga** speaks to the hapū, iwi responsibility to be an effective steward or guardian and relates to actions that ensure a sustainable future for all people (Te Mana Raraunga, 2016).

Te Mana o te Raraunga Framework

The cultural concepts identified by Anderson (2017) have been used to create the 'Te Mana o te Raraunga Framework'. The framework resembles a takarangi, consisting of two independent interwoven spirals. As you track along either the tapu or noa spiral you pass through each of the four planes representing core Māori concepts relevant to the management of data. These concepts inform the questions that relate to an assessment of the data, an assessment of the data use, and an assessment of the data users.

The takarangi reflects the duality that informs a number of concepts in Te Ao Māori and supports an assessment of the secondary use of data. We consider the secondary use of data the key issue in the data use context, as most parties will have agreed to its collection for its primary purpose. Subsequent uses, without explicit permission, through data linkage, data sharing, or data aggregation, create the potential for *kaiātanga* or (mis)appropriation. Each plane has two cultural concepts, which provide the context for the questions that should be answered in relation to the secondary use of the dataset. The concepts have dynamic and often interdependent relationships. The concepts represented in the green planes reflect expectations around data use. The concepts represented in the red planes reflect expectations of data users.

The 'mana o te raraunga' relates to the inherent value or 'taonga' nature of the data. Dewes (2017) identified three key factors that relate to determining the taonga nature of any data set:

1. the Provenance of the data;
2. the Opportunity for the data, and;
3. the Utility of the data.

The POU assessment comprising three questions can be applied if there is debate about whether the dataset is a taonga:

1. Provenance of the data: Does the dataset come from a Māori source?
2. Opportunity for the data: Could the dataset support Māori aspirations for their people or their whenua?
3. Utility of the data: Does the dataset have multiple uses?

Any data set identified as being a taonga, through this POU assessment, has an inherent mana, which needs maintenance through its use and application.

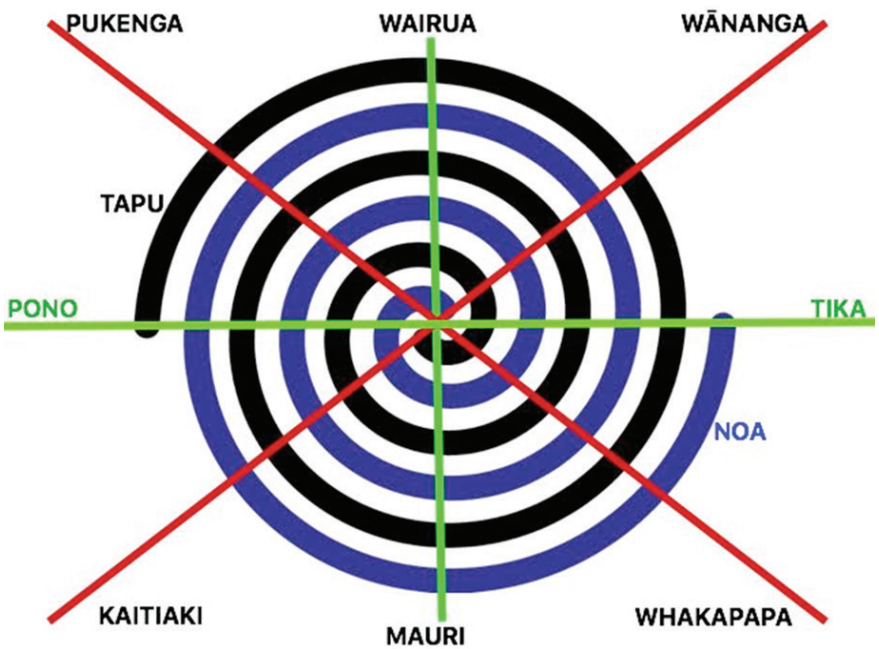

Diagram 1: *Te Mana o te Raraunga Framework*

Assessment of the data

Tapu / Noa

The two spirals represent the dynamic forces of tapu and noa. Tapu and Noa co-exist in relation to each other and therefore have a symbiotic relationship which is at times

wholly tapu or wholly noa but often with aspects of both. **Tapu**, the black spiral, reflects an assessment of the '**level of sensitivity**' associated with the data. This can be determined by asking the question "*How sensitive is the data?*" **Noa**, the blue spiral, reflects an assessment of the '**level of accessibility**' to the data. This can be determined by asking the question "*How accessible should this data be?*"

Assessment of the data use

Tika / Pono

The horizontal plane with Tika and Pono relates to the integrity associated with the use of the data. **Tika** refers to the '**level of value**' associated with the use of the data. Tika means correct and we relate correctness to the value and benefits that accrue to the community. This is assessed by asking the question "*How does the use of this data add value to the community?*" **Pono** refers to the '**level of trust**' associated with the use of the data. Pono relates to the trustworthiness of the process and outcomes of the using the data. It is assessed by asking the question "*Will the community support this use of the data?*"

Mauri / Wairua

The vertical plane with Mauri and Wairua relates to the authenticity associated with the use of the data. **Mauri** refers to the '**level of originality**' associated with the data. Mauri in this context is related to the source or origin of the data and is assessed by the question "*How unique is the data?"* Wairua refers to the '**nature of application**' associated with the use of the data. Wairua relates to the spirit in which the data is being used and can be assessed by the question "*Is the data being used in the same spirit as its origin use?"*

Assessment of the data users

Whakapapa / Pukenga

The angled plane with Whakapapa and Pukenga relates to the mandate to use the data. **Whakapapa** refers to the '**level of relationship**' associated with the data. Whakapapa in this context indicates a right of access and is assessed by the question "*Does the user have an existing relationship with the data?"* **Pukenga** refers to the '**level of expertise**' associated with using data. Pukenga in this context relates to the ability to use data in a culturally appropriate manner and is assessed by the question "*Does the user have the expertise and experience to use data in a culturally appropriate manner?"*

Kaitiaki / Wānanga

The angled plane with Kaitiaki and Wānanga relates to the stewardship of the data. **Kaitiaki** refers to the '**level of authority**' associated with stewardship of the data. Kaitiaki in this context relates to the cultural competency of the people with authority for protecting the data and can be assessed by the question "*How will the data be protected from inappropriate use*?" **Wānanga** refers to the '**level of responsibility**' associated with institutions that manage the data. Wānanga in this context relates to the infrastructure that supports the

stewardship of data and is assessed by the question "*Does the institution have the necessary infrastructure to ensure the use of the data in a culturally appropriate manner?"*

Table 1 summarises the assessment questions that help assess the level of sensitivity and taonga value (high, medium, low), which supports the identification of an appropriate level of data management.

Table 1: *Assessment Questions for Te Mana o te Raraunga Model*

Concept	**Characteristic**	**Assessment Question**
Tapu	Level of sensitivity	"*How sensitive is the data?*"
Noa	Level of accessibility	"*How accessible should this data be?*"
Tika	Level of value	"*How does the use of this data add value to the community?*"
Pono	Level of trust	"*Will the community support this use of the data?*"
Mauri	Level of originality	"*How unique is the data?"*
Wairua	Nature of the application	"*Is the data being used in the same spirit as its original use?"*
Whakapapa	Level of relationship	"*Does the user have an existing relationship with the data?"*
Pukenga	Level of expertise	"*Does the user have the expertise and experience to use data in a culturally appropriate manner?"*
Kaitiaki	Level of authority	"*Will the data be protected from inappropriate use*?"
Wānanga	Level of responsibility	"*Does the institution have the necessary infrastructure to ensure the use of the data in a culturally appropriate and ethical manner?"*

Levels of management

Māori data considered to be taonga by Iwi could utilise the Te Mana o te Raraunga Framework to assess the level of data governance required to ensure the trusted use of Māori data. High value or sensitive data would likely require a more active approach to data governance with Māori having control over data, or some kind of Māori partnership arrangement in relation to the data. Moderately valued or sensitive data might be more suited to a more passive approach to data governance consulting with Māori in respect of the use of Māori data and/or disclosing the use of Māori data to Māori (Kahui Legal, 2016). Data identified having low taonga value might be subject to a creative commons license or made available within the public domain. The next step in this programme of work is to identify specific tikanga able to be utilised in supporting these approaches to the

governance of indigenous data (Bruhn, 2014; Boulton et al., 2014).

Summary

The emerging open data environment and Big Data movement provides an interesting conceptual challenge for Iwi/Māori collectives to protect their rights and interests in data. Māori Data Sovereignty has a natural appeal for Iwi/Māori collectives as it calls for greater control over Māori data sets. However, it is important to ground Māori approaches to data in a Māori worldview and utilise Māori concepts and tikanga as the conceptual basis for data use activities. The Te Mana o te Raraunga Framework begins a process of aligning Māori concepts with their rights and interests to data and support Iwi/Māori collectives to articulate their expectations of appropriate data use.

Endnotes

[1.] Te Kapunga Dewes (2000).

[2.] Mead and Grove (2003, p. 424).

[3.] Albert Einstein.

[4.] Mead and Grove (2003, p. 30).

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He mahi māreikura: Reflections on the digitising of the Pei Jones' collection

Hēmi Whaanga

Abstract

The astounding growth in digital content in the past decade alongside the proliferation of Mātauranga Māori being made available through this medium has transformed and affected the ways in which we participate and communicate locally, regionally, nationally and globally. These advances have expanded the possibilities for both preserving and sharing our knowledge in non-traditional formats with our people and other Indigenous peoples across the world. This paper reflects on the digital journey of the Pei Jones' Collection from its various origins to its current physical and digital manifestation in the University of Waikato Library.

Background

My involvement with the Pei Jones' Collection first began with a dear friend and colleague, the late Rangiiria Hedley (of Ngāti Tūwharetoa). I assisted her and a number of other Māori colleagues with the conservation and cataloguing of the books, photographs, kākahu and taonga of one of Māoridom's finest writers and scholars, Dr. Pei Te Hurinui Jones (Ngāti Maniapoto). My role changed from a colleague and assistant to a leadership one when our research team applied for and was successful in obtaining funding from Ngā Pae o te Māramatanga. The funding that we secured was to undertake research, collate and develop ethical processes and appropriately display, in a digital format, the manuscripts, works and collected taonga of Pei Jones. While participating in the transition of Jones' Collection from its various locations in Aotearoa, and then leading the research on the digitisation of the collection, I observed and have been part of, a remarkable and often very complex collaborative process. A critical factor in the success of this project has been the close working collaboration that developed with Pei's whānau and the application of various tikanga. These ethical and guiding principles were applied throughout the project from initial negotiations, subsequent archiving, cataloguing, and development of the physical layout and conservation through to the on-going digitisation of the collection. In the following, I recount many of the observations I noted during this journey.

The Pei Jones' Collections

Dr. Pei Te Hurinui Jones was a noted Māori scholar, advisor to the Kīngitanga, and a respected leader in the revival and retention of the Māori language, cultural knowledge and heritage in the 20th century. During his lifetime, he amassed an impressive collection of books, manuscripts and taonga through his many interactions with foreign dignitaries, chiefs, rangatira, Māori leaders and whānau (see Baksh, 1991; Biggs, 2005; Hurst, 1996; Jones, 1982; Jones, Biggs, & Tainui Maori Trust Board, 2004 and Whaanga & Hedley,

2006 for a biographical sketch of Pei Te Hurinui Jones). Following his death in 1976, his collection of over 30,000 items were split into two parts, with some of the material remaining with his second wife, Kate Huia Apatari and her whānau (approximately one-third), and the remainder being placed with Brian Hauāuru Jones, Pei's son from his marriage to Hepina Te Miha. By the late 1980s, "Brian Jones was considering storing and making available his father's collection of published and manuscript material for future researchers following the scholarly example set by his father" (Whaanga & Hedley, 2006, p. 8). In 1990, Brian deposited his fathers' manuscripts of approximately 20-30,000 pages with the University of Waikato Library in the light of the close relationship that Pei, the Jones whānau and the University of Waikato had established over the years. The material was collected from Brian's residence at Taupō (Waipahihi), by the late Professor Evelyn Stokes and Jennifer King (then Chief Librarian). A qualified archivist, Salim Baksh, was employed by the University of Waikato Library to carry out the work on a short-term contract to archive and catalogue the materials (Baksh, 1991). In 1994, the collection held by the Apatari whānau was transferred to the Alexander Turnbull Library in Wellington. This significant collection contained 142 folders of holographs, manuscripts, typescripts and printed matter including, various correspondence, drafts and notes relating to Pei's various literary works, subject files on various political matters, some early Kīngitanga papers, whakapapa and other research material.

A digital journey

My first interaction with the Jones' whānau and the various taonga of Pei Te Hurinui began in 2002, following an informal discussion between Brian Jones and Rangiiria Hedley, a relative of Brian and Pei who was an expert in conservation and a staff member in Te Pua Wānanga ki te Ao at that time. This conversation centered on the possibility of depositing the remainder of Brian's collection with the earlier collection held at the University of Waikato. For Brian Jones, this part of the collection held many significant memories and taonga. Most importantly, it contained his fathers' prized possessions and memorabilia, such as the books which, provided inspiration for his literary masterpieces, various family photographs and kākahu. A number of taonga including various Ngāti Maniapoto whakapapa scrolls, huia feathers, pendants belonging to King Pōtatau Te Wherowhero, King Tāwhiao, Te Heuheu Patatai, Te Rauparaha and a patu ōnewa used to lay down tribal boundaries were also gifted (see, for a full discussion, Anderson, 2012; Whaanga & Hedley, 2006; Whaanga et al., 2012).

At this juncture of the journey, a range of hui were held between the whānau, Te Pua Wānanga ki te Ao, and Māori staff and key personnel in the University of Waikato Library, to discuss critical issues regarding ethical, cultural and financial implications of accepting a gift of this magnitude. After lengthy negotiations, a contractual agreement was reached concerning the nature of custodial gift. Known as the Whakaaetanga ā-pukapuka mō Te Tiaki i te Takoha o te whakahiatotanga a Pei Te Hurinui (Deed of Custodial Gift Pei Te Hurinui Collection), it carefully considers the act of gifting in addition to the five broad

areas identified during the initial discussion stages:

i. Te Takoha me te Whakaaetanga (Gift and Acceptance),
ii. Te Tiakitanga (Custody),
iii. Ko te Whai Wāhi Atu (Access),
iv. Tiaki (Care), and
v. Inihua (Insurance).

Of importance is the conceptualisation of Te Tākoha, in this application, which considers the possibility that, if at any time or for any reason, the terms in which these taonga were gifted changes, then the gift must be returned to the whānau (Whaanga & Hedley, 2006).

A small room was provided and named Mahi Māreikura after the title of Pei's manuscript, Te Tuhi Māreikura, a work dealing with the Māori account of the creation based on priestly lore of the Tainui people (Jones, 2013 a & b). From this base, we sought to establish and develop a culturally appropriate process to display and conserve his works and taonga within an academic institute. We considered the mana, whakapapa (genealogy), relevant kōrero (history), and usage, of each object in relation to the central subject, Pei Jones. We then arranged the collection, so far as the room size and shape would allow, according to the layout of a whare puni (an ancestral meeting house). Thus, for example, visitors, guests, or, in this case, researchers, students or family members, are called to enter through Te Tatau (the doorway) to explore and to grasp the knowledge which has been taught/ handed down and housed on Te Tara Nui, the right-hand side designated for manuhiri. The taonga are also defined and arranged in terms of these principles as they are located at the back wall; an area normally designated for rangatira and their photographs. In approaching the collection in this manner we challenged many of the practices and ethical procedures currently followed in libraries, museums and archives (Whaanga & Hedley, 2006, p. 13). Institutions normally split up a collection and their associated taonga according to their classification system and the various items are shelved or stored according to subjects and subdivisions within those subjects. In establishing Mahi Māreikura it was agreed by all parties that no part of collection would be separated. Our goal here was to ensure that the collection would remain as one for perpetuity and that any future students and researchers would experience, visualise and be inspired by the same books, writings, and taonga that inspired Pei to produce his many masterpieces.

During the developmental stages of the project, Brian Jones discussed the possibility of providing digital access to the collection for whānau members, scholars and researchers. In honouring this request, we applied for and were successful in obtaining funding from Ngā Pae o te Māramatanga. We first established an advisory group of key stakeholders whose membership was based on Pei's:

whakapapa (genealogy) links, representation from Pei's whānau, his close

> association with Kīngitanga, Tainui, Ngāti Tūwharetoa and the University of Waikato, representation from Māori academics at the institution that the collection was gifted to, and representation of the University of Waikato Library who administer and care for the collection. (Whaanga, et al., 2015, p. 533).

This group consisted of the various key personnel that were also central to the development and establishment of 'Mahi Māreikura'. The advisory group was formed to address areas of concern regarding the management, conservation, care and display of mātauranga Māori and taonga Māori in a digital context. Its key function was to establish protocols and procedures, as well as providing valuable guidance and advice. Three broad themes were identified from the hui held with key stakeholders: kaitiakitanga; contextualisation of information; and content development which also provides control across multi-layered access points (Anderson, 2012; Whaanga, et al., 2012; 2015).

Kaitiakitanga, in the context of the Pei Jones' Collection, was based on the experience of mauri (life principle, vital essence), mana (control), tika (be correct, right, just, fair), tapu (be sacred, prohibited, restricted), and noa (be free from the extensions of tapu, ordinary, unrestricted) of the collection and the protocols of kaitiakitanga (guardianship or preservation). The digital medium created a different level of connection, which brought with it a different wairua. In response to this, the advisory group suggested establishing a working guide of kaitiaki values, which would provide guidance on representation, provenance, context and the digitisation of the collection.

The group identified the 'contextualisation of information' as an extremely important aspect of the digitisation process. They noted that in order to maintain the integrity of the collection it requires an appropriate context with which to work from. As large portions of the collection are based on whānau, hapū and iwi knowledge, provenance was strongly emphasised as an essential component in the maintenance of integrity of the collection. A number of possible strategies were suggested including timeline diagrams, templates based on Pei's cosmology charts, diagrams and themes within the collection, which could be used to symbolise the content of the collection (see, for a full discussion, Anderson, 2012; Whaanga & Hedley, 2006; Whaanga, et al., 2012; 2015).

The 'control of content, and the development of multi-layered access points', were discussed at length by the advisory group (Anderson, 2012; Whaanga, et al., 2012; 2015). A number of possible strategies were suggested in relation to content development such as a model based on the crowd sourcing of the information where whānau assist with the development and control of content including the editing, proofing and checking of the content, in addition to being part of the control and management of content, that is, identifying important information and content that may need to be embargoed. The goal here for whānau, hapū, iwi "is to provide the procedures in which they can control their own knowledge and information and are full participants in the decision-making process" (Whaanga, et al., 2015, p. 534).

In conceptualising a digital space for the collection, we investigated the potential

of a model based on Tainui kaupapa, Kaupapa Māori and tikanga. The model proposed by members of the Advisory Group is based on Tāwhaki's ascent to the highest heaven to collect the baskets of knowledge:

> Similar to Tawhaki's ascent to collect the baskets of knowledge, the development of digitization processes is a process of trial and error. At times there will be successes in terms of the ethical and technical challenges and at other times a reformulation of the task is required in order to advance . . . The consolidation of that knowledge base is an essential part of the journey. For example, on arriving to the highest heaven, Tawhaki collected the baskets of knowledge and the stones of consolidation (both formal and informal), and on his return he consolidated these forms of knowledge as mauri . . . (Whaanga, et al., 2015, pp. 535-536):

Incorporating these aspects, the guiding principles provided by the advisory group, and in particular, the control of content and the development of multi-layered access points, the concepts of knowledge consolidation, and the contextualisation of information, posed a number of technical challenges for the research team. In response to the challenge of ensuring that the whānau were full participants in the decision-making process and the development and control of content, we chose to use Greenstone Digital Library software as our platform. Produced by the New Zealand Digital Library Project at our institute it has been developed and distributed as an open source, multilingual software in cooperation with UNESCO and the Human Info NGO Belgium over the past 17 years (Witten, Bainbridge & Nichols, 2010), Greenstone is issued under the terms of the GNU General Public License. This license agreement guarantees the freedom to share and change all versions of a program to a broader audience. As a research team, we considered it appropriate and advantageous to use software developed by our institute and used to create similar repositories, which contained mātauranga Māori. We also considered it beneficial that any developments, frameworks and protocols implemented in this project could, potentially be shared at no cost with other iwi, societies and communities in Aotearoa and further afield. To enhance the repository features we developed a range of enhancements and software (Whaanga, et al., 2015, pp. 536-543):

- A Māori language macronizer (see http://community.nzdl.org/macron-restoration/jsp/en/about.jsp.)
- A spatial hypermedia browser and editor (see Scrivener, 2012).
- A Digital Library toolkit (see Cader, 2012).

The Māori language macronizer provided a quick mechanism for us to add macrons automatically to text produced by OCR on scanned documents. This feature greatly enhanced the consistency of the reproduced text we were working with. The spatial hypermedia editor provided us with a method to test and trial the various ways in which

we could contextualise the spatial relationships that existed between the taonga and their historical and contextual significance to Pei. The Digital Library toolkit provided an enhanced functionality framework with which to manage the digital versions of the collection (Cader, 2012; Scrivener, 2012; Whaanga, et al., 2015). We aimed here to address the systems functionality and user experience. We also developed a proof of concept model based on the crowd sourcing of the information to edit, proof, check and embargo content. During this phase of the project, we felt it was critically important to implement a kanohi ki te kanohi (face to face) approach to these technical developments. For example, we worked closely with our computer scientists and programmers to stress and highlight the importance of the historical, cultural and spiritual link (both tangible and intangible), of the taonga and manuscripts to Pei.

Conclusion

In this brief paper, I have recounted some of the decisions we collectively made in the conservation, cataloguing and digitising of the many remarkable taonga, books, photographs, kākahu and manuscripts of one of Māoridom's finest writers and scholars. In accepting this taonga, we applied a range of tikanga and formulated a number of procedures to safeguard that not only the mana of the collection would be cared for, but also Pei's mana would be ensured throughout this journey. Thus, we developed deeds based on our notion of custodial gift and established a room formulated on the layout of a whare puni where the taonga were arranged according to their mana, whakapapa, relevant kōrero, and usage, in relation to the central subject, Pei Jones. We setup an advisory group of key stakeholders based on Pei's many whakapapa links with representation from Pei's whānau, the University of Waikato, and University of Waikato Library who administer and care for the collection. We developed a digital repository with a range of features that provide mechanisms for Pei's whānau to be central to the decision-making process where they can control, edit, proof, check and embargo content. All of this I believe was undertaken to preserve Pei's mana and to share his knowledge and scholarship with future generations. Many members of the initial group that first met to discuss the acceptance of this taonga continue to work on the premise of sharing Pei's work with the world. We recently released Pei's Shakespearean translations of 'The Merchant of Venice, Julius Caesar and Othello' where we retyped, edited and digitised his original manuscripts 71 years after he self-published The Merchant of Venice to a limited audience (Jones, 2017 a & b).

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Māori domains

Karaitiana Taiuru

Introduction

Domain names are important for Māori as they are the Internet equivalent of whakapapa and pepeha. The suffixes prior to the Internet address .nz further identify the groups that the web site or email address identify to; such as .govt.nz for government: .school for schools and .co.nz for commercial entities. The third suffix is where people self-identify themselves and their organisations. An example being taiuru.maori.nz. The suffix .nz represents that I am in New Zealand, the suffix .maori states that I identify as Māori, and finally, the suffix taiuru is personal self-identification and ownership.

The Internet was introduced to New Zealand in 1989 as an academic research tool. At that time there was no consideration for Māori rights, nor for the Treaty of Waitangi. In early 2000, despite over a decade of growing Internet use, Māori remained in the lower end of the user scale with the least access and use of the Internet (Parker & Te Puni Kōkiri, 2001). Another 17 years later in 2017, tikanga and digital integration has yet to be recognised. For example, New Zealand's cyber safety organisation NetSafe do not incorporate tikanga resources or Māori specific resources.[1]

It would appear that there was no thought or consideration for Māori representation by InternetNZ (guardians of the Internet Domain Name System in New Zealand) when policies were created for the daily management of its structure. In a similar manner to the Māori street protests of the 1970s and 80s, Māori online took the protest from the street to the Internet, actively lobbying for equal and equitable representation on the Internet. This was largely achieved by Māori efforts to be the first Indigenous Peoples in the world to make changes to the Domain Name System with majority support. Of 1,600 New Zealand Internet community members, 91.7% of the voters in the public consultation over '.maori.nz' supported its creation. InternetNZ, stated that the result of the Straw Poll was unprecedented.[2]

.maori.nz

.maori.nz was the world's first un-moderated Indigenous domain name first applied for in 1997 and subsequently made available on September 4, 2002. It took Māori three attempts and five years for the Internet governing body, InternetNZ, to recognise the distinct needs of Māori and to approve its implementation.

In 1997, Ross Himona led the first application. This application was a direct result of Kōhanga Reo being declined the right to use .ac.nz and .school.nz as domain names by InternetNZ, irrespective of the educational group status of Kōhanga Reo. The justification of the first .maori.nz application was to ensure that Māori could use a specific domain name that they identified with on the Internet.

The application did not meet the policy criteria developed by InternetNZ, and

the application was declined. Many individuals of the Internet community believed the Kōhanga Reo application was racist and created separatism in New Zealand. The backlash and the need for Māori to be represented online led to the creation of the New Zealand Māori Internet Society (NZMIS), which became an influential online Māori lobby group. In 2001, NZMIS and a proactive cohort of non-Māori members, under a new partnership, formed the Internet Society of Aotearoa to advocate effectively for the inclusion of .maori.nz. Again the second application attempt was thwarted and unsuccessful as it did not meet the existing criteria.

.maori.nz successful

The third, attempt was successful, and was achieved as well as implemented, on September 4, 2002, by the New Zealand Māori Society.[3] Using an online group membership that reflected a traditional group of rangatira, the leadership group, called the executive Komiti, had the author as the Chairperson. The group never met in person and used a mixture of IRC chats and MSN. Due to slow dial up Internet speeds, actual speech was rarely used. Everyone on the Komiti had an equal say and there were no rules, aside from the constitution, which was required to apply for a new domain name. The application was based on representation principles that any group could use the domain name. Although, some disagreed and wanted the domain name to be exclusively for Māori. The intention of the application was to be specifically culturally unspecific, in order to avoid being labelled as racist.

.maori.nz was the world's first indigenous domain name applied for by Indigenous Peoples, and was able to be utilised by anyone in the world. The open nature of the registration process saw one company take advantage of the process on the first day of registrations. The company registered numerous Iwi names in .maori.nz and then offered them for sale at inflated prices. A community of individuals used their technical knowledge and media networks to name the company and their immoral actions, resulting in a public apology and all names returned to their rightful Iwi.

There were several alternatives planned, in the event that the application for .maori.nz was not successful. A community of Māori individuals had created what is now known as the "Dark Net". The intention was not to create anything illegal, but to piggy back on the current internet infrastructure. his was a unique indigenous web, which had its own Indigenous domain names. The initial purpose was to enable and empower Māori and then invite other Indigenous Peoples to use it. Other options included seeking co-operation from other world governments that had similar te reo Māori domain names such as .ao in Angola to bypass the .nz system that ignored Māori and treaty rights.

.māori.nz and macrons in domain names

Non-English speaking countries, being the majority of Internet users, were seeking and developing ways the Internet could use their own languages. This demand created International Domain Names (IDN), which allowed a domain name to be created with

non-English characters. Māori preference of macrons required a minimal usage of the new technology and therefore minimal risk compared to other languages that did not use any Latin characters.

By 2005, this author had been involved for a number of years with the international internet governance body the Internet Corporation of Assigned Names and Numbers (ICANN) and was aware of the advancements and issues from non-English speaking countries who required domain names in their own language. In 2005, I wrote to the New Zealand governing body of the Internet, InternetNZ, proposing that it recognise the Māori Language Act, the Treaty of Waitangi and the orthographic conventions of the Māori Language Commission, by introducing macrons into the .nz domain name system. It was agreed to introduce non-Latin characters only for the five vowels that Māori used a macron. In consideration of anyone typing an address in capital letters, the five capital vowels would also be introduced, therefore, .nz included 10 new IDN characters ā Ā ē Ē ī Ī ō Ō ū Ū.

During this time, it was identified that the ability to have .maori.nz available with both a macron and without a macron was a simple entry into the domain name database. It was accepted that this should be the new default standard for all .maori.nz addresses. The change would reflect correct orthographic conventions for written Māori and would better cater to the majority of users, who at the time, could not type macrons on a computer.

In 2017, computers and the Internet Domain Name System are still behind and do not recognise non-Latin addresses by default. Disappointingly, a majority of New Zealand government organisations continue to ignore the use of the IDN's.[4] For people to utilise the macron in domain names, it only requires a small configuration in the web server and email client. Despite the inertia by some organisations, the IDN's are available to those who wish to use them.

Bilingual domain names

A request was lodged to the Domain Name Commissioner, a subsidiary of InternetNZ, in 2007 seeking approval to consider making the .nz hierarchy bilingual.[5] The request outlined the benefits of the change, demonstrating a commitment to the Treaty of Waitangi and the Māori Language Act. The response declined the opportunity to show leadership in this area stating it was not a policy, and the Domain Name Commissioner was not answerable to the Treaty of Waitangi as they were not a government department. Although the New Zealand government delegated authority to InternetNZ for the management of .nz, it was agreed not to pursue the matter. Around this time, a new domain, .KIWI, was launched and seized the opportunity to create a bilingual equivalent of the .nz domain name system and to prevent registration of a number of sensitive Māori names such as god names. Dot Kiwi was the first company in the world to protect Indigenous Peoples rights and to offer to represent Indigenous Peoples.

iwi.nz

In 1993, two non-Māori caretakers of the .nz domain Name System decided to create .iwi.

nz to reflect the recent Treaty settlements of Waikato and Ngāi Tahu. .iwi.nz became a moderated domain name along with .mil.nz, .govt.nz, .ac.nz, and .cri.nz, which formed the other moderated domains at that time. The lack of consultation and the lack of indigenous knowledge of the individuals, made .iwi.nz so exclusive that only iwi with a legal Trust Board could use the domain name. The registrations during the next 10 years reflected the exclusive nature of the criteria.

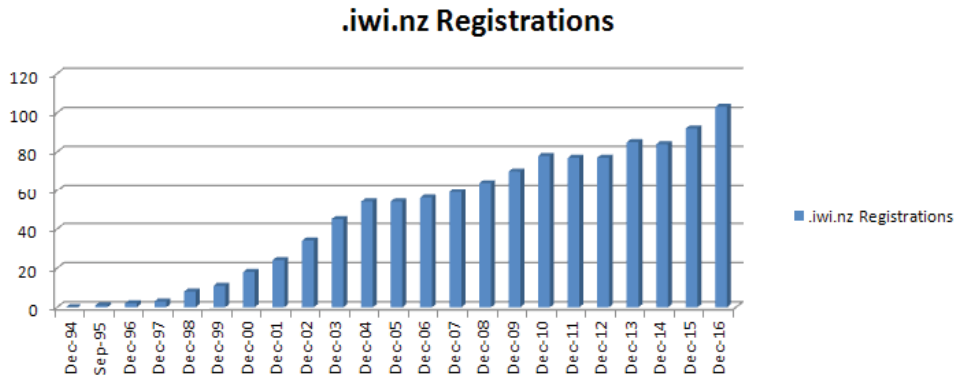

Figure 1: *.iwi.nz registrations 1994-2016*

In 2000, InternetNZ proposed to cancel or stop registrations of .iwi.nz until a suitable moderator was found. At this time the author become the iwi.nz moderator, a responsibility he still has in 2017. The first tasks the author committed to were to make amendments to the criteria to ensure any iwi could register in the .iwi.nz domain. Moriori were also included and are able to use .iwi.nz.

In the following years, three major revisions were completed on the criteria to be more inclusive of Iwi. Today with the changing nature of Iwi organisations, there is a need to review the moderation policy again.

UseNet .maori.soc.nz

UseNet was a bulletin board, discussion group part of Internet that is no longer used. UseNet was categorised by country and then communities and interests. There was no category to represent Māori and Māori culture. To create a new category an application had to be made to the community of users. A democratic and fair process that did not discriminate any groups. In 2002, after community consultation, the author proposed the creation of a UseNet group nz.soc.maori. The community voted in favour and the category was created within the .nz hierarchy. The whole process was completed in only a few months.

Conclusion

The domain names .iwi.nz, .maori.nz, .māori.nz and the ability for any .nz domain to use a macron on any of the Latin alphabet have created Māori representation on the

Internet. These achievements have been a catalyst for other Indigenous Peoples to ensure representation in their countries on the Internet. Passionate Māori individuals from the Internet community were responsible for the significant changes that allowed Māori to be represented on the Internet Domain Name System in New Zealand. There were no local or international central internet governing body or other organisation to advocate for and develop the Internet for Māori. In addition, there was no funding to assist Māori to achieve international leadership in creating a space on the DNS for Indigenous Peoples. Kaupapa Māori, tikanga, resilience as well as using a range of technical skills, created a new form of Māori street protest that eventually saw three Indigenous domain names established and Māori orthography appropriately recognised in domain names.

Endnotes

1. http://www.netsafe.org.nz
2. http://old.internetnz.net.nz/about/policies/nz/2ld/media-release020312maorinz.html
3. http://old.internetnz.net.nz/about/policies/nz/2ld/2ld01proposal-maori.html
4. http://www.taiuru.maori.nz/wp-content/uploads/New-Zealand-Government-responce-to-Te-Reo-Maori-email-addresses.pdf
5. http://www.taiuru.maori.nz/publicationslib/letter-for-a-bilingual-nz.pdf

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FamilySearch: Māori, Mormon & whakapapa

Michael W. Taiapa

Abstract

For Māori members of The Church of Jesus Christ of Latter-Day Saints (known hereafter as the Church) in Aotearoa, whakapapa is as much an integral part of their everyday life as it was for their ancestors. In their quest to become tohunga whakapapa (experts) in their own families, scores of Māori members utilise the Church's online genealogical programme, called FamilySearch (FS), as a digital platform for recording and preserving that knowledge for current and future generations. This paper will discuss some aspects of whakapapa and also raise an awareness of issues associated with the FS software, its impact on Māori members, and users in general.

The concept of whakapapa

Whakapapa (genealogy) is regarded as "most important to a Māori" the Indigenous people of Aotearoa, New Zealand (Makereti, 1938, p. 37). As the quintessential force pulsating at the heart of Māoritanga (Māori culture), it can provide a framework for tracing "the genealogical descent of all living things from the gods to the present time" (Barlow, 1991, p. 173); and is a basis for the organisation of such knowledge. Whakapapa embraces cosmogenic origins and creation stories, including historical and oral narratives borne out of 'myth' and 'traditions' (Walker, 1993, p. 1). It transcends generations of kinship ties embedded within iwi (tribe), hapū (kinsfolk) and whānau (family) and "should be carefully examined in conjunction with the history" (Jones, 1958, p. 162). As one of the most prized forms of knowledge, great efforts are exerted to preserve whakapapa (Barlow, 1991, p. 174).

Figure 1 *Hēni Pawhatai te kuia o te whānau a Taiapa (Maheno te pēpī) Tikitiki, 1916. Taiapa Archives©*

The preservation of whakapapa

The recording, delivery and preservation of whakapapa was carried out by Tohunga or Priestly experts who "were often specially trained as genealogists" (Tregear, 1904, p. 383). It may be emphasised that records were kept in the heads of men selected for the work using a system of word perfect repetition (Roberton, 1956). Demonstrating "phenomenal memories", they were highly skilled repositories of oral lore possessing the ability to recite hundreds of names of interconnecting genealogies (Ballara, 1991; Taonui, 2015). This responsibility was not wholly limited, however, to their charge alone, but included a

collective effort by "all the people in a community" both "chief and free man" to know at least their own descent lines (Barlow, 1991; Tregear, 1904). In truth, the Māori knew his or her whakapapa and exact relationship to every relative, partly due to the older people teaching their children the genealogies, histories and legends of their race (Makereti, 1938, pp. 37, 42). The recitation of whakapapa was often delivered through oral mnemonic devices, such as waiata (song), oriori (chanted to children) and/or kōrero (stories) to store and recall whakapapa information. Visual representations of this knowledge was also captured in the elaborate carvings, motifs, and symbolic messages encoded within and without the wharenui (ancestral house). A traditional practice which is highly atypical of whakapapa as a whare (Taonui, 2015). Indeed, whakapapa is the bloodline that binds tīpuna (ancestors) and mōrehu (descendants) to their culture, language and identity reminding them of their ancient origins, present conditions and future aspirations.

The LDS Church and genealogy

For members of the LDS Church, the concept and preservation of genealogy is also regarded as most important, a sacred work[1] and a fundamental tenet operating at the heart of the Mormon religion. It is the lifeline which binds them to who they are, where they come from, why they are here and, most importantly what happens to them after death. It connects them to both the living and the dead stretching back to the first parents, Adam and Eve, and to an omniscient and omnipotent god. In this respect, members regard the work of whakapapa as a covenant responsibility grounded in scripture[2] to seek out ancestors and provide for them the saving ordinances of the gospel through family history research, building temples and then performing vicarious ceremonies within these edifices (Bednar, 2011). In support of this goal, members of the Church are often called and trained to serve, as genealogists, to provide assistance. As a result, individuals and whole families can gain both intellectual and spiritual rewards by becoming more informed about their ancestors, and giving them a deeper sense of those ancestors as real people, who lived real lives. This has been a major focus since the organisation of the LDS Church in America, during the early 1800s.

The organisation of the LDS Church and a record keeping people

When the LDS Church was formally organised in Fayette New York, on 6 April 1830, the founder of the new religion, Joseph Smith Jr., proclaimed "*there shall be a record kept among you* [emphasis added]" (Smith, 1948, p. 75). In 2017, this belief is still in force and underpins the Church's aspirations for its members to be a '*record keeping people*'. They are counselled to write personal histories as valuable records in order to preserve and transmit their culture within each family including dates of birth, marriages, ordinations and deaths (Norton, 1992). By the time the Church arrived in Aotearoa during the mid 1800s, Māori were already a record-keeping people with much experience in reciting and preserving whakapapa information as an integral part of the culture. This would have become apparent to Mormon missionaries sometime after meeting and living with Māori.

Mormons meet Māori

The first LDS missionaries[3] arrived in Auckland, New Zealand, on 27 October, 1854. After some years of proselytizing among European settlers, a more concerted effort to take the Church's message to Māori began in the 1880s (Britsch, 1986).[4] The Book of Mormon (BoM), one of four canonical texts of the Church, was central to that message.[5] For many Māori, they tended to view the information contained within it as an account of their own ancestors and the past of a people similar to themselves describing patterns of events parallel to their own experiences that reflected their kind of history. It contained numerous references to the importance of genealogy. For example, Jarom, a BoM figure, stated "Now behold, I, Jarom, write a few words according to the commandment of my father, Enos, that our genealogy may be kept" BoM Jarom 1:1. Māori too kept whakapapa and accompanying accounts of noted ancestors . . . where much of their lore was directly or indirectly related to stories of families (Midgley, 1999, pp. 2-4). It is no surprise then, that many Māori seemed to recognise themselves in the Church's messages when it was first presented to them. As a result, thousands had been converted within a few years following the 1880s (Underwood, 2000, p. 107). Around this time, the Māori population was estimated to be less than 50,000 (Statistics New Zealand, 2017) or 43,143, a more specific number provided by (Britsch, 1986, See Chapter 16). By the 1900s, the Church recorded about a tenth of the total Māori population as members (Underwood, 2000, pp. 107-108). Today, the total church membership[6] in New Zealand is 112,366 with 52 Family History Centers (FHC) operating throughout the country (The Church of Jesus Christ of Latter-Day Saints, 2017). It is within this historical context that many Māori have joined the Church and now do whakapapa work as an integral part of their everyday lives. Where tradition meets technology, scores of Māori members are now using the Church's online genealogical software called FamilySearch as a primary tool for the organisation of their own whakapapa information. This work is carried out on a scale that their ancestors could not have predicted.

A background of FamilySearch

The LDS Church has been a world leader in genealogy research since the inception of its 'Genealogical Society of Utah (GSU)' in 1894. Today, it is now known as FamilySearch. Over time, the Church has pioneered industry standards for gathering, imaging, indexing, and preserving records. With advancements in technology and the emergence of the digital world, it provides an opportunity to share these resources with people of all nations to help them connect with their ancestors through accessible historical records (FamilySearch, 2017a). The GSU was established by Wilford Woodruff in 1894.[7] By the 1930s, the GSU had pioneered the use of microfilm technology to preserve and provide access to genealogical records. These records are kept in the Granite Mountain Records Vault, which was completed in 1963, for preservation and protection. Over the next fifty years the GSU pioneered desktop genealogy by launching software called 'Personal Ancestral File' in 1984. However this is now discontinued. The Church launched FamilySearch.org in 1999. To increase production, FS.org began crowd-sourcing in 2007, allowing volunteers to index

Figure 2: Genealogical Society of Utah building & logo, 1894.

records and make them searchable. In 2013, they introduced the 'Family Tree' and 'Memories' as major features of the software. The following year, in 2014, FS.org was made available to the general public by allowing them to create a free online account, become a registered user and then start using the software (Lloyd, 2014) (see *Table 1* below).

Whakapapa timeline of GSU and FS 1894-2014

1894----------GSU Established
1930----------GSU pioneers microfilm technology
1963----------GSU complete Granite Mountain Records Vault
1984----------GSU launch Personal Ancestral File (discontinued)
1999----------Church launches FamilySearch.org
2007----------FS.org begins crowd-sourcing
2013----------FS.org introduces Family Tree and Memories
2014----------FS.org available to general public via free account

Table 1: Key dates in genealogical developments in LDS history 1894-2014

From Table 1 above, it is important to note that:

1. Non-members will now be able to create a free account to become registered users and start using FamilySearch without any obligations to the LDS Church;
2. They will now have an opportunity to compile, share and edit their own family history and genealogical information on a single, worldwide online tree and become part of a global family; and
3. They will also be able to collaborate with other family members, relatives and/or others to confirm, to reconcile and/or to discuss their own genealogy information.

As the largest genealogical organisation in the world, FamilySearch maintains a collection of 5.66 Billion searchable names in historical records; 1.23 Billion digital images of historical documents published online; 356,663 digital books; and 2,220 collections of historic records in its database (FamilySearch, 2017b) (see *Figure 3* below).

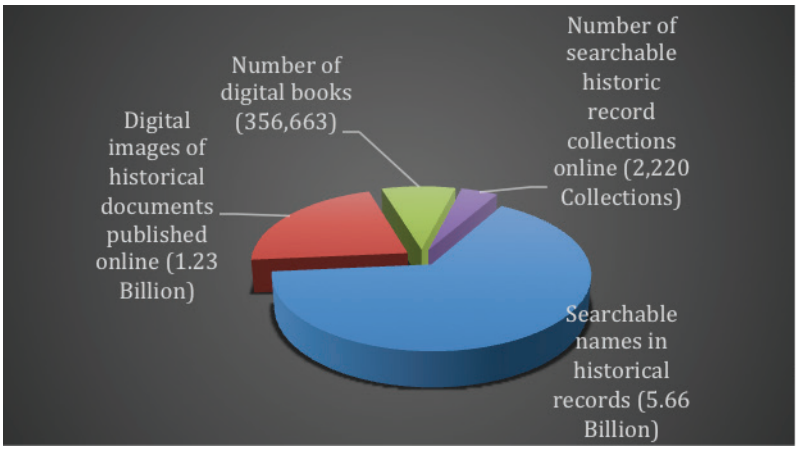

Figure 3: FamilySearch facts as of 2017

Using FamilySearch

When users open the FamilySearch homepage, they are presented with a graphical user interface that displays icons and related information to facilitate easy navigation of the site's contents. The most significant features are:

1) The option to create a free account;
2) The 'Tree' feature where most genealogical information of recently deceased family members and ancestors is recorded; and
3) The 'Memories' feature where users can compile their family history with the options to add images, text files, audio and other media to preserve and share their stories with related family members and future generations.

FS also provides audio, visual and video aids located in the self Help Center including, a site Blog where users can collaborate with each other to contribute Q&A, ideas and post messages and/or advice about a topic. Registered users or non-registered interested parties can also visit a Family History Center and speak with an on-site professional consultant about genealogical research and/or using the FS software. If registered non-members prefer, they can access FS at a public library (as part of the Church's affiliate programme) or at home on their own computers through the FS website and logging on to their accounts for a non-threatening, comfortable environment (Higgins, 2017).

The 'Tree' feature

The 'Tree', a critical feature, allows users to view data about their deceased family members and ancestors in a range of pre-designed schematic charts, such as the 'fan' view option. As information is added to the tree, it will become populated and expand showing the different relationships and generations such as grandparents, parents and siblings. Here, users can

access and edit their own or other users' information, such as names, birth dates, death dates, including the option of adding new data categories to existing ones. For example, dates of christenings (see *Figure 4* below).

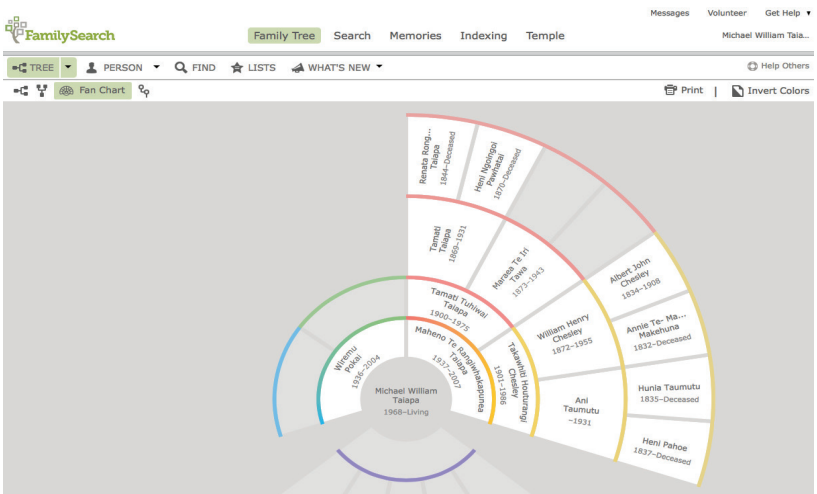

Figure 4: Fan view in the 'Tree' showing four generations of my whakapapa (FamilySearch.org).

The 'Memories' feature

The 'Memories' gallery allows users to compile their family histories and stories then enhance them by adding photos, stories, documents, and audio recordings related to individuals identified at the 'Tree' level. Although living[8] users' personal information is private, anyone can potentially see their photos, documents, and stories contained in the memories gallery (see *Figure 5* below).

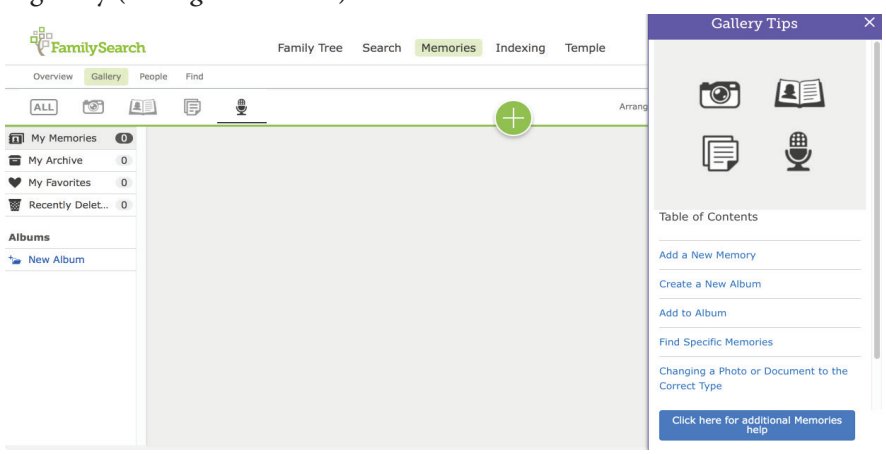

Figure 5: The Memories feature for compiling family histories (FamilySearch.org).

Some ethical issues about using FamilySearch

As a Māori and user of FamilySearch, this space has become increasingly interesting for

a number of reasons, raising some critical issues and questions associated with ethical practices as well as concerns around the use of some features in the software. As Church leaders become more informed about emerging issues, they will often release statements or policies to guide members and users on codes of conduct and proper use of FS. These issues are usually voiced through member discussion forums, information updates on the FS site with accompanying blog, official church and news announcements. FamilySearch allows registered users to collaborate with each other at two corresponding levels:

1) Users can correct or edit each other's genealogical data; and
2) Users can discuss and reconcile any aspect of the data that has been edited or other related topic.

Level 1: Correcting or editing information

The following principles outlines Church policies for correcting or editing information in an attempt to specify as accurate as possible data submitted by different users, and to reconcile that data where discrepancies and/or gaps may occur (For more details, see FamilySearch.org):

1) You can correct information that is in the *Vital Information* and *Other Information* sections of a *Person's* page;
2) You can edit the information for a record in Family Tree regardless of whether you created the information;
3) Family Tree uses a 'change history' to keep track of all changes to a record. If you disagree with a change, you can use the change history list to restore a previous version of the information;
4) You can undo changes on a record regardless of whether you entered the information or made the change;
5) If possible, attach a source to show that your information is correct. See Sources in Family Tree; and
6) Every time you make a change, you have a responsibility to enter a detailed reason that explains why you believe the information you entered is correct.

Level 2: Discussion forum

The following principles outlines Church policies for forum discussion (For more details, see FamilySearch.org):

1) You (user) can comment regarding a particular deceased individual and provide details regarding that individual;
2) You (user) acknowledge that any items you submit through the discussion feature will be viewable by anyone able to access this site; and
3) The discussion feature is intended to help collaboration efforts, to coordinate the

correction of errors, and to facilitate additional research with other interested users.

Points of issues

Taking all these things into consideration, the collaborative feature of FamilySearch can raise more issues than addressing them. In the first instance, there is the potential to create confusion where order should be paramount as users come to terms with internalising and making sense of edited or added information to their records as performed by other users. When users have an open access platform to edit each other's genealogical data, then it brings into question issues around informed consent, conflicts of data accuracy, the validity and reliability of both user and data, the effectiveness of the discussion forum and other issues.

- ***Informed consent:*** Despite FS guidelines, it is not clear how users should seek and get approved consent when editing each other's sensitive information or even if it is a necessity. This is extremely important if participants are going to experience "any stress, pain, invasion of privacy, or if they are going to lose control over what happens … such informed consent requires full information that outlines possible consequences and dangers" (Cohen, Manion, & Morrison, 2007, p. 52). If consent was a requirement, then what would be the process to obtain it? Would it be in writing or some other electronic form? Would this attract a positive or negative reaction? What would be the pros and cons of informed consent? And how might this impact on takahi mana (i.e. trampling on one's mana-authority) as a closely guarded characteristic of Māoritanga? In the meantime, it seems that consent is implicit whenever current and new registered users log into and then start using the actual software as they automatically conform to the FS Terms of Use.
- ***Conflicts of data:*** It was reported that some members who were concerned about changes made to their data decided to restore it back to its original state due to the intrusive nature of their information, and, believing that their knowledge and data was more accurate. It is often the case that users may not be known to each other but by virtue of linking to one's lineage can give users a sense of right to change other peoples' data. Where changes to data cannot be reconciled or resolved, then it will remain in a state of conflict of accuracy. This can lead to disagreements and feelings of animosity rather than appreciation being counter-productive to Church's teachings to respect one another. As previously mentioned above, Māori come from a long history of oral traditions where whakapapa information handed down can become corrupted and eroded overtime. Some users may find it useful that their data has been edited by others, therefore filling information gaps. However, there is always a tendency for conflicting parties to debate as to who is right or wrong.
- ***Validity and reliability:*** Any changes made to a user's data can raise doubts about the validity of the information in question. Cohen et al. (2007, p. 135) says is not made up, selective or distorted and subsumes reliability being akin to the notion

of 'truth' of what actually happened or, in other words, objectively factual. This not only challenges but also calls into question the reliability of the user and the data if discrepancies are found in information that has been edited or added to the original. Again, what are the consequences to the whānau involved? How will this affect long held beliefs of whānau knowledge if new or edited information is introduced? Attempts to validate the reliability of whakapapa information must not be based wholly on accepting edited or added data alone, but meaningful discussion should take precedence in these matters by all parties involved.

- ***Discussion forum:*** Users can collaborate and reconcile records as far as their research and knowledge allows but reconciliation of information can be difficult to affirm when trying to establish contact and meaningful dialogue with the parties involved. In fact, as indicated above, it appears that users are responsible but not strictly obligated to provide sources and reasons or to participate in discussions or add notes when editing data. This can foster an environment of anonymity and avoidance. FS does, however, caution users not to give out personal identifiable information about themselves, such as names, contact or address details in the forum section but to converse through private email or other forms of communication.
- ***Other issues:*** Registered users who have not read the FS terms of use and/or are not aware of the issues associated with using the software will be the most vulnerable. At length, it appears that users will be left to work out the finer details as they engage with the FS environment.

Conclusion

How, then, did the message of the LDS Church, in particular its emphasis on genealogy, impact on Māori in the late 1800s? When Māori and Mormon came into contact over 150 years ago, it revealed some surprising parallels and differences in whakapapa beliefs and practices. It resonated something deep within Māori and many joined the Church as a result. For thousands of their descendants today, they have become not only more aware of their own family whakapapa, but are also guardians of that knowledge in their own right. With advancements in technology, the Church's online digital software, FamilySearch provides a platform for these members to record and preserve their whakapapa knowledge and enhance their work. In its intention to do good, FamilySearch, however, presents a range of ethical issues as previously mentioned. It is recommended that the Church explore more robust and advanced software applications to address the issues raised here. Although FamilySearch has a potentially bright future, in some respects, it is still largely uncertain.

Endnotes

1. Here, the notion of 'work' refers to researching, recording, and preserving one's own whakapapa.
2. A call "to turn the hearts of the fathers to the children, and the children to the fathers" (See King

James Version, Bible, Malachi: Chapter 4, Verses 5-6).

3. These initial missionaries were, Australian Mission President Augustus Farnham, Elder William Cooke (an Australian convert) and Thomas Holder (a priest).

4. The Māori land wars of the 1860s and 1870s would have limited missionary efforts to share the LDS message with Māori. Hence, the gap in time between 1854 to 1880s.

5. The other three texts include the King James Version, Bible, The Doctrine and Covenants and The Pearl of Great Price.

6. Over time, it seems that keeping statistical information about any one specific ethnic group has fallen out of practice, if officially practiced at all during Church history. One reason seems to suggest avoiding discrimination against members ethnical backgrounds and by keeping in harmony with scriptural guidelines that treats all people as one in the gospel (Higgins, 2017). As a result, it is not known how many Māori make up the total New Zealand membership given here notwithstanding an initial consensus count taken by the Church, in the early 1900s.

7. The fourth President of The LDS Church from 1887-1898. (See https://www.lds.org/churchhistory/presidents/controllers/potcController.jsp?topic=facts&leader=4).

8. The term 'living' refers to the user who created the account and, therefore, is identified as a living person at the time of creating it.

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Keep teaching this! Engaging Māori Studies students with digital cultural mapping tools

O. Ripeka Mercier, Bruce McFadgen & Arama Rata

Abstract

The Te Kawa a Māui Atlas (TeKaMA) project is a Victoria University of Wellington initiative that incorporates mapping assignments and activities into courses run by the School of Māori Studies. Digital mapping in particular engages our students in cutting-edge technologies, critical pedagogies of place, opportunities for peer sharing and contribution to a school-wide project. This paper gives an overview of the project and student responses to it. It then presents different mapping software that students have used to address critical questions in relation to contested places. Throughout, we comment upon how mapping supports activity in relation to community: whether that is a community of students and scholars, or a wider community to which the student belongs.

Engaging students with the Te Kawa a Māui Atlas

> *Keep teaching this! It's an amazing tool and a fantastic resource for future students. MAOR124 Student, 2014*
>
> *I feel like a test on concepts such as aroha and utu would have been more relevant to the course. MAOR123 Student, 2014*

Since 2010, the staff at Te Kawa a Māui (the School of Māori Studies) have introduced a large variety of mapping assignments across 10 of its 30-odd courses. These activities include reading and analysing oral, digital and paper maps; adding layers of information to paper and digital maps; and creating maps in oral, paper, 3-dimensional and digital forms. The project has invited staff and students alike to reflect on and explore how mapping can put 'our faces in our places' (Hoskins, 2008). It explores what a 'critical pedagogy of place' (Gruenewald, 2003; Manning, 2009) might look like in practice.

However, the initial motivation for introducing maps into our programme was primarily to enhance the learning and engagement of our students. Maps are a visual and colourful form of text. As well as representing physical space, they can also connect people to place, presenting human history and culture in a dynamic and colourful way. Maps, and by extension an Atlas, potentially exemplify a 'high-impact practice' (Kuh, 2008). High-impact practices are argued to engage students in numerous ways: for example, by involving students in actively contested questions, engaging them in research from the undergraduate level, connecting them with the research interests of academic staff and contributing to large-scale, meaningful projects beyond their assignment. The TeKaMA project did all of these things, and in addition, our 'Atlas' provided a papa or base upon which to layer the diverse disciplinary backgrounds of academic staff, and the research of our students. Depending on the course, mapping can contribute from 5% to 100% to a student's total

course grade. The following list outlines the aims of the mapping assignments. They:

1. diversify the learning experience of Māori studies students (Mercier & Rata, 2016);
2. teach critical reading of spatial representations (Mercier, 2013);
3. teach skills in digital mapping;
4. explore notions of boundedness and framing; and
5. explore how mapping can tell histories, share mātauranga Māori and Indigenous knowledge (Mercier et al., 2013).

Students have produced highly original work, promoting their own and others' engagement and learning, as well as pushing the boundaries of what can be considered Māori studies. In response to the quality and variety of work students produced, we set up and posted selected research in the online version of the Te Kawa a Māui Atlas (www.atlas.maori.nz). Students have formally evaluated the mapping activity and we have analysed and published this in previous works.

> Feedback has indicated that the cultural mapping ecosystem at Te Kawa a Māui fosters student engagement on several levels: it encourages self-directed learning, uses a culturally-relevant pedagogy, takes for granted the validity of Indigenous knowledge, teaches transferable skills in digital technologies and communication, provides the option of relating scholastic projects to communities and areas familiar to students, gives an outlet for primary resource material and gives students agency in their research while providing inclusive learner-to-learner experiences. The quality and diversity of map-based projects is itself an indication of how cultural mapping can engage students. (Mercier et al., 2013, p. 147)

Qualitative feedback from student evaluations has been largely positive. Most negative feedback related to poor communication of assignment purpose and how to complete tasks; aspects that we can improve upon. The second quote at the beginning of this section reveals another theme in the negative feedback, students considering work not relevant because it did not resemble traditional forms of assessment. Furthermore, one of the key lessons learned was that:

> spatial mapping needs to be integral and meaningful to the assignment's purpose and alongside that, the technology needs to support the aims of cultural mapping. While our students demonstrated readiness to overcome technical challenges and pride in their accomplishments when they do, they and our staff need to see the relevance of the digital to the assignment and be given adequate training. Also, if spatial and technological aspects do not support wider efforts in the recovery and maintenance of Māori and Indigenous knowledge, they can disengage students. (Mercier et al., 2013, p. 147)

A mapping assignment that contributes up to 10% of a course mark is enough to raise awareness of the physical spaces students occupy, diversify the learning experience and demonstrate the relevance of mapping to Māori studies, while not detracting from traditional forms of assessment (Mercier & Rata, 2016).

Assignments, digital mapping tools and community

Detailed descriptions of our mapping activities, which include how students collaboratively built map databases, can be found in previous publications. For instance, in the 'Māori society and culture' course, students writing about the history behind 'colonial monuments' used the pins and narrative box functions in the Google Maps Engine to locate and describe the landmark of their choice. Using Picasa, students of 'Māori science' located, photographed and uploaded geotagged images of different rākau (plants) on campus (Mercier & Rata, 2016). The latter project also made use of previous student research published online. In each of these projects, work for the databases contributed to knowledge sharing amongst the students, by the build-up of information in a centrally accessible database, at the same time building a community of scholars.

MAOR203, Mapping Whenua, "is a practical course which leads students to understand how mapping in Aotearoa New Zealand has impacted on Maori relationships with their lands. Field and workshop exercises … enable students to produce maps of their own" (Te Kawa a Māui, 2016). MAOR203 is 100% assessed by map-related assignments, taking different forms, such as written reports, presentations and assignment questions. Two major pieces of assessment include an archaeological site visit, and a 'cultural mapping' project of the students' choosing.

Mapping produces an abstraction of place that we try to mediate by taking students to actual places, where they visit sites and carry out various activities – thus refusing to "settle for the abstractions and simulations of classroom learning" (Gruenewald, 2003, p. 8). Students locate and visit archaeological sites, comment on their condition and assess any threats to the site. Prior to their field visit, they use the New Zealand Archaeological Association ArchSite database, to find the locations of, and other information about, the sites they will visit. Before the field visit, they plot the sites on a map using place-marks in Google Earth. A printout of their Google Earth map helps them to find the sites. After their field trip the students map the sites they visited using Quantum GIS (QGIS). In order to add further historical information to the maps, the students geo-reference and overlay other data, such as survey maps, on to a topographical base map in QGIS.

For their second project, students use a variety of digital programmes to complete their work. Since 2011, these have included Google Earth, QGIS, Google Maps Engine, Picasa, Word Clouds (Tagxedo and Wordle), websites, Prezi, infographics, videos, Voicethread, Powerpoint and GIS Story Map. In some cases students are guided towards particular software that the coordinator is aware might fit the kaupapa (for instance, Voicethread). In as many other cases, the students may select their own medium (for instance, Prezi) and teach themselves how to use it.

In our compulsory course for the Māori Resource Management major, MAOR301, one of the course learning objectives (CLOs) is to explore how spatial/map-based presentation of information contributes to the understanding and analysis of Māori resource management issues. To assess students against this CLO, a project worth 30% is set. The project consists of a presentation (5%), an essay (10%) and a map (15%). Students choose a topic, research it and present it in a visual and spatial way. Their essay presents their framing and critical reflections on the topic and the mapping of it. They are asked, for instance, 'how does visualising the resource contribute to managing it?'

As for MAOR203, students chose a diverse range of topics to explore. Furthermore, a diverse range of mapping media were also chosen. In 2016, the digital media used were Google Earth, Google Maps Engine, Word Clouds, Prezi and Piktochart. Students also submitted non-digital projects.

Student Tayla Cook used Google Earth to pinpoint the whakairo (carvings) within Te Tumu Herenga Waka. Her aim was to promote a sense of community and belonging for students both on campus and to their iwi.

> With the use of Te Tumu Herenga Waka Marae, a map was created to help not only create a first step for non-Māori to connect with their Māori identity, but to find a 'home away from home'. (source)

Tayla also reflected on the limitations of 'pinpointing' in Google Earth, particularly in relation to her migrating ancestor Kahungunu. This points out a general limitation of entry level skills in digital mapping. Placemarks require placements so precise as to render the broader connections to place meaningless.

Some students had done MAOR203 Cultural Mapping, or other courses in which they had received instruction on Google Earth, word salads and infographics. Sarah Mann's submission on mātaitai reserves, using infographic producer Piktochart, included a map, infographics and a word salad, revealing her previous experience with these.

Conclusion

Māori Studies is not a school of geography or cartography, instead traditions of oceanic and terrestrial navigation using cognitive maps, oral cartography and other navigational aids connect Māori to a cartographical whakapapa, justifying our use of maps in Te Kawa a Māui. Nonetheless, the ongoing success of such an ambitious and amorphous project relies on sustained effort and championing. The setup and maintenance of mapping assignments requires a unique set of teaching skills. Thus, although the learning and engagement benefits seem clear, map-based assessment is not likely to overthrow more traditional forms of assessment, such as tests, essay writing and seminars.

Nonetheless, teaching spatial literacies gives us all some basic skills and insights in how to tell our own stories with maps. As well as benefitting from working with their peers on map-based activities, anecdotal evidence suggests that students are sharing what they

learn with their whānau and other communities. The students are a conduit of information, but usually have limited resources, so it is vital that we teach and use free and easy to access mapping software, such as Google Earth and QGIS amongst others. We do not have to be experts to use many of the mapping tools and many of them cater sufficiently to community needs. Sometimes we provide instruction, at other times the student motivation is high enough, that they learn how to 'read and write map' themselves.

By offering students the mechanism by which they can learn and use digital cultural mapping to engage with places of significance, we at Te Kawa a Māui can open their eyes to ways they can support important community work. That work might raise their own understanding of history and context in relation to place, or present known information in a visual way, contributing to other communities' understanding. Whether those communities are of their own peers, or of their friend, whānau or hapū communities, mapping engages and enhances not just their learning experience, but also their ability to situate themselves in the context of place and people.

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Mapping linguistic landscapes: Where geo-tagging meets geo-linguistics

Vincent Olsen-Reeder

Introduction

Linguistic Landscaping (LL) is an emerging field of sociolinguistics. Born out of semiotics, the approach is largely concerned with examining the relationship between language and visual representations of language. In, what is believed to be the World's only Indigenous Language Planning and Policy (LPP) paper, students at Victoria University of Wellington use cultural mapping tools to create linguistic landscapes of the Greater Wellington Region. This case study provides a brief account of the small body of LL literature, before illustrating how geo-tagging tools are used to create visuals of signage around Wellington city. The study demonstrates the potential of cultural mapping tools to aid in the study of a language's revival. Lastly, some key issues that have arisen as part of this exercise are discussed, mostly surrounding the use of third-party tools that change (or disappear) over time.

Linguistic landscapes

Visual representations of language surround us – in works of art, on posters, on labels, on packaging, in our devices and on signs. Written signs – either informative or imperative – tell us information about the certain space in which they are located. They are only useful within a location-specific context. For example, a street sign in inner city Wellington is infinitely more useful in Wellington than it in rural Canterbury. For this reason, how signs are used in a given area can provide key insights into how languages are used in that area (Backhaus, 2007). Because signs are designed to be interpreted by people who can read them, they can also provide general information about what languages are spoken in a given area, how much they are spoken, and in what contexts and domains they are spoken.

LL was popularised by sociolinguists Landry and Bourhis in the close of the last millennium (Landry & Bourhis, 1997). Since then, it has steadily emerged as a useful approach to investigating written signage (Backhaus, 2007). LL was originally designed for researching public signage (Spolsky, 2007). LL is often concerned with distinguishing "official and nonofficial signs" (Backhaus, 2006). A large number of official signs, (road signs, for example), are distributed by institutions with power over language, such as government. These tell us languages are accorded status in a 'top-down' fashion, because the signs a government might produce are going to reflect the languages they prefer to be used in their domain. If we consider an advert on a public noticeboard, we might learn something about the language one considers pertinent to the skill or person they are looking for (or not looking for, by using a language they cannot understand). These kinds of signs are generally termed nonofficial. To this end, both official and nonofficial signs carry important information about the status of languages, the privilege they might enjoy in a given space, and the economic weight they have. That is to say, a linguistic

landscape "signals which languages are and can be used in a particular area, and also the power relationships between different language groups in that area" (Landry & Bourhis, in Macalister, 2010, p. 56).

LL potential in language revival

The New Zealand National Census identifies approximately 190 languages spoken in New Zealand (Statistics New Zealand, 2013). Just two of these languages, te reo Māori and New Zealand Sign Language, have been investigated using an LL approach. In this study Macalister (2010, p. 56), notes, "New Zealand is generally considered to be a strongly monolingual English-speaking country" but "that census data suggest that monolingualism is reducing." Even so, the latest Census shows 3,819,969 speakers of English from a total population of 4,242,051. The same data set identifies 148,395 speakers of te reo Māori, or 3.49% of the total population. A small te reo Māori speaking population, coupled with a decreasing monolingual population that is still very dominantly English-speaking means New Zealand's LL is ripe for LL studies, especially where language revitalisation of te reo Māori is concerned.

LL in a classroom context

Victoria University of Wellington's MAOR222 course is possibly New Zealand's only te reo Māori LPP course. The course is centred around an in-depth exploration of te reo Māori LPP, understanding how our micro-level LPP differs from that of other language's around the globe, and how our individual efforts can effect positive outcomes for te reo Māori in the micro-level spaces we inhabit.

In MAOR222, a group of students are assigned a pre-determined space to investigate. They are taught LL theory and are required to collect images of official and nonofficial signs in their areas. Spaces so far have mainly been contained to Wellington, its CBD, restaurant district and Government district, although, a few studies have been conducted in neighbouring Porirua and Petone CBD's. One student also completed a survey of Queen Street Auckland. All students are taught about the ethics of conducting such an experiment in public. Students are not allowed to enter any private premises, take photos of other people or provide any other kind of identifying information.

All students are required to use cameras and smartphones with geo-tagging enabled. This means the exact location of the sign is also recorded upon capture. Students must take hand written notes of sign locations in the event the geo-tags are lost. Photographs are then loaded onto tools that allows each sign to be mapped accordingly. The tool in use at the time of writing is Story Map, prepared by ESRI.[1] The following screen capture shows the result of a successful capture and upload of photographs to ESRI.[2]

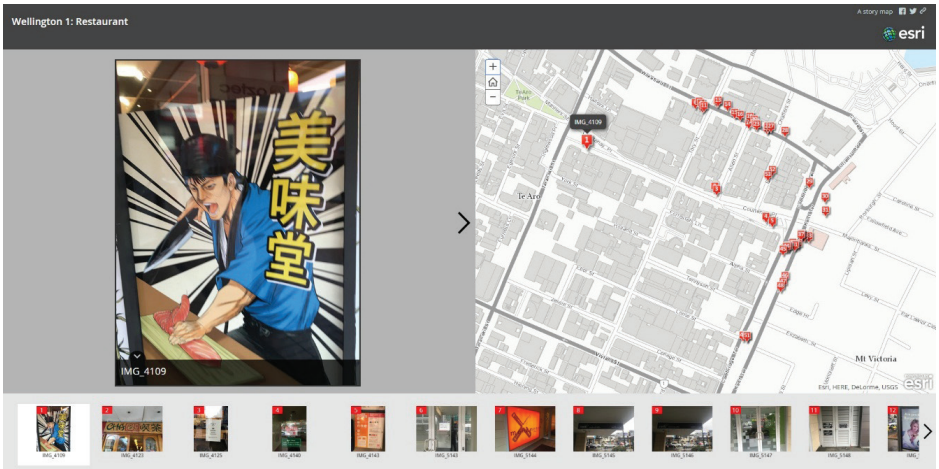

Figure 1: *Depiction of the LL of Wellington's restaurant district*

In this instance, the location of the photos appears on a map. Clicking on a numbered red tag will return an image of that sign on the left. Reporting back to the class, the students analyse the images they have collected to draw conclusions about what languages are present in their area. They tabulate the images to see how many signs and how many languages are present, how many are monolingual or multilingual, and how many are official top-down signs, or nonofficial signs. They may also talk about whether signs are there for functional, informational, economic or entertainment reasons. All of these analyses help the students to make inferences about how languages are used in their respective areas, and discuss the differences between the areas investigated by the class as a whole. From a language revitalisation perspective, this exercise allows the students to critically analyse te reo Māori and its presence on signs in their area. For example, on the whole signs in te reo Māori seldom exist. Where they do exist, they are generally translations of Government departments, or are an attempt to stand as a marker of cultural authenticity for tourism needs, such as souvenirs and gifts. Useful, functional signs in te reo Māori are few and far between. The underlying message from signs in Wellington tends to be that in order for a sign to be useful, it needs to be in English. Using LL, it might also be inferred that in order to be useful in New Zealand, one must speak and use English. This has clear implications for language revitalisation, and multilingual objectives more generally.

The exercise also allows the class to examine our own attitudes about te reo Māori and its presence on signs. Before beginning this LL exercise, typical early attitudes assert that bilingual signage is an absolutely critical activity the Government must carry out. Those attitudes generally evolve to thinking about bilingual official signage as tokenism. Of this topic, Harlow (2005, p. 144) notes that in many cases, organisations "… find a [Māori] name which is opaque and metaphorical and does not by itself reveal anything about the nature of the organization." As tokenism, we question whether it is helpful that the

Government perpetuate the use of te reo Māori in that way, or if it would be better to have monolingual English signage in the official space. Harlow fears,

> that the people asking for and supplying these names do not actually intend that these organizations should be referred to in Māori using them. They are provided as one would provide a flag or logo, for use on signage and letterheads, but not for the designation of the place concerned within any normal discourse conducted in Māori. (2005, p.144)

To this end, while our class generally concludes that it is better to have tokenistic recognition and no recognition at all, we also acknowledge that this perpetuates the notion that the role of te reo Māori is not to be useful. It further supports the idea that te reo Māori signs cannot exist without an accompanying English translation. Of course this is not true, but this is a risk of engaging in multilingual signage in this way, especially when a language is coupled with a more dominating one.

Politically, our class also expects that the country acknowledges the position of te reo Māori as the Indigenous language of this country and allow it space as such. However, from the position of semiotics, signs are designed to be read and their message 'understood', even if people do not speak the languages they see. For example, a Japanese sign outside a restaurant in the restaurant district of Wellington, New Zealand, will most likely, be understood by non-Japanese speakers as a great place to enjoy Japanese food. The biggest challenge pitched to the class is that if they expect non-Māori speakers to encounter te reo Māori on signage, they need to find a way to make those signs relevant, so that non-Māori speakers may understand why te reo Māori is there. That is going to be a critical part of securing acceptance for te reo Māori on signs in the future.

Future use

As successful as this exercise is in helping students to understand some of the sociolinguistic complexities surrounding written language and language use, there are some very real issues which have caused some confusion. Most notably is that not all devices record geo-tags in a way that computer programmes can read. There has been at least one case where location and geo-tagging settings on a device were enabled but the metadata did not carry across anyway. Secondly, the initial online software used for the exercise is now retired.[3] Picasa was the preferred programme of use because it was linked seamlessly to the class Gmail account. Photos emailed and saved to that account were automatically uploaded to a single Picasa account, which contained software to read geo-tags and create detailed Google Maps. The idea was that in successive years the class could review their work in comparison to previous groups. However, the retirement of Picasa meant that action was no longer possible and a new programme was sought. Photos emailed to the class Gmail account are now downloaded by the lecturer and uploaded to a class Flickr account. They are then imported from Flickr into Esri Story Board. Early issues encountered with this

new process included ensuring the Gmail, Flickr and Esri accounts were all configured to export and import the necessary geo-tagging metadata. Some of the groups using this new process could not track the metadata along all of these avenues and it was ultimately lost. Such a simple process for the initial classes was made confusing and frustrating by the retirement of Picasa. Having said that, the product delivered by Esri is of a higher quality and contains more functions. Future LL studies in our class will be all the better for these issues, providing the current software in use remains active.

Finally, as with any approach, LL studies have their limitations. The class readily accepts their findings are generalisations about the presence of language in their area. Asserting any kind of statistical assurance about their findings is not encouraged. For this to happen, literally every visual representation in an area would have to be photographed. However, this does not detract from the ultimate objective of the project, which is to become more critically aware of the linguistic landscape that surrounds us, with particular attention paid to how the present languages affect te reo Māori. Comparisons between Census and local council statistics, however, is encouraged. This allows the students to attach some kind of quantitative meaning to their work by allowing them to match up their photographs with demographic data from specific communities they are working in.

Conclusion

As an LPP course, the ultimate goal of MAOR222 is to produce students who are critically aware of a myriad of language issues pertaining to te reo Māori and its revival. LL as an approach to understanding representations of written Māori and how those representations interact with other languages in New Zealand, is one of those issues. Recent government efforts aim to increase the number of bilingual te reo Māori signs (Te Puni Kōkiri, 2016). This is going to mean New Zealand future language planners must understand the linguistic landscape of the nation deeply. In MAOR222, cultural mapping has been instrumental in teaching those future planners to think critically and examine our society in engaging, meaningful ways.

Endnotes

1. www.esri.com. An example of one group's landscape can be found at: http://arcg.is/2cIn30b.
2. I must acknowledge the work produced by MAOR222 students Jono Brumley, Te Wainuiarua Poa, Kealyn Marshall-Nyman and Jo Cook. Thank you for allowing me to share your work.
3. See https://picasa.google.com/

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Te Koronga[1]: Mapping case studies

Hauiti Hakopa, Anne-Marie Jackson, Ngahuia Mita & Chelsea Cunningham

Introduction

Mapping has its limitations; and as long as you understand this and know how to work with those limitations then mapping has its uses. Mapping, for Māori, is the expression of a symbiotic relationship with the gods. It is the convergence of tools and techniques that convey the idea that Indigenous peoples, including Māori, need them to communicate their understanding of and interests in (ancestral) landscapes. That is simply not true; they have their own techniques that have served them well for many generations. Non-Indigenous people and organisations will (probably) need these tools (GIS and maps) to deconstruct the mystery behind the framework of an oral lens and to reduce land to its simplest form of discrete points, lines and polygons to convey a sense of meaning for them. Yet for Māori, land is more than a series of points, lines and polygons arranged within an artificial Cartesian framework that display relative positions of objects on a map. It is a relationship; a high-level relationship that resonates with and co-constructs their sense of identity invested in those landscapes. Maps are, simply divested of the capacity to convey (cultural) relationships. What they are is another historical document of Māori connection to sites of significance; and Māori have taken advantage of this technology to express their connection and sovereign rights over their cultural landscapes.

Stories, genealogies and significant sites relative to the preservation of cultural heritage are important to all human collectives but especially to Indigenous peoples and hence, Māori. Indigenous peoples are traditionally oral based societies with a knowledge base that was maintained and passed on using oral methods. For Māori, oral narratives such as songs, genealogies, chants, theatre and storytelling were used to store their notions of who they were and how they connected to their ancestral territories. These methods were used to pass that knowledge forward to each successive generation. Embedded in these oral narratives were their notions of place, which informed their concept of a cultural landscape and cultural identity; this is the basis for mapping their cultural landscapes. While GIS and maps have their uses in (geographic and spatial) knowledge transmission, they cannot connect the Indigenous dots to provide a deeper inter-generational sense of understanding land.

We will share three case studies. The first is drawn from Dr Hauiti Hakopa's research and practice as a surveyor working for his iwi of Ngāti Tūwharetoa. The second is Chelsea Cunningham's research which she undertook in a Ngā Pae o te Māramatanga summer internship as a pre-cursor to her doctoral studies with her whānau of Ngāti Kahungunu. The third case study is from the Dr Anne-Marie Jackson led National Science Challenge Sustainable Seas research, in collaboration with Ms Ngahuia Mita and Dr Hauiti Hakopa, focusing on an example of how to utilise mapping for engaging in mātauranga.

Case Study 1: Tūwharetoa by Dr Hauiti Hakopa

Saturday the 8th of July 2017 was an historical moment for Ngāti Tūwharetoa. Hapū members from around the rohe (the Central North Island region centred on Lake Taupō and the Central Plateau) converged on Waitetoko marae, nestled on the eastern shores of Lake Taupō, to welcome iwi from around the motu and the Crown representatives for the signing of the Deed of Settlement. Te Ariki, Sir Tumu Te Heuheu, chief negotiators, hapū members and the Crown signed the Deed during the course of the day. This event signalled the culmination of a series of historical milestones that began, for me at least, in the early 1990s when I was seconded sideways into a mapping company to investigate Waitangi claims. That aside for the moment, the Waitetoko July event included pōhiri/pōwhiri, formal speeches by the Minister for Treaty of Waitangi Negotiations, the Honourable Christopher Finlayson and Te Ariki on behalf of Tūwharetoa, the official signing of the Deed followed by a hākari. For me though, this process began in the early 1990s.

In the 1990s I was part of a team, funded by Crown Forestry Rental Trust (CFRT), commissioned to undertake an investigation into breaches by the Crown against Ngāti Tūwharetoa pertaining to the Kaingaroa Number 2 (predating the Central North Island claim) and the Tauhara (North, Middle and South) blocks which eventually became part of the comprehensive claim. I was retained as a surveyor and began training as a cartographer under James Canning and Isobel Gentil, principals of a mapping company called Canmap working out of Rotorua. Both James and Isobel taught me the intricate details of aerial photography, the art of cartography and the tools involved in creating maps; moreover, they taught me the innovation of cartography, which I employed on several occasions when the technology changed over time. While cartography offered an innovative method for visualising spatial/geographic data, it was surveying that grounded me in data collection.

Fast forward to 2010 when I attended the very first collaborative Indigenous-Google mapping workshop in Mountain View, San Francisco, adding to my data collection toolkit the suite of tools offered by the Google Earth platform. I was sponsored by the Indigenous Mapping Network, and fully funded to attend, by Google. I was also given permission to use a claimant group's data to test the Google platform. Again, the Google platform has its uses as long as you understand its limitations. My thinking at that time was to use an alternative and engaging method (besides a map) for re-visualising the spatial data that would accompany the Mana Whenua report and to help the layperson understand the spatial context of cultural information. It did not work out that way for reasons beyond the scope of this chapter. This was followed closely by a 2010 meeting in Christchurch for the Ngāti Tūwharetoa comprehensive claim culminating in 2013. I interviewed members of the 26 hapū of Tūwharetoa and compiled 150 plus maps for the Ngāti Tūwharetoa Hapū Profiles Map book using a combination of tools and skillsets I had gathered over many years.
In the 1990s we used a Computer Aided Drafting package called AutoCAD coupled to digitising tables and plotters (with a 4 MB buffer) to compile and produce maps which was a tedious and lengthy process; for example, it took approximately eight hours to plot 100 A3 maps using 3 desktops attached to 3 plotters containing 4 pens each. Today we use GIS

packages attached to Microsoft Power Point and printers to create A3 map books that depict connection to and knowledge of sacred sites.

In the 1990s I used my skills as a registered surveyor to track down data from Māori Land Court Minute books, Certificates of Titles, cadastral and topographic maps (NZMS 261's and 262's), ML's, aerial photographs, field books, Church marriage records and the National Archives. I then merged this with hapū cultural kōrero. All of the hard copy maps we used were rubber-mapped prior to digitising the information. A decade later, in the 2000s, the digital environment yielded online sources for harvesting data which aligned well with GIS and supported hapū cultural knowledge. All of the archival maps were digital and geo-referenced, making it easy to curate and integrate into GIS and transmit the cultural data onto base maps. Whatever the tools of the trade, Māori and mapping are not mutually exclusive events. In fact, our ancestors have been compiling maps using oral methods of their ancestral territories since they arrived on these shores of Aotearoa and Te Waipounamu.

Māori and mapping are largely a social organisational event that just happens to contain a technical component; this is where GIS and cartography are integrated into the event. In every mapping workshop that I have conducted with hapū, they have demonstrated that the backbone of mapping ancestral territories are the stories that connect them to their cultural landscapes. To capture the stories is to capture the essence of their connection to the land.

When I think of the communities I have worked with to create maps, I am pleasantly reminded of the earthiness of our people. When I think of the connection our people have with the land, I am reminded of the strong role land plays in their cultural identity. When I think of some of the people I have interviewed, I am reminded of the passion they have for their land, their ancestors and the legacy left for them to carry and convey to the next generation.

During the Tūwharetoa comprehensive claim I interviewed whānau from all 26 hapū. I am reminded of one koroua whom I had finally tracked down for a one-on-one interview. I made sure to leave Tūrangi early enough to get to Taupō because I wanted to visit the local bakery and grab some treats to share. With my food in hand I showed up at his place in Waitahanui. I pulled into his driveway to find that he had just returned home and was stepping out of his jeep. I approached him and we began talking; he was not sure he wanted to be interviewed (his face and body language told me he was unsure about the interview). So, I replied that it was no problem, and that he may as well help me eat the treats I bought with me. I retrieved them from the car and plonked them down on the boot. He looked at me and decided to invite me in to eat. He had a coal range and on the coal range, he had pork bones, which he offered up. He indicated to a seat at the table and laid out a plate for me. We began talking as I ate and I casually asked him a few questions, he gets up and retrieves a couple of topo maps marked up with kōrero; we begin the interview.

The mana whenua mapping project involved several discrete but integral components. Firstly, the preparation of a mapping proposal and brief, outlining the focus

of the project, the methodology employed, the resources required, the milestones and expected outcomes, and the proposed timeline. Secondly, the presentation of the mapping proposal to the iwi claimants for perusal, comment, changes and final ratification. Thirdly, conducting mapping interviews or workshops to gather oral data. Fourthly, designing and preparing the geodatabase for the project, processing the oral data in preparation for digitising into GIS, preparing a series of maps to complement the oral history report, and presentation of draft and final maps to iwi for ratification. And finally, empowering iwi to manage their cultural assets by implementing GIS training for their tribal members.

Māori still map their land in a similar manner as those early ancestors such as Reko, Huruhuru, Tuki and Te Heuheu. This is how they relate to their lands. This is how they contribute to a Māori mapping project; by telling their stories. This is the makeup of their tūrangawaewae, their mana whenua, mana moana and mana tangata. How do we portray these instances of mana? Clearly, maps are an incomplete method.

The milestones of this project reflected the initial approach and thrust of the mapping project at the beginning. Ostensibly, to capture geographic locations of significant sites, along with their place names, for the purpose of creating a series of maps which reflected how iwi used and occupied the land. Yet on the ground, when working with the people in a workshop or one-on-one interview, a measure of flexibility and fluidity was required to change and adapt to what was appropriate and important at a specific instance in time to meet the objectives.

The Mana Whenua report provided a vehicle for negotiating iwi status with the Crown and in so doing support claims to resource control and use in the region. The final maps could eventually form the infrastructure for developing an environmental plan. The entire document could also be used as a basis for cultural and traditional knowledge curricula for the benefit of future generations. Since the actual purpose of this report was to identify mana whenua and mana moana over a large and distinctive area to which the iwi claimants laid claim, it was important for the iwi claimants to identify and clarify the extent of cultural information to commit to a map.

Maps depicting the spatial extent of rohe whenua can be addressed in two ways. Firstly, by using the existing survey or cadastral boundary data that delineate the ancestral territories, and secondly, by using traditional evidence and landmarks which illustrated how iwi used and occupied their ancestral territories. Since the Mana Whenua report is first and foremost about establishing mana whenua by iwi, it was essential to determine rohe boundaries in two ways: one, using oral and traditional information which depicted customary use and occupation of their ancestral landscapes; and two, examining the extent of the place names embedded into the landscape by their ancestors.

Customary usage of an area implies knowledge and the prior existence of māra kai, rua kūmara (storage pits for kūmara), knowledge of fishing grounds and coastal resources. Alongside, are associated practices, location and knowledge of traditional resources such as plants used for weaving, wood for carving and rongoā (medicines), knowledge of ancient travelling routes and sites significant to the identity of iwi. Occupation of an area refers to

areas of continuous use, habitation, settlement, naming, knowledge and control over such areas. It can also include stories and legends about places, ecological knowledge of the regions, and place names indigenous to the area. Habitation sites include kāinga, pā sites or fortified settlements, wānanga sites, battle sites, urupā or burial grounds, tauranga waka, tribal landmarks, sacred sites and sites of rituals, and marae. The toponyms or place names are a distinct and major consideration as they define the ancestral mana embedded into the landscape. Furthermore, place names are the ancestral footprints woven into the landscape.

This storehouse of customary knowledge and practice, forms part of the unique identity of iwi woven into the landscape, leaving footprints, which, can be interpreted by those custodians or keepers of this knowledge. Knitting all this information together are the genealogies, stories and songs epitomising the deeds that occurred in these places, the ancestors who breathed and bled their very lives into the landscape, and the oral traditions, which preserved this type of knowledge to the present day. Thus, identifying the custodians of this knowledge was essential to the process of creating the maps. Once the custodians of the storehouses were identified, the next task was to set out the mapping themes, which would inform and guide the mapping interviews. The rest is history.

The lessons learned from engaging in a mapping programme which articulated the mana whenua, mana moana and mana tangata are invaluable in terms of understanding the sense and depth of connection Māori still have with their ancestral places. It was equally invaluable learning how to work with people on the ground and engaging with the living repositories. Drawing out the information in a meaningful way, whilst thinking about how to engage the technical aspects of the actual mapping itself. It is useful or, rather, mandatory to have a good grasp of te reo Māori and of the tikanga associated with being Māori. If the mapping coordinator does not have the language, it becomes a technical process. Mapping instances of mana is not a technical process, it is a tikanga process. To observe this process of tikanga is to be proficient in the Māori world and the spatial information technology world.

Case Study 2: Mapping pēpeha by Chelsea Cunningham

Pēpeha (expression of whakapapa) outlines your whakapapa or genealogical connections in relation to geographical topographies and people such as, maunga (mountain), awa (river) waka (canoe) iwi (tribe), hapū (sub-tribe), marae (meeting house) and tūpuna (ancestors). According to Hakopa (2011, p. 3), "Māori position themselves geographically and culturally in the world using a variety of methods such as whakapapa and pēpeha". Whakapapa has been a fast growing passion of mine over the last few years. My experience has shown that learning and engaging with whakapapa provides an opportunity to not only explore your own personal identity, but more importantly the identity of your whānau (family) and iwi. The desire to understand whakapapa, by first engaging with it through maunga, awa, pā and marae, is an example of learning whakapapa by embedding yourself within a particular environment. This then guided the idea around mapping pēpeha by way of not only revisiting the places in which we connect to genealogically but also, researching the pūrākau

(Māori narratives) of these places and producing a map of our pēpeha.

Why is whakapapa/pēpeha important to understand?

Barlow (1991, p. 173) defines whakapapa as "the genealogical descent of all living things from the gods to the present time; whakapapa is a basis for the organisation of knowledge in respect of the creation and development of all things". Hakopa (2011, p. 4) established that whakapapa "is also the instrument whereby Māori derived their intimate connections to the land and how they articulate their sense of belonging to their sacred places, stretching back hundreds of years". It is through whakapapa that we are able to identify 'who' and 'where' we come from. This gives us an identity and establishes those connections we have to people, land and atua (deities) (George, 2010). Whakapapa is a corpus of embedded knowledge. The process of acquiring embedded knowledge about whakapapa through listening, reading, writing and engaging in whakapapa through maunga, awa, marae and pā sites is a lived reality of whakapapa.

The mapping of pēpeha is a task that required an in-depth look into the past using the tools available in Māori oral tradition including, waiata, karakia, mōteatea and pūrākau. By doing so, you can create a timeline of events, people and places that create a narrative that starts from the past, brings us to the present and guides us into the future. The whakapapa that defines my geographical and cultural centre is captured concisely in the pēpeha below; it represents how I position myself within this world as a descendant of Ngāti Kahungunu, and has guided this case study.

> Ko wai te waka, Takitimu
> Ko wai te tangata, Tamatea Arikinui te tangata
> Ko wai te tohunga, Ruawharo Tupae Te Rongo Patahi Putahi
> Ko wai te maunga, Kahurānaki o Te Matau a Māui Tikitiki a Taranga
> Ko wai te awa, Ka titiro whakararo ki te awa o Ngaruroro Mokotuararo ki Rangatira
> Ko wai te iwi, Ngāti Kahungunu e!

This case study involved collating pūrākau about the specific geographical and genealogical connections to places and people outlined in the above pēpeha, therefore was centred on my Kahungunu whakapapa. Data collection consisted of personal communication with three kaumātua within the Ngāti Kahungunu region and a literature review specifically focused on pūrākau and whakapapa of Ngāti Kahungunu. Literature reviewed did not produce many references because I found that there were many disparities between many of the stories and the literature. This case study involved an extensive range of pūrākau and whakapapa. Therefore, for the purpose of this publication I will focus on the awa, Ngaruroro-Mokotuararo-ki-Rangatira.

Ko wai te awa, Ka titiro whakararo ki te awa o Ngaruroro-Mokotuararo-ki-Rangatira
What is the name of the river, looking downward to the river of Ngaruroro-Mokotuararo-ki-Rangatira

Ngaruroro Awa (as seen in *Figure 1*), owes its name to the tidal influx of fish, which penetrated well into the interior of the river. This is just one version of the whakapapa of this awa name and it came from the explorer Mahu Tapoanui. He was in the Ngāti Kahungunu area, when his dog disturbed a shoal of upokororo (grayling fish) while crossing the river. The fish (upokororo) took fright and fled up the river, creating ngaru (waves), it has since been known as Ngaruroro (Parsons, 2013). While most people only refer to this awa as Ngaruroro, its full name is Ngaruroro-Mokotuararo ki Rangatira. Mokotuararo is the name of one of Ruawharo's sons. Ruawharo sacrificed his son at the mouth of Ngaruroro in order to make sure the people of Ngāti Kahungunu will have an abundance of food for his descendants for the rest of time. Rangatira is said to be the name of another awa that branches off Ngaruroro, or the name of a place in which this branch of the awa flows to.

Ngaruroro is a long river, the headwaters lie beyond the Kaweka and the Ruahine Ranges then break onto the Heretaunga plains through a gorge at Maraekakaho. Ngaruroro has changed course many times due to natural disasters such as flooding. The great flood of 1867 caused the biggest change of course as it diverted the awa to Pakowhai via Omahu (Parsons, 2013).

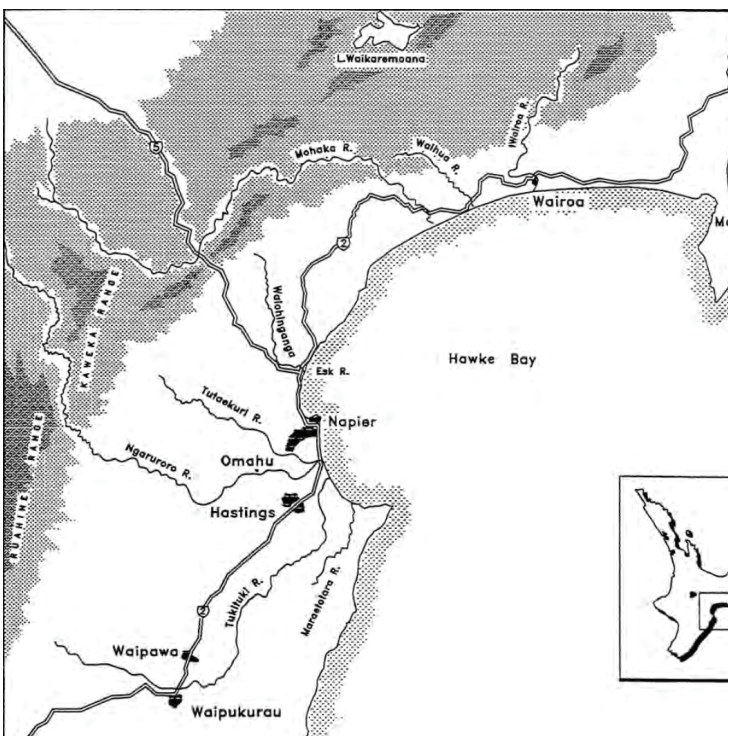


Figure 1 *Modern location map of Ngāti Kahungunu region. Adapted from Te Whanganui a Orotu Report. In Waitangi Tribunal (1995, p. xiv).*

At different periods of occupation, the Ngaruroro Awa became a tribal boundary. Rangitāne and Ngāi Tara iwi were located on the South bank of the river, these two iwi occupied Heretaunga before Ngāti Kahungunu migrated (Parsons, 2013; Pishief, 1997). It was difficult to find any literature detailing any accounts in which Kahungunu himself was within the Heretaunga region. However, a local historian recounts a story to me about him and his father Tamatea Pokai Whenua.

Tamatea Pokai Whenua

Tamatea Pokai Whenua, also known as Tamatea Ure-Haea is a well known and avid explorer. As Mitchell (1972 p. 56) put it "he had in his veins the blood of the Pacific Ocean Viking, his grandfather (Tamatea Arikinui), and the blood of one who could stride over geograpical obstacles, [like] his father (Rongokako)". Tamatea Pokai Whenua and his wife Iwipupu had a son named Kahungunu. Kahungunu was born at Tamatea's pā, Tinotino, that was built at Orongotea on the North West shore line of the Hokianga (Mitchell, 1972). Being the explorer that Tamatea was known to be, there are many stories of his journeys both on the water and the land. The one that will be shared is a story that was told to me from a local Hawkes Bay historian. It is known that Kahungunu settled in the Mahia region with wife Rongomaiwahine. It is also known that Kahungunu did not spend much time in the Heretaunga region. However, this story retells of a father-son trip between Tamatea Pokai Whenua and Kahungunu in which they travelled up the Ngaruroro River, naming many places along the way. Italics is used to put emphasis on the story being told and will be used throughout.

> *He [Tamatea Pokai Whenua] brought Kahungunu down here to the Ahuriri Harbour on a sort of father and son bonding session when Kahungunu was still a boy. They camped around the islands [one island known as Tapu-te-ranga) in around the [Whanganui-a-roto, lagoon] harbour [of Napier] for several weeks just enjoying the kai moana and there would have certainly been some of Whatu Mamoe[2] here at that time. Then they went off, left their waka, which at the time was Takitimu II and then they made their way up the Ngaruroro River with a group of followers and a lot of the place names further up the river are named from that journey. Place names like Otupoupou, which is just in front of the Omahu Marae area (seen in figure 1), that was where he looked in his basket, a calabash one, and he thought one of his lizards had died, one of the ones he had picked up down here and so he had a stick and poupou, prodded it and it opened its mouth and he saw it was still alive so they named the place here it happened Otupoupou. Further up the river at Omahu is Ohiti or Owhiti if you say it correctly. That was named from something that had to do with that, that trade. Torohanga was another one. Tamatea stopped at a rock sitting on the hillside and he said a prayer to his atua through the rock. But as you go up the river almost all the place names right up to the Ruahine Ranges and beyond are named from different events that happened on that trip* (Personal communication,

22 January 2017).

I find this story very exhilarating knowing that both Tamatea Pokai Whenua and Kahungunu travelled along the Ngaruroro River. Although the river has changed direction since then it would be a great opportunity to not only map this journey but also to walk or paddle it as well, as we retrace the journey of our ancestors.

Kaitiaki of Ngaruroro

There are two known taniwha of the Ngaruroro; Karukaru and Wahaparata. The kaitiaki of our whānau marae, Kohupātiki is Wahaparata. A local historian explains more.

> *The two that I've been told, one is further up the river called Karukaru, I was talking to [a kaumatua from Bridge Pā] one day and I said, I was over at anonymous A3 recently and she was telling me about Karukaru the taniwha of the river at Omahu. But I said that must have been your taniwha in the past because the river didn't flow through Omahu until after 1867, it flowed through Roys Hill behind Flaxmere over near Bridge Pā right down Longlands Road and back to Havelock North. When I mentioned Karukaru, anonymous B picked it up and she said that was our taniwha, its rua was where Te awa o te atua stream flowed into the old Ngaruroro river. That's where our old people said where Karukaru, her lair was. I said that is possible but after 1867 when the river changed course she would have had to change course with it, couldn't live on dry land. When anonymous A talked to me about Karukaru she was at the river at Omahu I know she had red hair but not much more than that. Down at the mouth of river, the taniwha there was in the form of a wave that made its way up the river this was when the tide was coming in, like a small tidal wave. The wave passed Kohupātiki very regularly, particularly for young people there would have been a bit of superstition attached to this wave that came so regularly every 12 hours or so. There was a place on the old Ngaruroro River when it went to Havelock North, there was a place on the river called Te Waha o te Parata which is the point where the tide coming in fizzed out. In other words that's where the waves stopped. This produced the belief that it was this taniwha Parata. The Parata in Māori mythology is a monster that lives deep under the sea and its breathing in and breathing out causing the tides. The fish do tend to follow the incoming tide [bringing kai with it]. Anonymous A also told me she looked after the children of the river. Even if one did drown she would put the body on the side so that they could be found and not washed out to sea* (Personal communication, 22 January 2017).

These stories were just two of many stories that were shared. This knowledge could definitely help to construct a map of the old Ngaruroro Awa, as it flows much differently today. Mapping and retracing the taniwha trails would also be a great journey to undertake, as with the one with Tamatea and Kahungunu. This case study just shows the potential

of something bigger, to be able to map our whakapapa with our whānau for not only our tīpuna, but ourselves in the sense that we get a strong understanding of who we are, and the whakapapa in which we all come from.

Conclusion

This case study exhibits how mapping geographical and genealogical connections can be done, simply by following the knowledge of Māori oral traditions, which are now embedded in pūrākau. It is these pūrākau and our whakapapa, which can guide and transcend the mapping of pēpeha. Our engagement with these ancestral landscapes is the most precious and understanding the opportunities to learn from this should not be taken for granted. The prospect to map pēpeha sends me in the direction I want to explore. The expectation is to enhance knowledge of our pēpeha and whakapapa as well as affirming our Māori identity and health and wellbeing.

Case Study 3: National Science Challenge Sustainable Seas Hui-te-ana-nui: Understanding Kaitiakitanga in the Marine Environment by Ngahuia Mita, Anne-Marie Jackson and Hauiti Hakopa

The *National Science Challenge Sustainable Seas Ko Ngā Moana Whakauka* is a 10 year programme of research with a primary objective to "enhance utilisation of our marine resources within environmental and biological constraints". Our Project is 3.1.1 entitled Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment (Hui-te-ana-nui). This research had two objectives. Firstly to examine mātauranga associated with the marine environment through archival research and examination of key texts and; secondly to undertake a desktop examination of literature, reports and frameworks relating to Māori perspectives of the marine environment. The project team was Dr Anne-Marie Jackson (nō Ngāti Whātua), Ngahuia Mita (nō Te Aitanga-ā-Māhaki) and Dr Hauiti Hakopa (nō Ngāti Tūwharetoa). Ngahuia Mita created this innovation from the findings of Objective 1.

We sourced and examined ancient karakia (incantations), mōteatea (chants), pēpeha (tribal sayings), whakataukī (proverbs), and pūrākau (stories) regarding the marine environment available through the Hocken and Alexander Turnbull libraries, sources within the Journals of the Polynesian Society and Ngā Moteatea (collected and edited by Tā Apirana Ngata and Pei Te Hurinui Jones). We built upon pilot archival work undertaken at the Hocken Library, Archives New Zealand and National Library (completed by Ms Ngahuia Mita in collaboration with Dr Jackson and Dr Hakopa) funded through Ngā Pae o te Māramatanga. The key method for this research was archival research including retrieval, examination, databasing and analysis of the material. We also used contemporary literature where necessary in order to give further explanation to contrast and compare ancient practices derived from archival sources with current Māori beliefs; and practices associated with kaitiakitanga of the marine environment today.

One of the most important outcomes of Hui-te-ana-nui was to provide whānau, hapū, iwi and communities with a plethora of mātauranga associated with kaitiakitanga

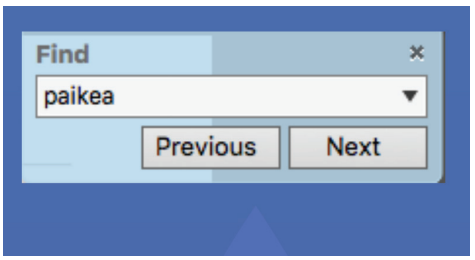
within the marine environment. Information, which can be used in practical ways to inform engagement with and management of the marine environment. For the purposes of Hui-te-ana-nui we have created an example of what a map of archival sources could look like and how individuals, whānau, hapū, iwi and communities could access and utilise these sources via a map. As part of the data collection process for Hui-te-ana-nui the archival sources, that were collected, used for the body of the report, were tabulated and created a database of sources categorised by keywords. The exemplar of the map we have created was done using Prezi (a presentation tool) in order to show how these sources could be organised and displayed on a map.

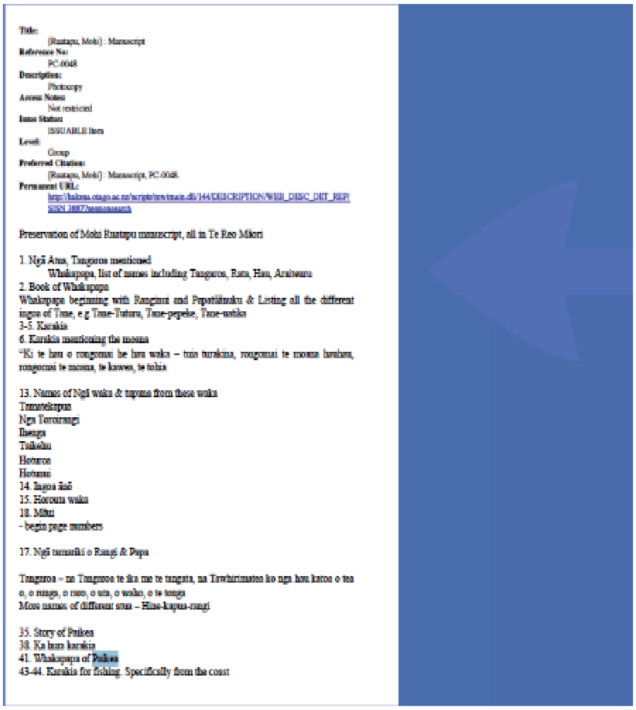
However, in order to create a usable map for this material Google maps, Google earth or other types of GIS software could be utilised. The key idea for presenting the data in this way is to show the relationship of the archival material and their locality and therefore the whānau, hapū, iwi and communities within this area. The benefit for viewing and analysing the material in this way is that it can provide valuable archival and historical information about kaitiakitanga in specific locations and allow whānau and communities to access them.

For the purposes of this example, we have used a piece of archival material specifically connected to Whangarā and Te Tairāwhiti (the East Coast of the North Island) where Ngāhuia has whakapapa connections. The map begins on a large scale with a full size map of Aotearoa, New Zealand, which we have named Te Mahere Kaiao o Aotearoa, the living map of Aotearoa. The map then zooms in to a closer view of the East Coast, and then further in showing Whangarā specifically. The next aspect of the map displays an area which contains links to, he kiriata (video/videos), he kōrero (discussion/oral recordings) and ngā pānui (written documents). The figures below demonstrate the features of this map that we have discussed. Following this is a landing page, which demonstrates three options to access resources video, oral and written. The examples we have given here are what could, potentially, be shown through accessing both the he kiriata and ngā pānui tabs. Specifically, a video showcasing Whangarā marae and the surrounding area as well as an archival document that pertains to Ngāti Konohi and Ngāti Porou ancestor Paikea. This document, written by Mohi Ruatapu, includes whakapapa information pertaining to Paikea and other tūpuna, as well as stories and whakapapa. Should this map go on to be created as an interactive database of archival and other materials we have also considered the importance of maintaining the mana of the sources and the whānau, hapū and iwi to whom they ultimately belong. Therefore, it is thought that within a potential map and database there would be levels of access. At the discretion of the whānau hapū, or iwi that they belong to, there would be a firewall system, which, would allow certain people access to parts of the map or certain sources using a specific username and password.

The benefits of creating Te Mahere Kaiao, or a living map are that it enables us to not only share the archival and secondary sources that we have accessed throughout the project, it also enables others to use these in a practical way. Organising archival material through the process of building a map also allows us to align the pūrākau and whakapapa

kōrero within the locations, which they come from. This means that ecosystems based management in these areas would be informed by the mātauranga held within archival materials, in these areas. Below is a set of images that show each step of using the map, as described previously. These images create an example for what a possible map of archival material and secondary sources based on our research for Hui-te-ana-nui.





Title:
[Ruatapu, Mohi] : Manuscript
Reference No:
PC-0048
Description:
Photocopy
Access Notes:
Not restricted
Issue Status:
ISSUABLE Item
Level:
Group
Preferred Citation:
[Ruatapu, Mohi] : Manuscript, PC-0048.
Permanent URL:
http://hakena.otago.ac.nz/scripts/mwimain.dll/144/DESCRIPTION/WEB_DESC_DET_REP/SISN 38887?sessionsearch

Preservation of Mohi Ruatapu manuscript, all in Te Reo Māori

1. Ngā Atua, Tangaroa mentioned
Whakapapa, list of names including Tangaroa, Rata, Hau, Araiteuru
2. Book of Whakapapa
Whakapapa beginning with Ranginui and Papatūānuku & Listing all the different ingoa of Tane, e.g Tane-Tuturu, Tane-pepeke, Tane-waika
3-5. Karakia
6. Karakia mentioning the moana
"Ki te hau o rongomai he hau waka – tuia turakina, rongomai te moana hauhau, rongomai te moana, te kawea, te tohia

13. Names of Ngā waka & tupuna from these waka
Tamatekapua
Nga Toroirangi
Ihenga
Taikehu
Hoturoa
Hoturoa
14. Ingoa ināō
15. Horouta waka
18. Māui
- begin page numbers

17. Ngā tamariki o Rangi & Papa

Tangaroa – na Tangaroa te ika me te tangata, na Tawhirimatea ko nga hau katoa o tea o, o runga, o raro, o uta, o waho, o te tonga
More names of different stus – Hine-kapua-rangi

35. Story of Paikea
38. Ka huru karakia
41. Whakapapa of Paikea
43-44. Karakia for fishing. Specifically from the coast

Concluding thoughts of the three case studies

Indigenous peoples, including Māori, around the world face unique challenges pertaining to their ancestral territories in planning for and protecting their notions about those ancestral territories. For Māori, issues related to mana whenua, the protection and maintenance of cultural assets, their language, their histories and their stories will benefit from the creation of maps that reflect their notions of mana. Conceding this, mapping technologies such as GIS offers a unique suite of tools that will go a long way in moving toward this objective. The key to getting it right is to ensure the mana and tapu of all the whenua kōrero remains intact during any part of the process; this requires an understanding of cultural conventions.

Endnotes

1. Te Koronga is a Māori research excellence group at the University of Otago, Dunedin, New Zealand co-led by Dr Hauiti Hakopa and Dr Anne-Marie Jackson.

2. Mamoe are from the Ngāti Awa from Hokianga and Whakatane (Pishief, 1997). They were led by their chief Koau Pari (Pishief, 1997). They are also known to be the people who built Ōtatara and Hikurangi Pā (Pishief, 1997). Whatu Mamoe may or may not be connected to the hapū from Ngāi Tahu, the connection has not been found (Personal communication, 22 January 2017).

3. The historian mentioned people in his interview that will remain anonymous. When they are mentioned they will be referred to as anonymous A and anonymous B.

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The Indigenous Mapping Waananga 2017

Moka Apiti

Introduction

The concepts of cartography and Geographic Information Systems (GIS) are not new to Maaori. In fact, Maaori have been doing cartography and working with GIS since the beginning of time. In the Western world, cartography is defined as the art of map making[1] and GIS is defined as "A geographic information system (GIS) which lets us visualize, question, analyse, and interpret data to understand relationships, patterns, and trends".[2]

A GIS, as understood by Maaori, could be defined as a paataka korero tuku iho, a central repository of whakapapa (genealogy),[3] and traditional knowledge, which has been passed down from generation to generation. Cartography then, could be defined as the visualisation of the koorero tuku iho such as pepeha (tribal sayings), whakairo (carvings) taa moko (tattooing) paatere (chant/songs), whakataukii (proverbial sayings), and whaikoorero (speech making). These concepts are integral to the way Maaori express themselves and their relationships to their environment.

Cartography, and GIS, are constantly being redefined by the advancement in technology and the integration of internet interactive maps, 3D renditions and hyperlinks to multiple information sources. These advancements in GIS, have the ability to now create interactive maps, which, can be used to identify places of significance as well as to experience virtual tours, and have been incredibly significant for Maaori. Most importantly, and even more excitingly, is the ability for modern GIS technology to take on new visual forms of expression which are probably the closest they have ever been to expressing 'cartography and GIS' as Maaori have always understood it to be. As examples, we can use GIS to create a 3D map to present the different layers of a pa site, the whakapapa and hononga (relationships) that people have to whenua (land).

When Maaori were first introduced to modern GIS technology in the mid to late 1990s there was a mad rush to go out and buy software such as MapInfo, which was a relatively innovative GIS software at the time, as a 'must have'. Over the last 20 years, my observation has been that for most iwi organisations (tribal organisations), the ability to sustain their GIS has been challenging due to the following factors:

- expensive hardware costs over time;
- the need to sustain software costs over time; and
- the costs of baseline datasets, for example satellite imagery.

The accumulated costs and long-term investment required by iwi organisations meant that it was unsustainable for many iwi to maintain their GIS with limited funding and resourcing. However today, hardware, software and baseline datasets are more accessible and affordable than ever before. The adoption of a New Zealand Geospatial Strategy [4] to

make spatial data freely available and the integration of different types of technologies such as drones, augmented reality, web and cloud based services has meant that more iwi are able to use geospatial technologies in everyday applications to:

1) capture, preserve and present their oral and traditional histories;
2) visualise their cultural heritage;
3) manage their cultural and commercial assets; and
4) reconnect their communities to their cultural heritage and identity.

The development of GIS has occurred in tandem with the challenging and changing dynamics of the Treaty Settlement process in New Zealand and many iwi have turned to GIS to assist them in this process. While iwi have had to adapt to the increasing demands placed on them by the Treaty Settlement process, technology advancements such as Google Earth, for example, have provided iwi with 'new' tools to capture, collate, present and visualise iwi narratives using modern GIS technology. These 'new' tools create expansive opportunities for iwi and Indigenous communities culturally, socially, economically and politically.

As iwi and Indigenous communities become more aware of how GIS and the 'new' tools can support their aspirations, it is also important that they have opportunities to access the technology along with training. Furthermore, Hakopa (2011), identifies that a key problem is, how to translate an oral tradition's view of an ancestral landscape into a spatial tradition using modern spatial information mapping tools without that body of cultural information losing any of its integrity or cultural impact and, that the process is as important to the Indigenous mind as the end product. This leads me to an initiative called the Indigenous Mapping Waananga 2017 (IMW2017) which seeks to engage iwi and Indigenous communities with GIS and 'new' state of the art geospatial tools through the form of waananga.

Background

The IWM2017 grew out of an initiative called the Indigenous Mapping Workshop (IMW), which was first established in Canada in 2014 by the Firelight Group who worked in partnership with the Google Earth Outreach team to deliver expert training to First Nations participants.

In 2016 in my Google Earth Outreach trainer role I had the privilege to deliver training at the IMW in Vancouver, Canada where I decided to bring the workshop back to New Zealand. I delivered it for iwi under my company Digital Navigators Ltd in partnership with the Firelight Group, the Google Earth Outreach team, Kereru Associates, Meta Maori, and Land Information New Zealand. With support and sponsorship from a number of iwi, private and government organisations we also delivered a one-day waananga for rangatahi (youth) Maaori and a three-day waananga for iwi and Indigenous community representatives.[5]

The key objective of the IMW2017 was to provide opportunities for iwi and Indigenous communities to access technology, expert training, predominantly, Indigenous training within a learning environment where participants could apply the technology relevant to the context and practical experiences and realities we live and breathe every day. A key component of the IMW2017 is that training is delivered predominantly by Indigenous trainers with presentations and training embedding Indigenous values and traditions and, is focused on strengthening self-determination, cultural revitalisation and sustainable practice for our communities and the environments that we have kaitiaki (guardianship) responsibilities for.

The Indigenous Mapping Waananga 2017, Hamilton, New Zealand

Geospatial conferences are delivered all over the world, with a focus on technology advancements, the sharing and presentation of case studies as well as providing opportunities for growth and development. The unique perspective of this conference compared to others, is that the training was predominantly delivered by Indigenous trainers from an Indigenous perspective, which, integrated traditional cultural values and knowledge and recognised the relationship that many Indigenous communities have in their roles and responsibilities as kaitiaki (guardians) of their environments. The Indigenous Mapping Waananga (IMW2017) was a conference held in Hamilton from 15-18 May 2017 to teach participants how to use state of the art mapping and spatial data technology to tell their stories of connection with the land, rivers and oceans.

Over the course of four days, the IMW2017 was attended by close to 200 participants from iwi all around the country. Participants were taught how to use the leading mapping and spatial data analytics technologies including Google mapping software, ArcGIS, and QGIS tools in a hands-on training conference hosted at the Claudelands Event Centre. The first day delivered a workshop for rangatahi Maaori (Maaori youth) affiliated to iwi or Indigenous communities with established GIS or those undertaking GIS projects.

The conference endeavoured to share best practice with participants and provide an opportunity for them to hear first-hand how iwi and Indigenous communities are using GIS tools to support their aspirations and contribute to informing activities that promote and sustain their tino rangatiratanga (self-determination). The technical training was co-led by GIS experts from Digital Navigators Ltd, Google Earth Outreach, the Firelight Group, Land Information New Zealand, Kenex, and a global network of Indigenous mapping experts from Aotearoa, Costa Rica, Canada, Ireland and Italy. The key objectives of the IMW2017:

- Increase iwi and Indigenous awareness and understanding about geographical information systems (GIS) and infrastructure that will support them to capture, preserve, manage, enhance and present spatial and non-spatial information related to their iwi and tribal landscapes;
- Teach iwi and Indigenous communities to use geospatial tools so that they can

make better informed decisions about which tool will be support their needs; and
- Provide rangatahi Maaori an insight into geospatial technology as a valid career pathways and see the potential opportunities this sector can provide. The rangatahi one-day workshop targeted those rangatahi who affiliated to iwi and have been involved in the GIS sector, some with dedicated capability or who are undertaking GIS projects. An important driver here was to encourage iwi and rangatahi to consider succession planning, and building grassroots capacity and capability now to fill these roles with GIS skilled people from their own communities in future.

The IMW2017 was delivered in three streams across the three days, which taught and showcased the benefits and challenges of the following world leading geospatial technologies:

1) Environmental Systems Research Institute (ESRI), ArcGIS;
2) Quantum Geographic Information System (QGIS); and
3) Google's array of mapping tools (Google Earth/ MyMaps/ Street View/ TourBuilder/ Open Data Kit/ Fusion Tables).

These tools were chosen because they are the leaders in GIS technology and in many cases have been used by Indigenous communities around the world. The trainers were all familiar with these technologies and knew of case studies whereby the software technologies were used by Indigenous communities. The workshop streams provided hands-on practical training for participants to learn how to use each tool and identify which tool would be meet their needs.

Iwi and Indigenous communities all over the world are undertaking groundbreaking projects using these technologies. Presentations were delivered throughout the waananga by Indigenous representatives who talked about the application of these technologies to assist them with:

- Projects around navigational wayfinding and voyaging;
- Mapping the Maaori maramataka (calendar);
- Cultural and language revitalisation;
- Reconnecting tribal members back to their land, rivers, oceans;
- Genealogy and Treaty settlements; and
- The use of drone and the creation of real time data to inform decision-making.

In summary, presentations provided insights into how iwi and Indigenous communities around the world are using new tools to assist with some high impact projects. Projects ranged from:

- The development of a research mapping methodology, Direct to Digital (Olson,

Hackett, & DeRoy, 2016), by the Firelight Group, Canada by integrating Google Earth mapping techniques with research methodologies; to

- The creation of an holistic Ngaai Tahu tribal sites of significance search engine which integrates ArcGIS and tribal cultural values to meet the cultural needs of their tribal members; to
- Indigenous language revitalisation and the role of Google mapping tools to map and visualise the current state and wellbeing of languages around the world; to
- How Te Ruunanganui o Ngaati Hikairo use GIS within the New Zealand Treaty settlement framework to inform overlapping interests, freshwater management, tribal engagement, heritage management and the Takutai Tai Moana; to
- How Te Aitanga a Hauiti have integrated Google's mapping tools including Google Earth, Street View, Open Data Kit, Fusion Tables and MyMaps with local communities around the East Coast to develop a story telling and decision-making platform. Aspects of the platform are targeted not only to create greater awareness of local issues for the many tribal members who live outside the tribal boundaries, but also to support iwi members to make informed decisions around effective planning within the community; to
- Work being undertaken by First Nations and how geospatial tools are assisting them to realise their own aspirations; to
- The introduction of Drones such as the DJI series and software packages including Pix4D Capture, Drone Deploy, Litchi and Drone2Map and how they have influenced the way mapping is being done.

Outcomes

The overall objectives of the Waananga were to introduce participants to geospatial technology, provide information about free data sources and data sets relative to their own tribal landscapes and environments and strengthen their ability to use the technology to support the aspirations of their own projects. Further outcomes achieved included:

- Participants gaining a stronger understanding about GIS and what can be achieved through practical training and experience using the technology with expert trainers across the 4-day event and access to key presentations from iwi and Indigenous speakers on their projects;
- Participants feeling empowered to make informed decisions about which GIS would best support their aspirations;
- An opportunity for rangatahi Maaori to learn about GIS career pathways and for their iwi organisations to support growth and development opportunities for future succession planning in this area;
- Building and strengthening relationships for everyone involved through creating networks of support for iwi and indigenous GIS practitioners; and
- The opportunity to have robust discussions around how Indigenous communities

integrate traditional knowledge and korero tuku iho with modern technology while still maintaining tikanga into the future.

Summary

In summary, the Indigenous Mapping Waananga was a huge success and highlighted the need for this type of conference here in New Zealand. The IMW2017 achieved the objectives it set out to achieve for iwi and Indigenous participants to support participants to learn about GIS and state of the art geospatial technologies to support them in their projects and day to day applications. It was about educating participants of the different options available to them when wanting to incorporate GIS into a project that they have.

Feedback reflected that there was strong participation from key iwi, hapuu and whanau representatives who are working in kaitiaki roles and who are directly responsible for managing capturing, preserving, analysing, presenting and sharing information relevant to their communities and who are or would benefit significantly through the use of GIS technology.

In conclusion, what the waananga showed was that each iwi is dynamic with a different set of parameters. This particular hands-on training was a starting point for them to utilise and design a program that they can take ownership of using a set of tools, which, in my experience works. Many of the participants were grassroots advocates and there is no other initiative of this size in New Zealand that integrates maatauranga Maaori and exposes participants to the leading GIS software applications. A successful iwi GIS program must be championed from within the iwi and have a clear set of parameters that they have identified and which works across the total organisation. Maaori participation in this space is integral to the work iwi are doing on every level and will only grow as awareness, understanding of the tools, capability and capacity continues to grow. Fundamentally GIS is just a tool, no different to 3D printing or VR. What is important is that we retain our maatauranga Maaori and look to use these tools to enhance and assist Maaori in their endeavours. Hence, the significance of providing opportunities like this will continue into the future. Lastly, I would like to acknowledge the organising committee of Lillian Clarke, Jude Cornelius-Nuku, Duane Wilkins, Steve Deroy, Jeff Hackett and Kylie Ngaropo for all the work they did to make this a reality.

Endnotes

1. https://en.wikipedia.org/wiki/Cartography

2. http://www.esri.com/what-is-gis

3. A paper presented by AT Mahuika, 1996, *GIS Past, Present, Future: The Conception, Development, and implementation of Ngati Porou Information Systems*.

4. See https://www.linz.govt.nz/about-linz/our-location-strategy/geospatial-strategy-for-spatial-data-infrastructure/new-zealand-geospatial-strategy.

5. Partners included Digital Navigators Ltd, Google Earth Outreach, the Firelight Group, Waikato Tainui, Land Information New Zealand, Meta Maori and Te Kereru Associates. Sponsors included

Annies, Callaghan Innovation, Eagle Technology, Kenex, Manaaki Whenua Landcare Research, Ngaa Whenua Raahui, Te Kahui Manu Hokai The Maori GIS Association, Te Puni Kookiri and Te Tumu Paeroa.

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Maramataka

Liliana Clarke & Pauline Harris

Introduction

Many ancient civilisations used the heavenly bodies to track the passage of time. The regular motions of the sun, moon and stars, were used as clocks for agriculture, rituals, festivities and other activities (Aveni, 1980, Urton, 1981). Māori used similar methods for their calendrical systems, which were governed by more than one time cycle (Smith, 2011). The first cycle was based on the Sun's annual motion across the horizon from its northern to southern solstice points. The second cycle was based on the movement of the sky during the year, in particular the movement of the stars, whilst the third was based on the phases of the moon (Smith, 2011). These cycles in conjunction with environmental and biological indicators were used to track the passage of time. All of these combined formed a complex system of understandings called the maramataka.

The work of Roberts, Weko and Clarke (2006) showcases and discusses various maramataka from around Aotearoa. They present 43 published and unpublished maramataka from a number of iwi and a preliminary analysis of the meaning of the moon nights. In some versions of the maramataka, the year consists of 10 months with more than one month rolled together under one name, whereas according to Best (1922) the Māori year consisted of 12 months. Roberts et al. (2006) also posit that the number of moon nights varied from 28 to 32. It is suggested that variations in the number of nights/months allows for a necessary intercalation (the addition of extra days, weeks or month) to occur, which enabled the synchronisation of the moon cycles with that of the star risings at New Year. Roberts et al. concur with this concept, stating that an addition of a 13th month may have been done for seasonal synchronicity. These adjustments are not peculiar to Māori but were/are practiced in other cultures, in order to fine-tune their respective calendars.

Matamua (2017) describes the stars used to indicate the various months of the year. Similarly, the arrival of the seasons are also signalled by the appearance of particular stars and/or their constellations. Ropiha (2000) postulates that the names and meanings of the moon nights had ecological knowledge encoded in them, which described the influence of the moon cycle on fishing and planting activities. The recently published work *Living by the Moon*, written by esteemed kaumātua Wiremu Tāwhai (2013), provides detailed descriptions of the localised practices of his own iwi, Te Whānau-ā-Apanui. Drawing upon the knowledge handed down across countless generations, the appropriate activities to be undertaken, such as planting, fishing and ceremonies (or a combination of all three) for each phase and moon night, are outlined alongside their accompanying kōrero or tribal narrative.

Digital technologies today form a critical role in the ever growing research and education space that encapsulates maramataka. The broad and in depth relationship of maramataka with areas such as ecology, the environment and astronomy, yields a wide

interactive space to engage in a variety of digital technologies. In fact, digital technologies have enabled an enhanced experience within the maramataka research and education space. This chapter outlines some of the various digital technologies that maramataka utilises in research and growing understandings of the maramataka.

The Maramataka

The lunar component of the maramataka recognises the different phases of the moon, with each moon phase named with multiple references to such things as agricultural, environmental and ecological information for each phase. *Table 1* gives an example of a maramataka from the Ngāti Kahungunu tribe (Mitira, 1972) and *Figure 1* gives the associated phases of the moon. The example shows 29 names for each night, as well as descriptions of the phase and of relevant food practices for that day or night. Other examples of the maramataka contain similar names with some variations in spelling and ordering. These descriptions to the untrained eye only contain a sparse amount of knowledge on fishing and planting. However, to those with the knowledge, experience and context, these descriptions offer a doorway to a plethora of knowledge. We shall discuss this in more detail later in the paper.

Table 1: *The moon cycle calendar from the Ngāti Kahungunu tribe (Mitira, 1972).*

	Name of night	Relevant description of the night.
1	Whiro	Bad day; the moon is out of sight.
2	Tirea	Bad day; the moon is slightly seen. (New Moon.)
3	Hoata	Good day for planting and fishing, the moon is well shown.
4	Uenuku	Good day for planting from dawn to mid-day; good night for eels.
5	Okoro	Good day for planting from mid-day to sunset, good night for catching eels.
6	Tamatea-a-hotu	Bad day for planting and fishing; sea is disturbed by ocean currents.
7	Tamatea-a-ngana	Bad day for planting and fishing; sea is disturbed by ocean currents.
8	Tamatea-aio	Good day for planting and fishing. (Quarter Moon.)
9	Tamatea-kai-ariki	Bad day for planting and fishing, sea is disturbed by ocean currents.
10	Huna	Bad day; everything is hidden.
11	Ari	Fairly good for planting and fishing; good night for spearing eels.
12	Maure	Fairly good for planting and fishing; good night for spearing eels.
13	Mawharu	Good day, especially for pot cray-fishing.

14	Ohua	Good for planting, good return for all seeds and seedlings.
15	Turu	Fairly good for planting; tide coming in morning and evening, sun setting and moon rising simultaneously.
16	Rakaunui	Good day for planting, but not for fishing (Full moon).
17	Rakaumatohi	Fairly good day; whitebait is moving. (Moon commencing to wane.)
18	Takirau	Best day of all; plant kumara.
19	Oike	Fairly good day for planting and fishing.
20	Korekore-hahani	Bad day, everything is unobtainable.
21	Korekore-whiwhia	Bad day, everything is unobtainable.
22	Korekore-rawea	Bad day, everything is unobtainable.
23	Korekore-piri-ki-tangaroa	Slightly better day, from mid-day to sunset; night for eels. (Moon last quarter.)
24	Tangaroa-amua	Good day for deep sea fishing; white bait is running.
25	Tangaroa-aroto	Good day for deep sea fishing; white bait is running.
26	Otane	Bad day for all things.
27	Orongonui	Bad day for anything.
28	Omutu	Bad day for anything.
29	Mutuwhenua	Worst day of all. (Moon is dead.)

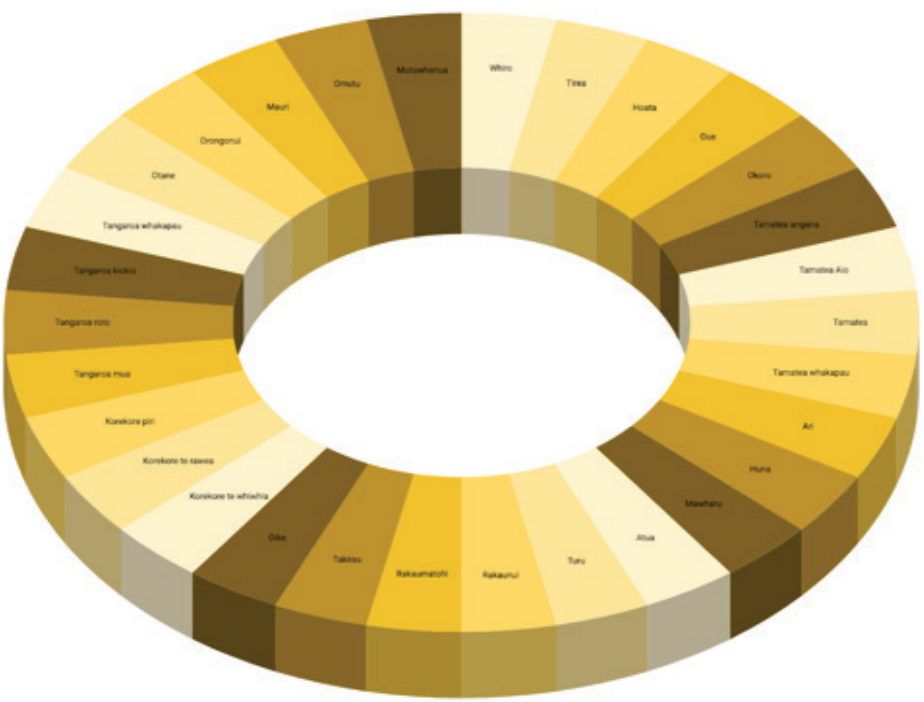

Figure 1: *The moon phases and their associated names.*

Digital technology in the maramataka

In understanding how the maramataka works researchers have embarked upon using digital technologies such as Global Positioning Systems (GPS), Geographic Information Systems (GIS) and Google maps to record and analyse data pertaining to the maramataka. As described above the maramataka encapsulates observations of the celestial, the environment and ecology, which is locale specific and inter-related. This spatial variation thus lends the need to use digital technologies such as GPS and GIS Mapping systems. In addition, there is also, at times, the need to design and develop standalone code for calculating astronomical occurrences such as heliacal rising of stars and moon position and luminosity. We describe here some of these systems and codes that are currently being used in maramataka research.

Geographic Information Systems (GIS) and maramataka

A GIS is defined as "a system for capturing, storing, checking, manipulating, analysing, and displaying data which are spatially referenced to the Earth" (Department of the Environment, 1987, p 132). GIS have the ability to generate:

> 'visual' spatial information which helps people understand relationships between information, concepts, and ideas. Both maps and graphical displays can communicate and present spatial information effectively; showing patterns (detecting change through time), quantifying features, analysing relationships, and visualising hypothetical 'what if' scenarios. 'Seeing' something graphically through pictures or maps has always been a good way to communicate and present information (Manaaki Whenua Landcare Research, 2017)

In a Māori context GIS systems need to be more encompassing to not only record the standard spatial and temporal information, but also aspects such as the relationship with individuals, places, cultural activities, spiritual connections, experience and the spoken word. Māori can employ GIS tools and add their own cultural imprint to existing applications (Pacey, 2005). Moreover, such tools complement the Māori knowledge systems traditionally used to store and transfer knowledge and information.

Current temporal GIS tend to keep track of time via the Gregorian Calendar and the universal 24 hour clock. This can be challenging when documenting and displaying maramataka which has multiple cycles ingrained including the lunar cycle, the tidal cycle, the seasonal cycle, the monthly cycles and specific activities for certain times. The GIS interface can be incorporated into a selection of these cycles to demonstrate how time might otherwise be visualised and queried outside of current standards to align to Indigenous ways of thinking and pedagogy. Some of the features utilised by the Gregorian Calendar and 24 hour clock are not universal, and other factors are salient for keeping time in other cultures. Sense of time is complex; much of it is tied to various events or historical weather events, while much of human behaviour and other species that humans

are tied to are cyclical. Various examples within the environment include the different behaviour of diurnal or nocturnal species, the seasonal migration of birds, the spawning events connected to the lunar phases and the effect of the tidal cycle on travel movements for multiple species in an aquatic environment. Without solid methods of gathering and querying this sort of knowledge, a key component of Māori knowledge will tend to be ignored, lost in translation, or overlooked by outside influences and organisations.

Google Maps API and maramataka

In Aotearoa, the similarities as well as the differences between tribal (and hence physical and geographical) areas are also of interest. For example, horticultural activities feature strongly among the northern tribes such as Ngāpuhi due to warmer climatic conditions and the richness and fertility of the soil; sea fishing among coastal tribes such as Te Whānau-ā-Apanui and Ngāi Tahu due to an abundance of migrational species and ready access; forest foods (birds and rats) among inland peoples such as Tūhoe and Waikato/Tainui tribes, again due to ready access and plentiful bird species, as well as freshwater fish and tuna (eels). Therefore, in the development of multimodal cycles these similarities and differences pose somewhat of a challenge. To represent the temporal predicate we have to set up five cycles of time (maramataka, lunar, seasons, year, tidal) as well as a temporal line in order to separate and classify such cycles. The spatial predicate is represented by the Google Maps API base map as well as a set of layers that represent and locate the activities developed by Māori, i.e., fishing, farming, hunting and others. Finally, the thematic predicate describes the activities by using an ontology, which allows for the classification of traditional ecological knowledge from different perspectives, and the adaptation of the base knowledge to the spatial predicate showing interactions according to temporal cycles. Thus, the user is then given the option of inserting or deleting, activating or deactivating cycles that take place during the maramataka in accordance with their own needs or region.

Heliacal Star Rising and Moon Phase Calculator

In addition to the environmental and ecological indicators, the celestial movements of the sun, stars and moon are also important mechanisms for conveying important maramataka information. Celestial movements of these objects are relatively constant on an extremely long time scale, making them a fundamental component of calendrical systems. At times when conducting maramataka research it is useful to calculate various observable quantities of celestial objects. The luminosity of the moon or the rising time of certain stars is of particular interest. Within the maramataka, stars that had not been seen in the night sky for a short time during year, would be used to indicate a certain time of the year when it reappeared. The reason why these stars are not seen in the sky is because they are obscured by the sun as we orbit around it. The stars will reappear in the early morning sky just before the sun rises as our orbit shifts around the sun. When stars rise in the early morning before sunrise this is called a heliacal rising. Sometimes stars do not need to disappear but need to be observed at certain times and places in the sky to be associated with a time of year.

For example Māori used the heliacal rising of Matariki, known also as the Pleiades. This constellation is sometimes hidden from view for a couple of months and is not visible in the night sky in April and May. When Matariki is seen again in conjunction with a particular moon phase for many iwi this then signifies the Māori new year (Matamua, 2017).

There are other stars that indicate seasons and months of the year. *Table 2* shows stars from Matamua (2017) that represent certain times of the year. Although online calculators and planetariums can enable you to determine when these stars are rising, it is useful to be able to calculate these for large numbers of stars and to view the changing altitude of the stars during the year continuously. In addition, another useful quantity is the luminosity of different objects such as the moon. This enables one to determine a percentage brightness and estimate the moon phase at a particular time, which is particularly useful for the maramataka. For the maramataka, defining the luminosity for a certain moon phase brings additional challenges such as locale specific maramataka, which needs to be accounted for in the code development.

Table 2: *Stars associated with the maramataka (Excerpt from Matamua, 2017, p. 39).*

Te Rua o Takurua	The second of Takurua	Takurua is Sirius	July
Te Waru o Rehua	The eighth of Rehua	Rehua is Antares	January
Te Ngahuru o Poutūterangi	The tenth of Poutūterangi	Poutūterangi is Altair	March

In order to calculate these quantities, Python coding language was utilised due to its relative ease whilst also having the benefit of having precoded computations. PyEphem is a suite of scientific grade astronomical computational algorithms programmed in Python (Rhodes, 2011). Given the date and location, the code can calculate position of the sun, moon, planets and stars. In addition, it is capable of calculating the luminosity of different objects such as the moon. These algorithms can then be utilised to calculate relevant information for the maramataka.

Stellarium

Maramataka lessons have recently been developed for delivery in to schools utilising a planetarium dome. The easy search function in Stellarium locks the moon as a target, which enables a quick zoom into the moon in order to then be guided through daily images of the moon and each moon phase. The planetarium presenter then describes to the audience how the moon phases change with each night followed by a description of specific moon nights and their characteristics and activities associated with it. The easily accessible time option in the programme enables the user to jump from minute to minute, night to night, year to year, quickly showing what the moon looks like at the chosen time. Details of where the lessons were implemented are discussed in the following chapter by Harris *Portable Planetariums in the teaching of Māori Astronomy.*

Discussion

The maramataka is a complex system that utilises the sun, moon, stars, environment and ecology to track time and occurrences. It requires a broad understanding of many facets from the world around us and above us. Due to its multi-layered nature the use of digital technologies such as GIS and Google Mapping have played a fundamental role in recording, displaying and analysing data from all around Aotearoa. In addition, computer programmes have been developed to calculate and validate celestial indicators during the year and to identify phases of the moon at particular times of the month. The use of digital technologies from the calculation of luminosity to the representation of ecological knowledge in GIS has opened a new avenue for viewing the maramataka. This has enabled the real complexities in the maramataka to be shown and brings a new way of looking at the ancient knowledge of the maramataka from the perspective of a modern digital world.

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Portable planetariums in the teaching of Māori astronomy

Pauline Harris

Introduction

Using the night sky, environment and ecology that surrounded them as teaching aids, our tīpuna, traditionally, taught Māori astronomical knowledge by observation and oral transmission. Today a variety of tools can be used to complement these traditional methods to facilitate the teaching and learning of Māori astronomy to present and subsequent generations. Our trust, called the Society for Māori Astronomy Research and Traditions (SMART) is at the forefront of revitalising Māori astronomical knowledge and is pioneering the use of digital technology in the teaching and dissemination of this knowledge. In this paper I discuss some of the avenues that have been used to transfer this knowledge back to our communities which consist of a variety of ages ranging from 5 years to kaumātua. Here we shall showcase our most recent programme, which utilised a portable planetarium to conduct outreach on Māori astronomy to communities and rangatahi. This programme had multiple project deliveries which received funding and support from the Ministry for Business, Innovation and Employment (MBIE) and Te Puni Kōkiri (TPK) for the English language delivery of the programme and Te Taura Whiri i te Reo Māori (the Māori language commission) for the te reo Māori component.

The SMART Trust

The Society for Māori Astronomy Research and Traditions ("SMART", 2017) is a group of experts in mātauranga Māori, science and education. The board members have expertise in different aspects of Māori astronomy. These members include:

- our voyaging community, Hekenukumai Busby, Hoturoa Kerr and Jack Thatcher, who carry with them significant expertise in celestial navigation;
- our specialists in the maramataka (Māori calendrical systems), Ockie Simmonds, Rereata Makiha and Liliana Clarke; and
- our academic arm including Professor Dr. Rangi Matamua who carries significant expertise in traditional narrative, the language and associated ceremony of Māori astronomy, Dr. Takirirangi Smith a master carver, canoe builder and mātauranga Māori expert and, Dr. Pauline Harris an astrophysicist and the chair of SMART.

Local to SMART's geographical headquarters in Wellington are representatives from Ngāti Toa, Taku Parai and Toa Waka experts in local history and mātauranga Māori. The core objectives of SMART are:

- to preserve and revitalise Māori astronomical knowledge; and
- to bridge science and mātauranga Māori in order to create career pathways for

rangatahi Māori.

These objectives have led to the development of several significant research projects and outreach programmes including two Marsden funded research projects '*Te Mauria Whiritoi: Māori astronomy as a cultural resource*', and '*Ngā Takahuringa o te Ao: The effect of climate change on traditional Māori calendars*' as well as our education programmes '*Tūhono i te Ao: Connecting the worlds*' and the '*SMART planetarium Dome*' project.

Māori astronomy revitalisation

The breadth and depth of Māori astronomical knowledge spans a variety of topics such as cosmology, agriculture, architecture and calendrical systems (Harris, Matamua, Smith, Kerr & Waaka, 2013). The revitalisation of Māori astronomical knowledge is a core focus of SMART's aims and objectives. In order to effectively revitalise a body of knowledge it is imperative to combine both research and education to ensure succession of knowledge to younger generations and communities. SMART's research programmes have therefore led to the development of education programmes aimed to foster the knowledge development of communities and rangatahi in Māori astronomy. Programmes have been wide ranging from public and community talks, in-depth wānanga, to school and kura kaupapa Māori engagements. Due to the diversity of engagements, it is extremely important that both the method of and content of delivery is appropriate to the audience in order to obtain optimal uptake of knowledge transfer.

Pedagogy

Pedagogy plays an important role in determining the most effective delivery of astronomy programmes to different audiences. Effective teaching of such topics needs to consider how the audience will best learn and engage, whether they be younger, older, Māori, Pākehā or other peoples from the Pacific. In addition, if the schools are kura kaupapa Māori, their knowledge and language base differs greatly from mainstream education. Thus, fluency in te reo Māori is essential as well as a higher understanding of language and content knowledge. With this in mind a generic base plan of content for the introductory programme includes, the teaching of the origins of the celestial beings, how they were placed in the sky, basics on how the stars move across the sky, and an introduction on what or who the stars represent. In addition, introducing concepts around the calendrical system called the maramataka and also basic navigational techniques have proved popular in the delivery (see *Table 1*).

There is a great need to engage Māori in education that is relevant to them in both content and delivery method. The inclusiveness of kaupapa Māori education has been a journey with many challenges (Pihama, Cram & Walker, 2002). Resistance by the mainstream can still be seen in the most recent issues around the inclusion of Māori history in mainstream education ("No Compulsory lessons", 2016) and compulsory teaching of te reo Māori ("Education Review", 2017; Ngawhare, 2017). These sorts of barriers have hindered the development of mātauranga Māori based content in schools. As a reaction

Māori have taken matters into their own hands, to develop programmes and schooling systems that are at its core, kaupapa Māori, that is (Smith, 2003) 'for Māori by Māori' (Durie, 1998).

The design of the Māori planetarium programme seeks to mitigate the lack of Māori science in the current education system and aims to create a transformative safe space whereby rangatahi and communities can learn and discuss Māori astronomy and related topics. This creates a space in which we hope to inspire communities, iwi and hapū in order to revitalise their own knowledge. In addition, we also hope to mitigate other key issues as well, such as the dearth of engagement of Māori in science education and careers. With relatively low numbers of Māori engaging in scientific studies and careers (Harris & Mercier, 2006), there are growing concerns that this lack of engagement puts Indigenous and Māori at a continued social and economic disadvantage (McKinley & Gan, 2014). SMART programmes seek to address this trend of disengagement whilst, more importantly, creating a meaningful engagement of sharing of ancient ancestral knowledge. In order to effectively design a programme tailored for Māori, and also our wider Pasifika whānau, we followed a kaupapa Māori methodology (Pihama, Cram & Walker, 2002; Smith, 1997).

Digital technology in Māori astronomy education

Over many years SMART has engaged in delivering Māori astronomy to a variety of groups from school children to kaumātua. The technology previous to 2016 was limited to hands on interactive activities, Powerpoint presentations and simply, but most effectively, going outside looking at the stars. This is an important fact that should be noted, that nothing can replace the true experience of simply going outside and looking up and around at your environment. Although technology is a powerful tool in teaching, true understanding of the sky, environment and ecology requires true engagement and experiential learning. In 2016, however, SMART obtained a planetarium dome and projection system. This system had been on the 'much desired wish list' for quite some time due to its great potential and 'wow factor' that would dramatically raise the level of engagement of rangatahi and communities with our programmes.

Portable planetariums

Portable planetariums are used worldwide to promote and educate communities about astronomy. Perhoneimi defines a planetarium as a circular dome shape which acts as a theatre and relies on a projection system to project a simulated view of the night sky onto the inside of the dome (as cited in Gillete, 2013). These planetariums can be a fixed structure or portable. Fixed structures are usually large theatres located within an environment such as a museum, which has accompanying displays and interactive activities. A portable planetarium is a dome that is collapsible, which is inflated using a fan system (Gillette, 2013). Portable planetariums are easily transportable with the small ones fitting into a large suitcase when folded. Early planetariums utilised an analog system that relied on a central light source with light rays exiting through pinholes in a covering

to mimic the stars and other objects in the night sky. Although effective in its time, new systems have highly sophisticated projectors, mirrors, lenses and sound equipment that are controlled by a central computer or multiple computers for larger systems. Accessibility to portable planetariums have more recently become more realistic with relatively inexpensive setups now existing. *Figure 1* shows a typical portable planetarium set up. The top figure is the outside of the dome with a fan used to inflate the dome and a double doored entrance way to ensure the dome stays inflated and dark upon entry. The bottom figure shows the interior of the dome with the projection system shown to the right.

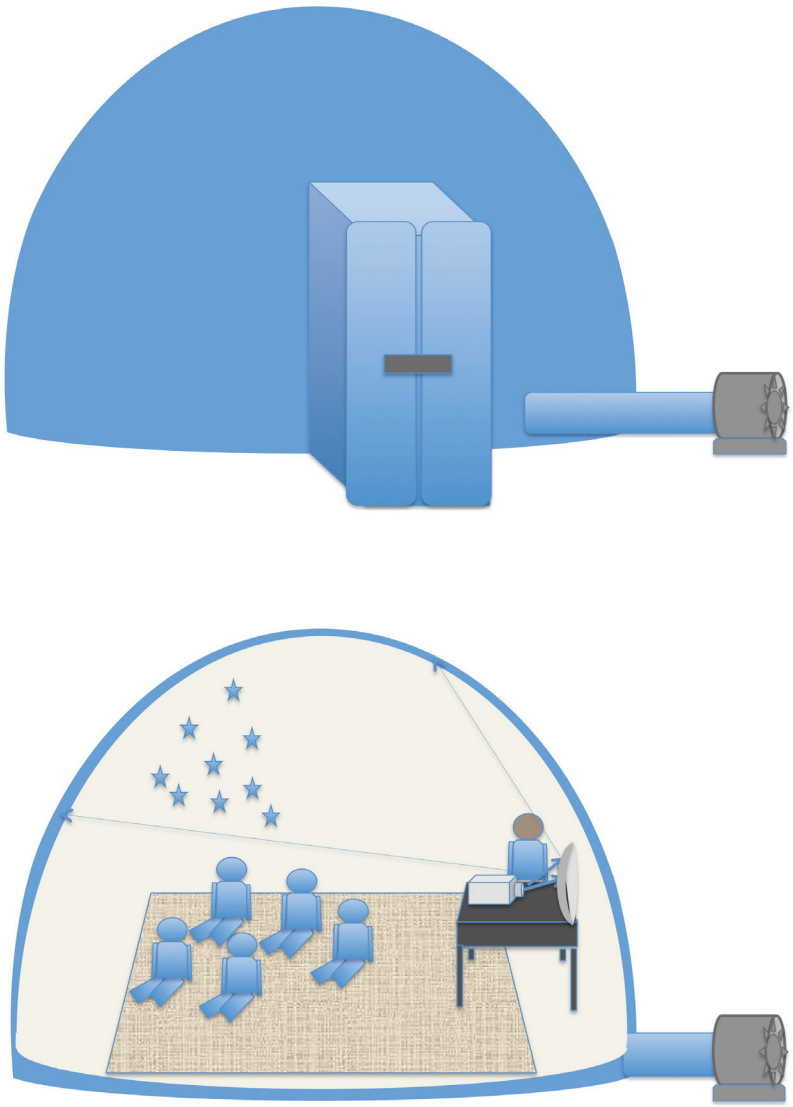

Figure 1: *The inside and outside setup of a portable planetarium dome.*

Planetarium system

Today a variety of methods are available whereby projection systems can range from simple systems using a high definition projector and convex mirror to more advanced systems using fish eye lens projectors. The former projects an image onto a convex mirror that is then bounced onto the inner surface of the dome whilst the latter system (fish eye) projects directly to the inner surface. Fish eye lenses are better quality with 360 degree image capability as opposed to the projected image via a convex mirror onto the dome which covers around 70% before distortion becomes an issue towards the back of the projector. Another major difference between the two systems is the cost which differs significantly, with fish eye lens system being much more expensive. The projectors for planetarium domes need to be high resolution and depending on the size of the dome, of high luminosity.

Mirrors

Normal mirrors have a reflective coating deposited on the backside of a substrate; this could be glass or plastic with a protective layer covering the coating. These types of mirrors are called second surface mirrors and are robust for general usage. First surface mirrors that are used in projecting images, such as that in planetariums, have a reflective coating deposited on the front of the substrate. There is no protective layer usually placed on the front of a first surface mirror. The main reason for using first surface mirrors instead of second is due to the fact that second surface mirrors have two reflections of the images (one from the reflective surface and then one from the substrate (glass or plastic) at the front), which produces a slighted distorted image. However, first surface mirrors only have one reflection, which results in a high quality undistorted image.

Figure 2: *Planetarium Dome equipment setup for inside the dome, from left to right mirror, computer and projector.*

Figure 3 *Inside the dome, Captain Tawhana Chadwick delivering a talk to an audience, behind Mary Tipoki watching the show.*

Full setup

The full setup of the dome includes one projector placed on a table at a distance from a convex first surface mirror; a good quality laptop that is capable of high definition video play if required; a blow up planetarium dome; and an external fan. The mirror is mounted for stability, with extreme care taken when putting it in place, bearing in mind that first surface mirrors cannot be touched or it will get damaged. The placement of the table-projector-computer system depends on your preference. However, after several iterations of the delivery, the current setup is about 70 degrees from the door, which minimises risk of audience participants touching the mirror.

A variety of research into planetariums has been conducted over the past several decades (Plummer, Schmoll, Yu & Ghent, 2015). Whilst some authors have investigated student learning experiences in planetariums from various perspectives including a focus on different delivery techniques such as kinesthetic delivery (Plummer, 2009), the effect of humour on learning in a planetarium (Fisher,1997), and the experience of the planetarium delivers themselves (Croft, 2008), an in depth analysis of Māori planetarium delivery has yet to be conducted. Nonetheless, we intend to undertake future analysis to gather Māori experiences following the model provided by Gillette (2013) pertaining to cognitive theory of multimedia learning. However, modifications to the framework will need to be undertaken to incorporate a Māori pedagogical and philosophical approach to unearth the potential of a kaupapa Māori cognitive theoretical framework for enhanced learning

experiences for rangatahi Māori (Harris, in preparation, 2018).

Tūhono i te Ao

The first project designed by SMART was a collaboration called *Tūhono i te Ao*. This project was designed to close the widening gap between Māori/ Pasifika knowledge and 'western science'. The lack of an appropriate approach and delivery of our mātauranga in mainstream public schooling system contexts, as discussed above, has been a strong driving force to develop this programme. *Tūhono i te Ao* is a collaboration with Te Roopu Awhina at Victoria University. This programme was designed and developed to create activities that related traditional Māori/ Pasifika knowledge to western science to make it relevant, exciting and enticing to our Māori/ Pasifika rangatahi. The planetarium dome was a major component of the *Tūhono* programme and was largely experimental during the early stage of development of the project. *Figure 4* shows the programme being run in Auckland over a 3 day period with over 700 Māori / Pasifika rangatahi coming through the programme. Feedback from end users was overwhelmingly positive with very few negative responses. This was an extremely satisfactory result considering that this programme reached more than 3000 Māori and Pacific students over a 5-month period. The content for the planetarium component was developed and tested using base knowledge the team already had used in previous outreach presentations and the delivery method was largely developed through trial and error. After several iterations of the dome programme a more streamlined delivery was achieved.

Figure 4: *Auckland expo for Tūhono i te Ao.*

SMART Planetarium Dome

Our second project the SMART Planetarium te reo Māori project was designed to deliver a planetarium programme to kura kaupapa Māori and for the majority of programme to be in te reo Māori where possible. Very few programmes exist in the science outreach space that can go into the kura kaupapa Māori and deliver a programme on science in te reo Māori. Furthermore, there is also a lack of science teachers that can teach in te reo Māori which amplifies the need for such programmes. This innovative programme proved extremely successful delivering to over 2000 rangatahi Māori in kura kaupapa over a 4 month period. The success of the programme can be attributed to the strong fundamental design principles that underpinned the programme as a whole, the strengths and skills of the delivery team, their training and management during the programmes running. The content design underwent a more rigorous process for this second project, with training and delivery development conducted by senior members of the team. The content and process was underpinned by a kaupapa Māori framework to ensure that the desired knowledge was effectively delivered to rangatahi Māori and their connected communities. The goal here was to inspire and excite rangatahi Māori into learning about astronomy, science and mātauranga Māori and to motivate and excite the audience into pursuing further knowledge from their respective regions and iwi.

The delivery team was selected from voyagers whom are students of celestial navigation and whom are also fluent in te reo Māori. The team consisted of trainee navigators Te Ira Tohu (first trainee Māori female navigator) and Kawai Joe (trainee navigator), who are both crew of Ngahiraka Waka Hourua under the teachings of Pou navigator Jack Thatcher, and Pera Waaka of Haunui waka hourua. The team was trained by Dr. Pauline Harris and Captain Tawhana Chadwick. Content was developed by Harris and Chadwick with information on traditional astronomical knowledge provided by *Te Mauria Whiritoi* and *Ngā Takahuringa o te Ao*, the two Marsden funded projects. The content from these two projects included baseline information of where the celestial beings originated from, how they were placed in the sky and the maramataka. Given the navigational background of the dome presenters, knowledge on basic navigational techniques was also included into the programme. As the programme developed the team included a number of chants that they were taught during their navigation training. In addition, kinesthetic learning techniques were applied outside the dome with activities including actions and chanting of star names were incorporated. The software that was used was the freeware programme Stellarium, which has been modified to contain a list of stars in te reo Māori. Initial images to represent Māori constellations have been included, which is an ongoing process. An example of the constellation is shown in *Figure 5*.

Figure 5 *Example of a constellation on left and Māori star names on the right. Planetarium deliverer Shane Warren seen here with the Māori star names on the right.*

Table 1 shows an example of the planetarium content that is currently delivered. Delivery is able to be done in both English and te reo Māori.

Table 1: *Example of a Planetarium session for ages 7-18*

Content	***Objective***	***Delivery description***
Mōteatea (chant)	Engage the audience with traditional method of knowledge transfer through chant.	Dome presenter stands and introduces themselves followed by a chant about a large waka constellation in the sky. As they chant they move the skyview around and point out the stars they are referencing in the chant.
Finding south	Familiarise the audience with how the stars are used to navigate around the Pacific.	The Southern Cross and Achernar are used to show how to find south. A discussion about celestial navigation is described also.

Origins of the stars	To imbue ancestral knowledge of the origins of the sun, moon, planets and stars.	The first whare that existed and the parents of the celestial, Tangotango and Wainui are described followed by how Tāne journeyed with the help of Tamarereti to put the sun, moon, planets and stars in the sky.
The stars as a clock	To teach how the stars apparently move around during the day and night and how they can be used to tell time.	The Southern Cross is shown and time is fast forwarded, showing an accelerated movement of the stars. The Southern Cross rotates around the south celestial pole and shown to take 24 hours to rotate. Note the sun's brightness is removed from the programme. A story relating to being on the waka and telling the time is also included.
Waka of the Pacific video	Waka hourua video shown, that shows Te Mana o Te Moana journey.	Loud, large video shown of double hulled waka travelling across the ocean using celestial navigation. Video includes people known and in the delivery team. Other videos also available depending on length of dome session.

Discussion

There is no doubt that portable planetariums are indeed a powerful tool when coupled with solid content and an excellent delivery team. Previous to the obtaining of the planetarium dome we were limited to using PowerPoint presentations. However, although using static images and text on a two dimensional screen can yield good understanding on who and what the celestial bodies represent, this mechanism did little for understanding such as the daily and yearly movement of the sun, moon and stars which can be a very complex concept to understand. This was evident especially in the classroom setting running laboratory type classes in a computer lab using Stellarium where students found it challenging to understand concepts around star 'movement', sun rising and setting from different positions on the horizon and the concept of summer and winter solstices. In addition, even more difficult was the teaching of basic celestial navigation and viewing of the night sky from different locations on the earth using a two dimensional flat screen. Now, however, with the benefit of utilising a portable planetarium dome we are able to teach more complex concepts in a shorter amount of time. This is critical when delivering programmes to schools, as the time that one has with audiences is typically short (30 minutes), thus it is imperative to have a delivery system and team that can deliver the content in the most optimal and effective way.

Figure 7: *The SMART planetarium team talking to rangatahi at a kura kaupapa Maori before they go in.*

Figure 8: *Some of the planetarium team, from left to right, Dr Pauline Harris, Te Ira Tohu, Pounamu Tipiwai Chambers, Pera Waaka, Captain Tawhana Chadwick, and infront Kawai Joe.*

The SMART trust has been designing and delivering innovative programmes to schools and communities for many years with the 2016 and 2017 programmes seeing the use of more advanced digital technologies via the use of a planetarium dome. These programmes have been seen by more than 7500 Māori and Pasifika rangatahi and communities. These programmes have been designed using authenticated and well-researched content from leading researchers in the area of Māori astronomy and maramataka. SMART has also assisted the development of programmes run by Te Toki Voyaging Trust who recently obtained two planetarium domes. One dome has now a similar setup to the SMART dome and is delivering programmes on celestial navigation nation-wide.

With the growing amount of research being conducted on Māori astronomy and maramataka, it is indeed an exciting time to implement our collaborative research and knowledge in an education space. The use of digital technologies, such as planetarium domes, has been instrumental in allowing an effective and exciting delivery to mass numbers. Although this method differs greatly from how our tīpuna taught and imbued their knowledge of the night sky, in the continuing effort to revitalise, preserve and pass on this knowledge, the SMART planetarium dome has proven to be a powerful tool for exciting and inspiring our youth and communities into learning and reclaiming our ancient knowledge of the stars.

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Theme 3.

Going digital in the GLAM[1] sector: ICT innovations & collaborations for taonga Māori

Michelle Horwood

Introduction

The relationship heritage institutions have with computers spans more than four decades. From a lurching start in the 1970s, to full immersion since the 2000s, the opportunities the digital age has provided for these institutions have far outweighed the journey's challenges (Henning, 2006). New sets of skills and digital technologies have unleashed diverse imaginings to expand our engagement with, improve the preservation of, and strengthen relationships around our heritage in innovative ways. A multiplicity of applications and rapidly evolving tools, platforms and interfaces are available for preserving, sharing, accessing, experiencing, communicating and learning from our dispersed heritage in the global museum-scape (Parry, 2010). It has been suggested (Wellington & Oliver, 2015, p. 594) that digital technologies also level the playing field for the galleries, libraries, archives and museums (GLAM) sector, by facilitating use of a single point of access for a multitude of cultural artefacts.

A number of cultural heritage digitisation projects have recognised the importance the contribution other knowledge systems have for supporting cultural revitalisation and influencing representation in heritage institutions (Mignolo, 2009; Srinivasan, Boast, Becvar, & Enote, 2009), while at the same time not privileging one knowledge system over another (Phillips, 2011, p. 293). In the introduction to 'Digital Subjects, Cultural Objects', a recent special issue of the *Journal of Material Culture*, for example, Salmond (2012) describes a range of these digital initiatives where Indigenous communities are able to conceptualise their engagement with museum-held heritage in culture-specific ways, along with authoring, and owning the content. New collaborative models developed for exhibition interactives have resulted in the development of tangible, embodied interactions that bridge the digital and material. The resulting immersive experiences tell personal stories, create evocative experiences and enrich heritage collections (Petrelli, Dulake, Marshall, Kockelkorn & Pisetti, 2016). For museums and Indigenous communities where research is "based on learning *from* communities rather than learning *about* them" (Jones & Jenkins, 2008), digital initiatives have created innovative solutions to communicate knowledge of the continuity of Indigenous values, such as through representations of intangible heritage in the museum space (Muntean, Hennessy, Matkin, Rowley, & Wilson, 2017).

This chapter begins by defining how digital innovations have influenced the GLAM sector and changed the ways and means by which tangible and intangible cultural heritage and people interact, using a broad range of examples to contextualise this work. I explore sector-based ICT activities, involving digital databases, virtual and augmented

reality technologies, and web portals and platforms, that have taken place in Aotearoa New Zealand as well as further afield to support the goals and aspirations of Indigenous people in relation to language, cultural, social or economic sustainability. Sector experts contribute to this discourse through six detailed case studies:

- Chloe Cull discusses technological transformations and themes of gender, time, power and representation in the work of artist Lisa Reihana;
- Claire Hall advocates a CMS-driven indigenous archiving portal to support reo and tikanga revitalisation;
- Michaela O'Donovan and Zoe Richardson document the process for strategic and procedural realignment of power for the use of Māori images at the Auckland Museum Tāmaki Paenga Hira;
- Matariki Williams champions the voice of emerging museum professionals via an online platform;
- Paul Diamond considers the need for qualitative data to assess the use and societal impact of online Māori language archives, and
- Wayne Ngata provides insight into Te Aitanga a Hauiti's re-engagement with their material heritage held elsewhere.

Shifts in power in online environments

Museums, libraries and archives are moving towards open access to digital collections to increase access to, active engagement in and collaboration with these collections. Open access also brings together material from a range of institutions with narratives about events, places and people, and can also facilitate connections with personal stories and treasures, such as in the Europeana 1914–1918[2] project (Chapman 2015). In this age of the digital object, Wellington & Oliver (2015, p. 595) consider "the issues of authenticity and resonance appear to be foremost." It can be further suggested that assigning authority over, and control of, the movement of digital heritage items is equally significant and of particular importance for institutions caring for Indigenous cultural material. Research to identify ways to reconcile culturally different approaches to knowledge have been explored, for example in the United States (Isaac, 2015) and Australia (Christen, 2015a).

In Aotearoa, many heritage institutions restrict access to photographs with Māori content without first seeking permission to do so from the communities or individuals who have the authority to approve access. This is often a complex and time-consuming activity, and can be especially difficult for some institutions who are inadequately resourced, or lack the community networks to support this process. Auckland Museum, however, has achieved a solution to this issue that considers Māori authority and control of access to this material is 'information appropriate'[3]. Michaela O'Donovan and Zoe Richardson (this chapter) explain the Auckland Museum's development of a framework and procedural model for what they call 'cultural permissions', which, provides clear direction for staff to fulfil the aim of increasing access to and engagement with the museum's collections and

stories through its image library.

Museum collection catalogues have morphed from simple, paper-based indexes to sophisticated digital management systems both on and offline. Museums have been identified as early internet contributors with online collections from 1994 (Manchester Museum) and online exhibitions from 1995 (Museum of the History of Science in Oxford) (Chapman, 2015, pp. 275-276).[4] While authors, including Cameron (2005), Srinivasan, Boast et al. (2009), and Phillips (2011), have found that significant issues for museum digital databases relate to standardising of information and pluralities of meaning especially, for Indigenous collections. In recent years, focus has turned to the development of digital platforms and databases to return cultural information and objects to communities. Notable projects include:

- *Ara Irititja*[5] the collaborative community directed mobile digital archive for remote Australian communities (Pitjantjatjara Council Inc., 2011). (*Ara Irititja Knowledge Management System* software has been superseded by *Keeping Culture KMS*[6].);
- *GRASAC*[7] a digital repository and knowledge sharing system of Great Lakes Aboriginal material culture and heritage items (GRASAC, 2008);
- the *Reciprocal Research Network*[8] an indigenous-museum collaboration in Northwest British Columbia (Museum of Anthropology University of British Columbia, 2012; Rowley, 2014; Srinivasan, Boast, Furner, & Becvar, 2009);
- *Plateau People's Web-Portal*[9] a collaboration with a number of Northwestern North American Tribes as a gateway to their cultural heritage held in a number of heritage institutions (Christen, 2015b);
- *Creating Collaborative Catalogs*[10] an online innovation in New Mexico for two-way movement of information between museums and originating communities (Srinivasan, Boast, Furner, & Becvar, 2009);
- the *Traditional Micronesian Navigation Collection*[11] online database at the University of Hawaii Library (Smith, 2008); and
- *Recalling Ancestral Voices*[12] a collaborative project with the Sámi people of Sweden, Norway, Finland and Russia to digitally repatriate knowledge of their material heritage (Harlin & May, 2014).

Closer to home, another digital, museum collections project, initiated in 2011 by Arapata Hakiwai, kaihautū at Te Papa, was the development of a database of taonga Māori held in museum collections around the world (Hakiwai, 2012). This project stems from the 1986 *Te Māori* exhibition wānanga recommendations, which included that "100 years from now all Māori taonga should be catalogued regardless of where they are so that tribal groups would have a record of their taonga" (Hakiwai, 2012). Titled *Virtual Repatriation*, this project aims to reunite these 'digital taonga' and their intangible qualities with their Māori originating communities in Aotearoa to ensure that knowledge of their existence will not remain the "privileged information for just a few" (A. Hakiwai, personal communication,

June 22, 2017). Digital preservation utilising 3D imaging is an emerging field with a range of potential applications in the museum and heritage field for conservation, education and access.[13] The *Virtual Repatriation* project team has been exploring these cutting edge technologies—long-range laser scanning and photogrammetry—to capture detailed 3D representations of taonga (Fergusson, 2017). The first iwi-based training took place in Tūranganui-a-Kiwa in July 2017.

Innovative digital projects to support inter-generational sustainability for social, cultural and economic well-being have defined Te Aitanga a Hauiti of Uawa, Tolaga Bay, on the East Coast of the North Island, as "leading the field in New Zealand and beyond when it comes to 'virtual repatriation'" (Salmond, 2012, p. 216). Te Aitanga a Hauiti's involvement with digital technology ranges from live streaming tangihanga, to the digital databases Te Rauata and Kiwa[14] as a partner in the collaborative international project *Te Ataakura*, re-connecting Cook collections through the creation of digital taonga (Lythberg, Hogsden, & Ngata, 2017). In this chapter Wayne Ngata takes us on a journey to Tolaga Bay, explaining why Te Aitanga a Hauiti engage with digital technologies to further iwi outcomes of re-energising, re-connecting and re-imagining their whare kōrero, generating mātauranga Māori and advancing projects for cultural, socioeconomic and artistic revitalisation.

A successful digital platform adopted by numerous indigenous groups in Australia, Canada and the United States as well as in Aotearoa, is Mukurtu[15], a free, open source, content management tool for the management and sharing of digital cultural heritage. Mukurtu was developed by Kim Christen and Michael Ashley with the Warumungu Aboriginal community as a collaborative community directed mobile digital archive for remote Australian communities (Christen, 2008, 2011; Christen & Ashley, 2012; Mukurtu CMS development programme, 2011; Srinivasan, Boast, Furner, & Becvar, 2009). Te Reo o Taranaki is one group who have investigated the potential of this programme in a regional Aotearoa context. The result is the Mukurtu-driven digital archiving portal Te Pūtē Routiriata, the Taranaki Māori Archive[16] of Taranaki iwi language, history and traditions. Claire Hall, in this chapter, describes Te Reo o Taranaki's successful application of this tool for mātauranga Māori knowledge management, as well as their engagement with archiving projects in Taranaki, and the potential for wider use of Mukurtu throughout Aotearoa.

In response to the desire to increase collection accessibility, development of online portals to institutional collections' data has increased exponentially over the past two decades. Institutions also utilise platforms which host multiple institutions to share their collections with a wider audience, or to host their collection catalogue if unable to do so themselves. Europeana[17] is one such platform, capturing Europe's art heritage and making it accessible via theme-based galleries, blogs and exhibitions. Another, Google Arts & Culture[18] allows collections from partner institutions to be explored and shared via an expansive Google toolkit. While Trove[19] brings together more than 540 M Australian and online resources from numerous research and collecting institutions, which users can text correct, comment on, tag and contribute content. In Aotearoa NZMuseums[20], a National Services Te Paerangi (Te Papa) initiative, hosts museums and their collections

using an Aotearoa-developed cloud-based CMS, eHive (Vernon Systems), to catalogue collections and then share them online. Similarly Digital NZ[21], described as "the search engine for New Zealand culture" (National Library of New Zealand, 2017), is an open source platform connecting people to digital material from more than 200 organisations, government departments, the media, community groups and GLAMs in Aotearoa. Work to establish a standard for understanding societal impact (IMPKT[22]) within the GLAM sector is the initiative of a consortium of international cultural heritage associations, including DigitalNZ. Through the development and application of an impact assessment toolkit, they aim to help to change the way people engage with heritage (Verwayen, 2017).

The GLAM sector has been digitising archival material for over 20 years to enhance access for communities who are often unable to make contact with the physical resources. However, as Crookston and his co-authors state (2016, p. 4),

> With online accessibility now viewed as a default service, and with digital information enabling a range of different uses … it is necessary to shift the mechanisms by which the memory sector understands its services beyond quantitative access measures, toward assessing the use of archives and the impact that use is having on society.

In this context, with access and use of digitised Māori language archives little understood, Paul Diamond (in this chapter) describes a Victoria University of Wellington initiative, supported by the Alexander Turnbull Library, to investigate the use of digitised Māori archives and their impact on society. The findings of this research project highlighted repeated sharing of digitised information, akin to a 'multiplier' effect. This appears to be prompted in part by an obligation to share collections associated with whanaungatanga, a sense of connectedness and relationships.

Communicate / experience / learn

Digital technology applications have become a familiar experience for visitors to cultural heritage institutions. Experiments with emerging technologies incorporating virtual reality, projection (video) mapping, or tangible interactions have developed numerous digital experiences to enhance visitor engagement. These range from simple hands-on interactives to the latest immersive, interactive, augmented reality exhibition experiences.

Research by Sarah Kenderdine, Jeffrey Shaw and colleagues is at the forefront of the interactive and immersive technological and experiential developments for museums and galleries. Shaw has been experimenting with immersive interactive visualisation as a part of his cooperative, interdisciplinary art practice since the late 1960s (Kenderdine, 2016, p. 27). One initiative at the UNSW iCinema Research Centre is AVIE[23], the world's first 360-degree 3D projection system, a platform for 3D interactive, audio-visual experiences (McGinity, Shaw, Kuchelmeister, Hardjono, & Favero, 2007) which has, since 2006, been commissioned by numerous international organisations as a "curated visualisation platform" (iCinema:

Centre for Interactive Cinema Research, 2017). mARChive[24], the new interface for Museum Victoria's collections, utilises this platform to provide interactive access for visitors to more of the museum's collection than would otherwise be physically possible, inside a 360-degree 3D exhibition display screen.

This immersive interactive platform has also been used to stage projects where innovative approaches to public engagement for museums and sustainable preservation are being explored for heritage at risk. One such project is *Pure land*[25] a virtual, 1:1 scale, 3D immersive experience of the Mogao Caves, a UNESCO World Heritage Site, at Dunhuang in Gansu Province northwest China, vulnerable to increasing tourism (Kenderdine, 2016). Developed by the interdisciplinary digital innovation incubator ALiVE[26] (Applied Laboratory of Interactive Visualization and Embodiment) at the City University of Hong Kong and led by Kenderdine and Shaw, *Pure Land* allows visitors to interact with virtual elements of the sculptures and paintings that adorn the caves "in a surrogate experience" of actually being there (Kenderdine, 2016, p. 30). An experience enhanced by 3D animation of recreated elements within the paintings, pictorial recolouring, digital enlargement and a soundscape. Kenderdine describes this as not a passive visual experience but rather an interactive performance (2016, p. 33). Transferrable to the museum space, in 2016 the Art Gallery of New South Wales brought *Pure Land* to Sydney as part of the exhibition *Tang: treasures from the Silk Road capital*[27].

Opportunities for exploration of these virtual or augmented reality developments in Aotearoa are being provided by Mahuki[28] Te Papa's innovation accelerator, giving entrepreneurs a platform for digital and experiential product innovation in the cultural sector. Koha Information and Technologies Solutions, one of the first intake in 2016, responded to the Mahuki challenge of connecting iwi, hapū and whānau with taonga to revitalise culture and heritage and support collaboration and reconciliation[29]. This team completed a four-month programme at Te Papa developing a process model to engage with indigenous communities in the development of taonga digitisation protocols (Koha Information Technology Solutions, 2016).

In addition to this initiative, Te Papa is also now offering virtual tours of collection storerooms led by their experts and using 360-degree videos[30]. These can be accessed via a tablet, smartphone or PC, or, for an immersive experience, through the use of a simple VR (virtual reality) headset.

Ngāti Awa iwi from the Bay of Plenty in the North Island of Aotearoa has used innovative design and digital technology to tell their history and that of their wharenui Mataatua[31]. Using projection mapping to integrate taonga tuku iho with iwi narratives, this immersive experience is staged within Mataatua for visitors to the house. Projection mapping has also been used for thematic or narrative digital displays on buildings exteriors as celebrations, commemorations or to highlight topical issues. In 2015 and again in 2016 *WW1 Remembered* paid tribute to Aotearoa's involvement in World War 1 conflict—including the Gallipoli campaign, the Anzac relationship, and our history of conflict, resolution and peacekeeping— in this way. Projected onto the National War Memorial

and Carillon (*Figure 1*) and Dominion Museum building at Pukeahu War Memorial Park, Wellington, this astonishing multi-sensory experience brought World War 1 to life through photographs, graphics, animation, original artwork, and a soundscape. Using an iPad, historic First World War sites could also be explored with the Ngā Tapuwae Western Front app.[32]

Figure 1: *WW1 Remembered projected onto the National War Memorial, Pukeahu Park, Wellington, 2016. Photographer: Michelle Horwood.*

Similarly, the iconic Auckland Museum building has been used as a canvas to connect people with heritage and events in new and visually surprising ways. *Figure 2* shows *Illuminate* a 2017 project where film footage was projected onto the museum's northern façade in an ANZAC commemoration. This project included rarely seen images from the Western Front, along with the first ever conscription ballot taking place, the work of the medical corps and footage from an All Blacks rugby team playing France during wartime (K. Bothwell, personal communication, July 27, 2017). Another development in 2017, described as the largest projection mapping project in New Zealand (Barraclough, 2017), was Joseph Michael's *Antarctica - while you were sleeping* where the Everest iceberg was projected and mapped onto the Auckland Museum's outer walls at full scale.

Figure 2: *Auckland War Memorial Museum Tāmaki Paenga Hira during Illuminate, 2017.*

Recent visitor engagement and experience developments at the National Library of New Zealand include innovative use of digital technologies. In *He Tohu*[33] the permanent exhibition of He Whakaputanga Declaration of Independence (1835), Te Tiriti o Waitangi/ The Treaty of Waitangi (1840), and the Women's Suffrage Petition (1893), visitors are able to navigate and explore the rich exhibition content of text, images and interviews utilising touchscreen interactives. An award winning, interactive visitor experience that opened in 2008 at Te Papa was *Our Space*.[34] Physical and online visitors were encouraged to contribute images and videos that could then be remixed and used by visitors to generate content on the exhibition's Wall, a state-of-the-art interactive canvas, and interactive glass floor Map. After more than 10,000 images and videos were added, the *Our Space* experiment closed in

2014.

In Aotearoa, new approaches to sharing cultural content appropriately have also been integrated into recent exhibitions. The Te Papa iwi exhibition *Whiti Te Rā! The story of Ngāti Toa Rangatira* (2014-2017), for example, included *Ka Mate: The Exhibition*[35]. This interactive experience used camera technology to enable virtual Ngāti Toa Rangatira haka instructors to teach the actions of the haka *Ka Mate* to participants. Another initiative can be found at Ngāi Tahu's Te Ana Māori Rock Art Centre in Timaru, in the South Island of Aotearoa. Exhibition components at this cultural centre include interactive experiences that embed Ngāi Tahu cultural values while sharing narratives of place and creativity (Thompson-Carr, 2013, p. 220).

It is opportune to highlight experimentation in creative art practice, encompassing technological innovation that extends the boundaries of new media, through the work of New Zealand's 2017 la Biennale di Venezia representative Lisa Reihana, explored in this chapter by Chloe Cull. Reihana's involvement with new media started with experimental film in the 1980s. Her ready adoption of new technologies culminate at the Biennale in an extended realisation of *in Pursuit of Venus [Infected]*, a 64 minute performative re-imagining of a number of Pacific encounters that disrupt "gender, time, power and representational norms" (Creative New Zealand, 2017) presented as an ultra HD panoramic video. Importantly, her collaborative approach, described by Thomas (2017) as exemplifying "the forms of Oceanic sociality that historically and pervasively have been constituted out of encounter, negotiation, exchange and performance", illustrates a successful model for other cross-cultural projects. Expanding audience engagement with Reihana's work is also possible through museum-hosted, online, teaching resources for schools.[36]

Meanwhile, in Gisborne on the East Coast of the North Island, Tairāwhiti Museum, a small regional museum known for innovative museum practice, has recently employed augmented reality to enhance learning in their schools' education programme. Using an open source application Aurasma[37], museum educators Julie Noanoa and Iona Maxwell engage children with traditional Māori technologies revitalised in the present and brought to life through graphics, animation, video, audio, and 3D content (see *Figure 3*). The development is described by Noanoa (personal communication, July 14, 2017) as their "response to the education pedagogy for 21st century learners, placing learning in the hands of students and remaining relevant to how people receive information in today's digital, technology-rich world." They aim to enable learners to connect with taonga and art using multi-media (audio, visual, text) by supporting the diverse ways in which people process information. Augmented reality applications like *Aurasma* provide contemporary, guided learning experiences that offer the element of surprise and discovery. The Tairāwhiti team, inspired by teachers in their community who provided insight into digital strategies implemented in the classroom, adopted "a learn as you go approach" quickly upskilling so as to film and edit content and sync iPads in-house and resolve technical issues (Noanoa, personal communication, July 14, 2017). A class set of iPads to "level the playing field" for all students was identified early as a key criteria for success across the community (Noanoa,

personal communication, July 14, 2017). This innovative education team are contributing to key government priority areas for education—implementing digital technologies and supporting Māori achievement—and gauge their success from the positive feedback they have received from schools and, their programmes being booked to capacity (Noanoa, personal communication, July 14, 2017).

Figure 3: *Ngātapa school students from left Riley Kirkpatrick, Greta Cave, Rahkus Māhaki and Mahu Shalders with Julie Noanoa, Education Team Leader, Tairāwhiti Museum, Gisborne, 2017. Photographer: Norm Heke.*

Developed as a collective experience in time and space, exhibitions which embrace today's technology, as Wellington and Oliver (2015, p. 591) point out, have "the potential to disengage the visitor from the collective experience and transcend physical space". This is particularly true for online exhibitions delivered via the web, mobile applications, or kiosks and are developed for many purposes including expanding exhibition content, exposure to a wider audience, avoiding conservation or insurance issues, and minimising resource costs. They are also valuable as a platform for audiences to engage with content in ways that are most suitable for them.

Mobile apps and social media are two platforms that support discovery, access and content sharing in GLAM institutions (Wellington & Oliver, 2015), while also providing opportunities for more agile responses to visitor needs. While twitter and Facebook provide momentary exposure to commentary and content from the cultural heritage sector, two Wellington-based innovators are using social media and the web for

a different purpose. Matariki Williams and Nina Finigan's passion for museums led them to investigate developing an appropriate platform for emerging museum professionals to contribute constructively to the sector. This resulted in *Tusk – Emergent Culture*[38], a website and two social media channels. In this chapter, Williams talks about the challenges and opportunities that contributors to *Tusk* are able to share via this platform, in particular those for normalising and socialising te reo Māori, as well as the influence of sector role models.

Finally, cultural or Indigenous mapping, a process of transmitting "knowledge embedded in physical and metaphysical landscapes through oratory, performance, writing, architecture and art" (Brown & Nicholas, 2012, p. 317), is a digital development for tangible and intangible cultural assets, for which material from collections in GLAM sector institutions can be a rich resource. Using Geographical Information System (GIS) technology to record, map and transmit traditional knowledge, the incredible potential of this process in Aotearoa for reconnecting people with landscapes and narratives is best illustrated by the work of Takerei Norton and his team for the Ngāi Tahu Cultural Mapping Project. As Norton stated at the National Digital Forum in 2016, using this technology "the stories and place names that record Ngāi Tahu history in Te Waipounamu are being mapped onto a virtual landscape for future generations" (Finigan, 2016). With 4,500 place-names in Te Waipounamu mapped on Google Earth, Ngāi Tahu "have reclaimed their land by giving it its names back" (Finigan, 2016). Similar work is being undertaken to map Tairāwhiti stories, as mentioned by Ngata below, encouraging reconnecting to these stories physically by walking the land.

Conclusion

To conclude, the ICT developments described in this chapter, in particular those developed for and by Māori in Aotearoa and further afield, offer insights into the range of opportunities for cultural heritage institutions utilising digital technologies to support the goals and aspirations of Indigenous people in relation to language, cultural, social or economic sustainability. With debate over the value of virtual repatriation ongoing, a number of iwi and Aotearoa's national museum are exploring opportunities involving virtual taonga. As Phillips (2005, p. 108) argues virtual repatriation helps "restore connections to collections that remain in museums, reopening channels of knowledge that were closed off by the massive collecting projects of the first museum age and to which community members have a moral right". However, reconnection with Indigenous material heritage is not possible if its existence remains the privilege of the few. Institutions such as the Auckland Museum who are committed to increasing access to its collections online, developing a relational database and practical processes to expose, share and connect their collections while realigning power and authority, are an example of how GLAM institutions can invest in ongoing and meaningful relationships with the communities whose heritage they use and have responsibilities for. As Christen (2015, p. 384) states,

> Digital platforms, projects, and spaces are not just tools to reach more viewers or open more collections; they are, instead, part of the possible integration of new types of relationships that will redefine the very notion of the museum itself.

In this way, supporting scholars and artists such as Lisa Reihana who, as Chloe Cull argues, explores new ways to "reclaim and decolonise the images and language of colonisation and prejudice", through her evolving use of film and new media, to reactivate Māori and Pacific histories. In tandem, content management systems for digital cultural heritage such as Mukurtu, advocated for by Claire Hall for te reo revitalisation, can also be "powerful tool[s] of decolonisation and reconciliation". While the results of research such as that by Paul Diamond and colleagues will help to gauge the societal value and impact of the use of Māori language resources from the GLAM sector on community wellbeing. Likewise, Wayne Ngata's challenge to adapt when opportunities arise by doing things differently can result in successes similar to those achieved by Te Aitanga a Hauiti's for re-connecting and re-energising their whakapapa. A challenge taken up by the founders of the online platform *Tusk*, as Matariki Williams describes, empowering emerging museum professionals—"*Tusk is for us. It is our community*". Together the contributors to this chapter add to our knowledge of this fast moving but little understood aspect of current GLAM practice.

Endnotes

1. An acronym for the galleries, libraries, archives and museums sector.
2. http://www.europeana.eu/portal/en
3. In this context 'information appropriateness' is a concept described as "the appropriateness of selected digital media channels for the sociocultural needs of the information being transmitted" (Wellington & Oliver, 2015, p. 589).
4. See Chapman (2015) for comprehensive survey of the evolution of museum collections management systems.
5. http://ai.ara-irititja.com/archive/index.php
6. https://www.keepingculture.com
7. https://grasac.org
8. https://www.rrncommunity.org
9. http://plateauportal.libraries.wsu.edu
10. http://www.dmns.org/science/past-projects/creating-collaborative-catalogs
11. http://digicoll.manoa.hawaii.edu/satawal/index.php
12. http://www.samimuseum.fi/heritage/english
13. http://www.cyark.org/about
14. http://maa.cam.ac.uk/aofe/kiwa.html
15. http://mukurtu.org
16. https://puteroutiriata.mukurtu.net
17. http://www.europeana.eu/portal/en

[18.] https://www.google.com/culturalinstitute/beta/u/0

[19.] http://trove.nla.gov.au

[20.] http://www.nzmuseums.co.nz

[21.] https://digitalnz.org - winner of the New Zealand Open Source Awards 2016 http://nzosa.org.nz/categories

[22.] https://impkt.tools

[23.] http://www.icinema.unsw.edu.au/technologies/avie

[24.] http://www.jeffreyshawcompendium.com/portfolio/marchive

[25.] http://www.jeffreyshawcompendium.com/portfolio/pure-land-360

[26.] http://alive.scm.cityu.edu.hk/projects/alive

[27.] https://www.artgallery.nsw.gov.au/exhibitions/tang/pure-land

[28.] http://www.mahuki.org

[29.] http://www.mahuki.org/how-it-works/our-challenges

[30.] https://www.youtube.com/watch?v=VyhkGowM928

[31.] http://www.clicksuite.co.nz/work/mataatua-wharenui

[32.] http://ww100.govt.nz/wwi-remembered-a-light-and-sound-show-2016

[33.] https://natlib.govt.nz/he-tohu

[34.] UNESCO World Summit Award for eContent and Creativity (eLearning and Science); http://www.gibson.co.nz/visitor-experiences/ourspace

[35.] http://www.storyinc.co.nz/ka-mate

[36.] https://www.tepapa.govt.nz/learn/for-educators/teaching-resources/venice-biennale/lisa-reihana-emissaries

[37.] https://www.aurasma.com

[38.] https://www.tuskculture.com

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Navigating good practice image permissions for Māori collections held at Auckland War Memorial Museum - Tāmaki Paenga Hira

Michaela O'Donovan & Zoe Richardson

Introduction

In its *Future Museum*[1] strategy, Auckland Museum committed to increase access to its collections online. The museum routinely responds to requests for use of images of objects from all collections in its care, for use in publications, on websites or for other purposes. The digital environment affects how the museum responds to these requests. This paper considers how Auckland Museum manages requests specifically related to Māori images[2], also commonly referred to as 'cultural permissions'[3]. In the GLAM sector cultural care and open collections are often perceived to sit uneasily alongside each other, in particular for indigenous content in online contexts. Acknowledging that this is a living and learning process, here we explain the care Auckland Museum takes with requests to use images which depict Māori content in line with the museum's commitment to partnership through the Treaty of Waitangi.

Putting cultural care at the centre of the museum's work

An appreciation of the different ways of seeing the world and caring for taonga and the museum's source communities is fundamental to everything Auckland Museum teams do. This approach accommodates Māori and Moana Pacific cultural values and reflects the partnership expectations of Māori and Pacific communities central to the museum's commitment to nurture relationships as outlined in He Korahi Māori[4] and Teu Le Vā[5]. *He Korahi Māori* is a museum strategic priority, to act as kaitiaki but also enable considered access to these unique and precious taonga. When making decisions, legal status, appropriateness and the significance of the image or object are considered. This approach lifts responsibility for respectful and informed decision-making from the individual to the organizational level, it supports museum personnel and provides requestors with confidence that decisions have been well considered.

Open collections, open data

In the global context of open collections, the international museum community is moving away from traditional models, where access to collections was restricted by default, to a position which provides for open access as the default. Auckland Museum not only wants to provide open access to its collections, it also wants to ensure that audiences can find meaning in the collections each time they access them. To do this the museum supports audiences to make connections between objects and current and historic events, between people and places and between themselves and the objects. The collection records make up a network of information that contains these connections, which the museum has published as Linked Open Data (LOD)[6]. This is a giant network of information in which any piece of data can be connected to another, and through which people can make their

own connections and build their own stories that are relevant to their lives. Furthermore, by connecting to external sources the museum can enrich its collections and encourage active digital engagement with the objects.

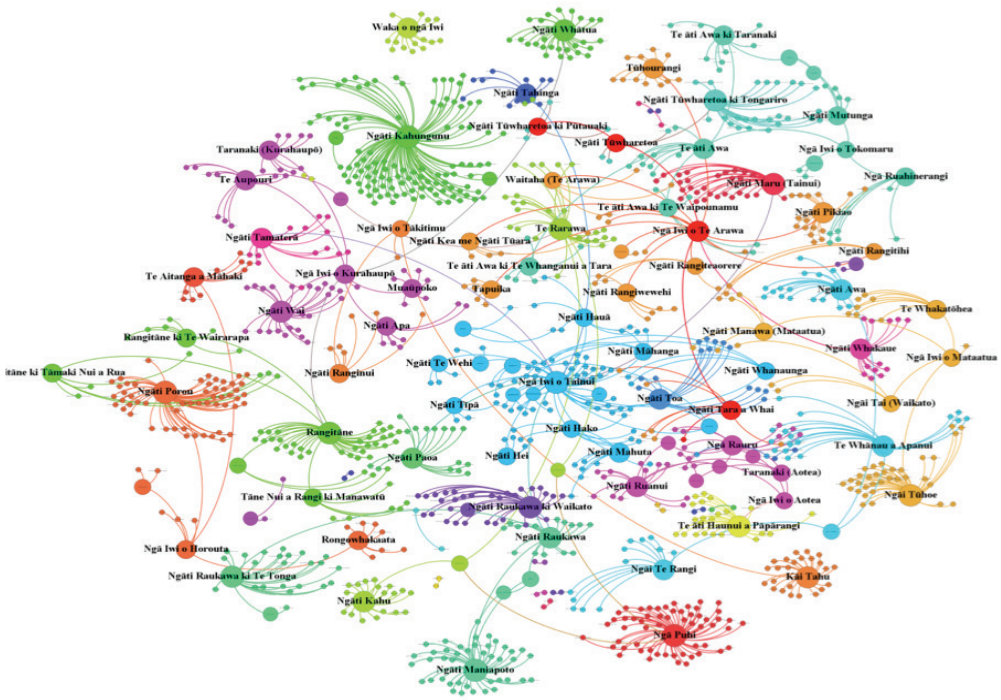

Figure 1: *Visualisation of iwi/hapu affiliations and connections of Auckland Museum collection objects (known information only).*

Figure 1 shows the known iwi or hapū affiliations and connections of the objects in Auckland Museum's collections, using LOD. It will shortly be possible to link Auckland Museum's objects with those in other LOD institutions, including objects made by the same creator, or with particular connections to an event or place. The museum does not see itself as the sole creator of new works based on the collections, whether they are apps, online exhibitions, saleable merchandise or other commercial products. Making collection records and information as open as practically possible is fundamental to achieving greater public and private value from the collections. The museum is currently undertaking the largest imaging and cataloguing initiative in its history. A year into the project over one million items and over 300,000 images have been released—free, open and downloadable under a creative commons license—with 5,000 data enhancements made daily and 2,000 new objects online every month. The open data API (application programming interface) is sharing the collections[7] with a global audience as well as powering in-gallery digital experiences. This really is open access to cultural data at a scale not seen before in the New

Zealand GLAM sector.

Māori content in this open, global, online context

The museum's cultural care and open access journey has included developing clearer practice around the release of images, particularly those involving Māori subjects.[8] An item is considered a taonga if it:

- is a representation of a Māori ancestor; and/or
- was directly associated with a known Māori ancestor; and/or
- carries a Māori ancestral name; and/or
- is considered of ancestral importance to the Māori descent group from where it originated; and/or
- continues to carry Māori ancestral value[9].

Figure 2: *Tāniko Kete. Auckland War Memorial Museum Tāmaki Paenga Hira, AM6878*

Previously, requests for images were managed through the image order service co-ordinated by the museum's Library and Enquiry Services. While care was taken, risks included:

- Māori culture and images being under-represented in the online environment as a result of a default position of restriction;
- delays, inability to respond in a reasonable timeframe, and inconsistent decision-

making resulting from the lack of clear criteria;
- challenges to the museum's reputation as a result of only one or two people making decisions with no clear support;
- duplication of effort resulting from not documenting decisions, precedents and relationships/conversations with iwi and hapū using collection management systems; and
- lack of alignment with the approach used by other institutions holding similar material.

A framework for decision-making

In March 2014, Auckland Museum convened a workshop across the heritage and libraries sector to identify practice, policy and procedures in relation to the release of Māori and Pacific images held by like institutions. From this workshop the museum developed a Mātauranga Māori decision-making framework and guidelines to better respond to requests for Māori image use. These were endorsed by the museum's executive team and the Taumata-ā-Iwi[10] before being shared with participating memory institutions and subsequently with GLAM institutions in New Zealand and Australia.

Implemented in August 2014, the original framework and procedures were reviewed in November 2015, and found to be effective in responding to all of the requests received during that period. Over 100 separate requests had been effectively managed. No challenges had been forthcoming from either communities or requestors, and all decisions had been provided within a week of receiving the required information. Only two requests were declined in that period and one subsequently. Requestors have been generally understanding and supportive and there is no backlog of requests awaiting a decision.

The framework provides clear direction for staff responsible for approving the use of Māori images based on Māori cultural values and current museum good practice endorsed within the organisation.[11] This is also in line with Museums Aotearoa Code of Ethics[12]. The fundamental principle is to be open by default and restricted by exception. Aiming to increase access to and engagement with its collections and stories through its image library, the museum takes a positive approach by assuming access will be provided unless there is a clear reason why approval should not be given. The exception to this principle are images known to be restricted, where the converse is the case[13]. The museum also seeks to ensure that the requested images fit with the intended purpose and that cultural obligations are not compromised.

Figure 3: *Korowai, Taranaki. Auckland War Memorial Museum Tāmaki Paenga Hira, AM7498.*

Under the principle of Manaakitanga, the museum ensures requests are dealt with in a timely manner. There are clear pathways of communication about how to request images, what information is required, who is responsible for making decisions, indicative turnaround timeframes and how requestors can give feedback or seek clarification on decisions. This includes an explanation as to whether 'restricted' images, may also be requested. The museum ensures consistency throughout the process and across the organisation by utilising the collection management systems to document all decisions and note established precedents for particular images. This helps in building and maintaining knowledge within the museum's institutional memory. The principle of Mana Taonga is about safeguarding the mana of the taonga. There is also the potential to enhance the mana of the taonga, when connected with the journey, stories and iwi that it is related to.

Figure 4: *Taiaha. Auckland War Memorial Museum Tāmaki Paenga Hira, AM5681.*

The principle of Mana Whenua guides the museum in its obligations to communities, whether they are defined or implicit. The duty of care is to uphold the mana of the communities that are associated with Māori images, no matter whether the connections are active or latent. Ultimately, responsibility lies with the communities from where images are derived even if this responsibility is not able to be activated. The museum applies a wide understanding of ownership and tries to identify all iwi interests and relationships. Where practically possible, requests are referred to the owners or relevant iwi/hapū if they are known. The preferred approach is to assist the requestor where it is reasonable to do so.

Figure 5: *Sanders, H.A.B. 1917. Boxing Championships of the N.Z. Contingent. The Maoris [sic] present gave their famous 'Haka'. Auckland War Memorial Museum Tāmaki Paenga Hira, PH-ALB-418 H130.*

Under the Kaitiakitanga principle, a high level of care is given to all Māori images. Images considered sensitive include, images of people, stereotypical, exploitative, racially demeaning or offensive images, and potentially provocative use of images. In these cases a peer review process is undertaken if there is any question or high degree of complexity over an image request. There is a well-defined chain of decision-making that can be called upon from Māori curatorial staff to the Māori Development Directorate and other relevant Māori staff through to the Taumata-ā-Iwi if required.

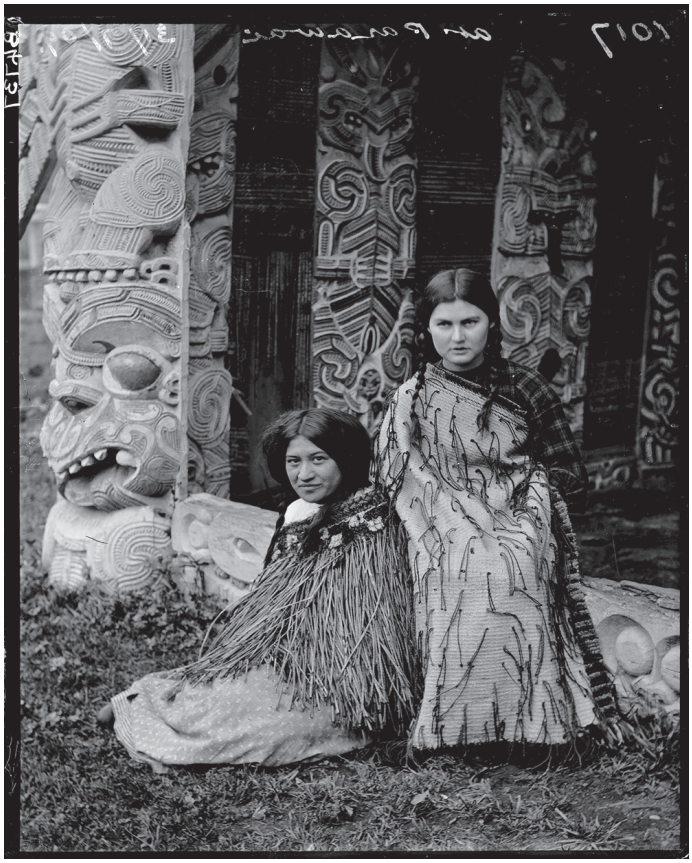

Figure 6: *Hammond, T. 1909. Mrs Erueni Taipari (nee Stewart) and Miss Goodman in front of Hotunui, Parawai, Thames. Auckland War Memorial Museum Tāmaki Paenga Hira, PH-NEG-B4737.*

In practice, the steps are straightforward:

1) Determine the acquisition pathway, ownership/legal title and any obligations relating to acquisition;
2) Consider what is being depicted—this is where the five guiding principles are utilised;
3) Consider intent or nature of use;
4) Using the principles framework, specialist Māori staff consider the information collated. Options are available for escalation if further advice needed; and
5) The decision relayed to requestor and recorded on collection management databases.

The majority of requests are from whānau who wish to have a personal copy of an image of their tupuna or, an object they are directly connected to. A recent example is a request from

a member of the public looking for a copy of this image of their whare.

Figure 7: *Māori Whare. N.Z. Auckland War Memorial Museum Tāmaki Paenga Hira, PH-TECH-925-906.*

Her family was from that marae, and the whare had burnt down after this photograph was taken. They had no images of the whare in the family and were thrilled to see that the museum held a postcard depicting it. The requestor was registered with the iwi Te Āti Haunui a Pāpārangi. It was for purely personal use and was not going to be distributed or reproduced in any way. With instances such as this, the museum applies a pragmatic understanding of 'face value' and 'goodwill' where the applicant's assertion to whakapapa connection is accepted. The museum does not make judgment on the whakapapa connections that an applicant is asserting through this process. Experience to date is that descendants are very forthcoming with this information and are proud to tell the museum about their association to the person or place.

As mentioned earlier, three requests have been declined so far. The first came up at the time the framework was being developed and informed this work. This remains a much referred to example and is a good illustration of appropriate museum response using these procedures. The museum received a request for images of significant taonga on display including *Te Toki a Tāpiri*, the waka taua, the pātaka *Te Puawai a Te Arawa*, and *Hotunui*, the whare rūnanga, to be included in an artist's publication about her 'visionary surrealist' painting practice. Images of these taonga were to sit alongside her own art. The images were also referred to in a narrative about spirituality and the inspiration the artist derived from the taonga for her art. The artist provided copy for the book including mocked up pages as well as permissions from some relevant iwi members.

Figure 8: *Wero Taroi, Anaha Te Rahui. Te Puawai o Te Arawa Pātaka. Te Arawa. Auckland War Memorial Museum Tāmaki Paenga Hira, AM151.*

Museum staff considered this request against the principles. There was acknowledgement that the artist's creative interpretations were hers to make as she saw fit and that taking inspiration from such taonga was completely valid. Where this request moved into uncharted territory was the artist then giving spiritual and cultural interpretations of the taonga that museum staff knew to be incorrect or contradictory to existing scholarly research. This request was deemed to work against the Kaitiakitanga and Mana Taonga principles and on these grounds the image request was declined. Worth noting also is that the artist expressed her understanding when the reasons for declining this request were explained.

Importantly, the same due diligence is applied to ALL Māori image order requests, including museum colleagues requesting collection images for museum use and marketing. The *Taku Tāmaki* exhibition in 2015 featured arguably New Zealand's earliest photograph – a daguerreotype of Henare Taratoa taken in 1850. The photograph had been approved for display in the show and museum external communications personnel wished to use it on a very large billboard in a busy, inner city suburb, and on numerous bus shelter advertisements across Auckland city. There would be high visibility and also a significant likelihood of damage caused by traffic, people or other urban risks.

Figure 9: *Eyre, E. ca. 1850. [Henare Taratoa]. Auckland War Memorial Museum Tāmaki Paenga Hira, PH-2006-1-1.*

The scale of the image was taken into account and this request was declined under the Mana Whenua principle, because of the risk of vandalism to the image—the potential for the ancestral image to be mistreated in the public arena was deemed to be too high and was the tipping point in declining this request. In line with our value of Manaakitanga, alternative images with guidance regarding usage are routinely suggested by museum staff.

The museum has published *He aratohu mō te tono i ngā whakaahua Māori guide to requesting Maori images*[14] in bilingual, te reo Māori and English language, versions to explain the care it takes with requests for images depicting Māori content. Available online and routinely supplied to requestors, these guidelines have been positively received universally.

The museum is also progressively releasing non-downloadable, JPEG images of Māori objects through its Collections Online[15] service, including all of the Māori images from its pictorial collections under cultural permissions statements. These statements provide clear information on how these images can be used, broadly align with the New Zealand Open GLAM model proposed in colleague Sarah Powell's thesis *Towards a Connected Commons* (Powell, 2016) and reinforce that while an image may be out of copyright, it is subject to cultural permissions.

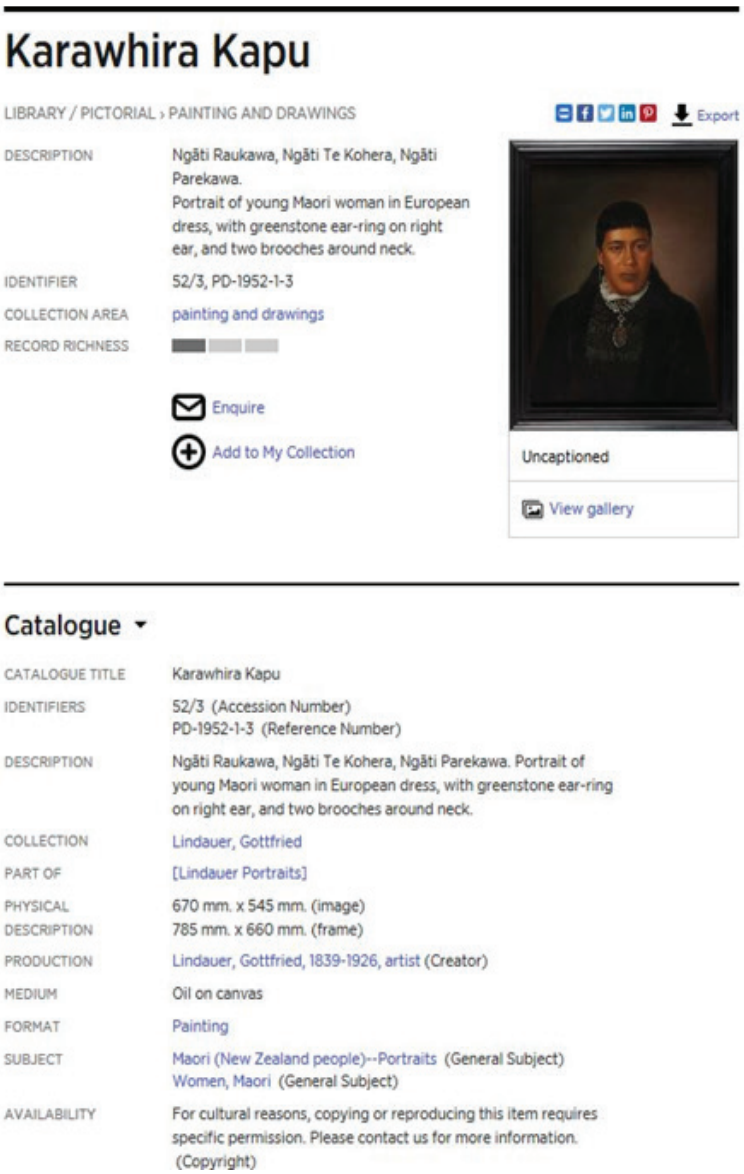

Figure 10: *Example of Auckland Museum Collections Online cultural permissions statement.*

This has been a journey of growth for the museum, both internally and in collaboration with rights holders and requestors and the museum is keen for the model to evolve as experience grows. It is also important to remember that like the objects within the museum, these images are also taonga. For Māori they carry meaning beyond being merely events or records. Rather, they offer a sense of a connected past through objects, people and places. By acknowledging this, the museum has been able to offer a way in which the mana and integrity of images and their related communities and descendants are afforded appropriate care. Cultural care, as expressed through Mana Taonga, Mana Whenua, Kaitiakitanga and

Manaakitanga, are increasingly integral to Auckland Museum's organisational practice in this global, online, open context.[16]

Endnotes

1. http://www.aucklandmuseum.com/about-us/future-museum/he-korahi-maori-a-maori-dimension-auckland-museum.
2. Images which depict Māori subjects or content.
3. This work was referenced in Powell (2016).
4. http://www.aucklandmuseum.com/about-us/future-museum/he-korahi-maori-a-maori-dimension-auckland-museum.
5. http://www.aucklandmuseum.com/about-us/future-museum/teu-la-va-the-pacific-dimension-at-auckland-museum.
6. http://api.aucklandmuseum.com/#linked-open-data.
7. http://www.aucklandmuseum.com/collections-research/collections/.
8. This process relates to the representation of the subject or object (the image) as distinct from the subject or object itself, which attracts its own level of care.
9. For example, unprovenanced woven items of Māori antiquity such as kākahu (garments), and any artistically carved or embellished items of Māori antiquity made from wood, bone or stone such as patu (weapons).
10. The museum´s Act provides for a Māori Committee known as the Taumata-ā-Iwi. Founded upon the principle of mana whenua (customary authority of and over ancestral land) and comprising Ngāti Whātua, Ngāti Pāoa and Waikato Tainui, the Taumata-ā-Iwi is responsible for the provision of advice and assistance to the Trust Board in a series of matters set out in the Act.
11. These guidelines should also be read in conjunction with Auckland Museum's 'Guardianship of Taonga Policy' https://www.aucklandmuseum.com/getmedia/6fa540aa-34ca-40f3-b05f-38b950712c2a/auckland-museum-governance-policy-guardianship-of-taonga.
12. http://www.museumsaotearoa.org.nz/code-ethics.
13. Images of human remains are restricted except under exceptional circumstances.
14. http://www.aucklandmuseum.com/getmedia/b55badf0-5d18-40e3-99f8-290760563444/awmm-library-guide-to-requesting-Maori-images-download.
15. http://www.aucklandmuseum.com/collectionsresearch/collections/record/am _naturalsciences-object-576531?pht=True&ooc=True&k=Huia&ordinal=18.
16. A companion framework has subsequently been developed for images with Pacific content, after an extensive international consultation process. This framework is grounded in Moana Pacific values.

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Kanohi ki te kanohi: Face-to-face in digital space

Wayne Ngata

Introduction

Kanohi ki te kanohi or face-to-face communication is a facet of human behaviour. It is indeed a key principal of being and doing as Māori. It allows one to not only see who or what one is communicating with, but also to hear, feel, and smell the relationship. In this age of fast growing digital 'stuff', increasing disconnection, and instant reconnection, we of Te Aitanga a Hauiti of Tolaga Bay, are finding different ways to re-engage with the notion of kanohi ki te kanohi. This applies, not only to ourselves as descendants of an ancestor but also, to numerous icons and artefacts associated with, and representative of ourselves. We have explored, and continue to develop, different ways to engage with these artefacts, and in effect with each other, by utilising the digital tools and expertise at our disposal. Short of all being resident in the one place or molecular transportation of Star Trek fame, it is as close as we can get to rebuilding and reconnecting our cultural stronghold, the essential whakapapa or genealogy of our whare kōrero, the house of stories, which contain our body of knowledge. This is what sustains our particular way of being and doing, and provides a platform for progress into the future.

Kanohi ki te kanohi in digital space

Marae or pā are considered to be places which provide and promote strong foundations for Māori cultural well-being. They epitomise the notion of kanohi ki te kanohi' engagement through both formal and informal encounters. They encourage connection, re-connection and reaffirmation of family and tribal links through marae ātea[1] discussion, wharenui[2] storytelling, and wharekai[3] 'catch-ups'. In times of sorrow, joy, celebration, serious debate or simple get-togethers, it remains an important social hub of Māori society.

According to the 2013 Census there were 668,724 people of Māori descent living in New Zealand (Statistics New Zealand, 2013) out of a total Māori population of 723,400 (Statistics New Zealand, 2017). Of the New Zealand residents, 86% lived in the North Island with nearly a quarter in the Auckland region, along with high percentages in the Waikato, Bay of Plenty, and Wellington regions. This correlates with urban migration trends over the past 60 years that have increased Māori populations in some key metropolitan areas and conversely depopulated some tribal homelands. This does not take into account the large number of Māori who live in Australia[4] or elsewhere overseas. Despite this, in 2013 according to *Te Kupenga* (Statistics New Zealand, 2015), 71% of Māori still knew their ancestral marae, with 89% of those having visited their marae at some time. This figure decreases further to 54%, however, when asked if they had visited their marae in the previous 12 months. Even though they may wish to visit, time, distance, and money are noted as major barriers.

The statistics paint a picture of what we have seen happening in rural tribal areas, or

more particularly, the effects of depopulation on iwi, hapū, whānau[5], and on pā and marae. Māori, like any other group of people, moved from one place to another for a range of reasons, ongoing survival probably being the predominant factor. Our history is highlighted with, and at times defined by 'heke', migrations brought about by both push and pull factors. Our ancestors traversed eastwards across the vast water continent of Te Moananui a Kiwa[6] over several millennia, reaching as far east as Rapanui and South America (Roullier, Benoit, McKey, & Lebot, 2013; Switek, 2013; Yen, 1974) and south to Aotearoa New Zealand. Within Aotearoa, Māori moved within larger areas of familiarity and sometimes completely outside of those for the same reasons as their ancestors. Pre and post European contact did not diminish movement and in fact contributed to Māori travelling abroad to other places, particularly to New South Wales and Tasmania in the 19th century. During the 20th and into this century Māori have continued to 'heke', from rural tribal territories to urban multicultural centres. The rural marae and pā and their associated communities have therefore, become depleted of people; the majority of descendants present in heart but not in body.

The population of Tolaga Bay was 768 in 2013, 81% being Māori. There are five active marae in its vicinity. Those five marae are immediately served by a small portion of this community, balancing responsibilities with work, child and aged care, recreation, social engagements, and other myriad obligations all communities are faced with. For example, since the mid-1960s, our own particular marae, Hinemaurea at Māngātuna, Tolaga Bay, has witnessed the disappearance of some 30 homes and whānau associated with these. Also four major floods that have adversely affected the marae facilities, the death of numerous descendants of the marae, the change of school status from mainstream to kura kaupapa Māori[7], the bussing of the majority, if not all children, 10 kms from Tolaga Bay to the kura, the shift from normally three or four speakers on the paepae[8] to one if organised in advance, the positive absence of alcohol at marae functions, the advent of smoke free marae, and, the growing gap of home experience between the home people and those who have left the area.

The consequence of these and other related effects are that communities change. Whakapapa however is constant and requires some attention to ensure that the nature and practice of whānau connection is maintained and nurtured. This is where opportunities arise to challenge ourselves around how we might do things differently given the changed circumstances. Differently does not always mean new. For us of Te Aitanga a Hauiti it is about understanding how our own people thought and worked in their own era and applying that to the now. Our learning and behaviour, before European contact, was based on the premise of whakairo (the verb and the noun), art knowledge and its fundamental importance in the world. This is expressed through the maxim,

> Ka tipu te whaihanga, e hika, ki Uawa.
> And art and knowledge did flourish in Uawa, oh son.[9]

Using this as our guiding principle, we have since 1999 deliberately explored ways and means through art to reconnect and re-energise our whakapapa, our bodies of knowledge, and our particular way of thinking and doing.

Toi Hauiti, an arts working group of Te Aitanga a Hauiti, initiated, organised or supported a range of experiences, activities, and projects that involved face-to-face or digital engagement. Some of these projects were simple. Cobbling together computer bits and pieces hooked up to a makeshift transmitter, enabled us to live-stream a tangihanga[10] to whānau around New Zealand and abroad in 2006. More organised ventures like Te Rauata, from 2010 to 2013, involved research institutions in Auckland and Cambridge, England cataloguing artefacts scattered throughout the world with provenance to the Uawa-Tolaga Bay region (Lythberg, Hogsden, & Ngata, 2017; Ngata, Ngata-Gibson, & Salmond, 2012). These types of experiences have led to sometimes more formal, sustainable engagements, while others have been parked until such time that we have the capacity to deal with them

We have experienced a range of communication tools in our lifetimes. One of our uncles, as a child, was responsible for lighting signal fires on a high point above Māngātuna to let people know in Hikuwai, 15 kms to the north, that a tangihanga was being held. Compare this with the fact that we can now use a small handheld device to carry out a video conference with several others who may be anywhere in the world. Our practice is not so much about digitisation as it is about adaptation. In this regard there are practical, ethical, and tikanga issues which arise around the care of, and access to taonga. We want to access both taonga and people for Te Aitanga a Hauiti, wherever they are, in order to reconnect with our ancestors through the taonga. To see, feel, hear, and smell the medium used by them to tell our stories. To engage fully with this one needs to physically access taonga, to talk with them, to be present with them, to re-establish them in the cultural contexts to which they belong. For the vast majority of taonga this form of repatriation is not possible for a number of reasons, particularly legal and regulatory barriers, as well as distance and cost considerations. We therefore utilise and adapt the available technology to do as much as we practically can to re-engage with our taonga, through building digital catalogues like the aforementioned Te Rauata, connecting live engagements through social media, and exploring how to recreate 3D digital taonga that can be 'beamed' out to Te Aitanga a Hauiti people around the world.

The focus of all of these activities has been on building the knowledge, skills, and strength of our own people through formal and informal participation in the arts. The effects of this focus are art and community outcomes such as creating a star navigation compass in the school playground. Young people are currently involved in waka hourua (double-hull canoe), non-instrument navigation and sailing in the Pacific Ocean. A weavers' collective is replacing whāriki, or woven mats, for all of our active marae. Working relationships with institutions such as the Museum of Archaeology and Anthropology, Cambridge University, and the American Museum of Natural History, New York, are providing annual scholarships for local school leavers moving into tertiary study. Organising bandwidth through local Canterbury providers enables national broadcasters to

broadcast Te Matatini[11] 2015. Currently Toi Hauiti is supporting a large range and number of arts-based projects. These include local artists' work around flax maintenance, wharenui restoration, local heritage trails, visits abroad to other indigenous art gatherings, and, visits of waka hourua to Uawa to coincide with 'Native Voices', a gathering of local and other indigenous artists in Uawa in 2019 to produce and exhibit works at the Tairāwhiti Museum. Toi Hauiti is also supporting work with Te Aitanga a Hauiti Hauora[12], the Horouta Healthy Families Collective[13], and Google Outreach using Google tools and expertise to map our Tairāwhiti stories from Te Whakatōhea people of Ōpōtiki in the north to Ngāi Tāmanuhiri people south of Gisborne, as a way of encouraging our people to reconnect with those stories by actively walking the story trails. This is part of a major focus on providing strength based, preventative health solutions for Māori.

The scope of our work with art, and how it intersects with technology, is organic in some ways as it depends on who is interested, available or organised to attend to activities. It is preordained in the aforementioned adage, 'Ka tipu te whaihanga, e hika, ki Uawa'. The focus is not so much on the actual activities but rather the types of positive outcomes derived from those activities. This allows a degree of freedom for our artists and 'techno-peeps' to explore, adapt, respond, and create as they see fit because they can see and understand this bigger picture, and are not constrained by unnecessary restrictions. We meet four to five times a year at whoever's place is providing the best lunch and talk at length about what is happening, what is needed to support that, who is doing what, and by when. The technology helps us to push boundaries through exploration but local whakapapa is what keeps us grounded and relevant. Promoting and providing opportunities for artistic expression is for us always about building local potential, economic pathways, and community engagement. Digital compilations of artefacts, live streaming of local events, virtual experiences, and Google Maps are all a means to that end. What happens for people beyond that is key to how Te Aitanga a Hauiti communities develop.

The art and technology activities that we are involved in are part of a wider landscape of community projects, marae engagement, and iwi progress. They are not isolated activities. Some are well planned, some are responses to opportunities that arise, some are simply part and parcel of normal daily life.

So, we ask the questions. 'Is our work building effective art knowledge and art people? Is it helping to build good people and contributing citizens?' 'Is it helping to develop economic opportunities?'

The answer to these questions is, yes. Without some dedicated research around acknowledging the types of systems that are operating and measuring the collective impact of our activities, however, it is difficult to say exactly how effective we have been, or how many 'good' citizens and businesses have been developed because of our work.

Our next steps are important in the sense that we have trialled a number of initiatives over the past 18 years. There have been many positive outputs and outcomes and we need to celebrate those. The fast changing technologies require us to adapt, particularly around how we preserve, present, and share our information, kanohi ki te kanohi with our

own who are scattered far and wide. It is a good time one thinks, to reflect, review, re-plan, and re-energise for the coming generations of Hauiti people—'Kia tipu tonu te whaihanga, e hika, ki Uawa'.

Endnotes

1. The space in front of an ancestral house.
2. Ancestral house of a marae.
3. Dining room of a marae.
4. 128,430 in 2011 (Te Puni Kōkiri 2014).
5. Tribes, sub-tribes, and extended family.
6. The Pacific Ocean.
7. Total Māori language immersion primary school.
8. The speakers seat on marae.
9. From Verse 6 of *Te Tangi a Rangiuia (The lament of Rangiuia).*
10. Funeral service.
11. The pre-eminent national Māori cultural performance competition held every two years.
12. An indigenous provider of health services.
13. A collection of eight iwi health providers from Ōpōtiki in the north to Gisborne in the south.

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Kōrero kitea: Ngā hua o te whakamamatitanga. The impacts of digitised te reo Māori archival collections

Paul Diamond

Introduction

Using native speakers as a resource to teach te reo Māori, the Māori language, to second language learners, has been a key strategy in efforts to revive the language. In more recent years, the dwindling numbers of people whose first language is te reo Māori has made this approach more difficult. A 2013 conference in Sydney suggested a different, but complementary approach. *Hidden Gems: The Role of Libraries & Archives in Cultural Revitalisation* was a symposium hosted by the Indigenous Unit at the State Library of New South Wales.[1] *Hidden Gems* aimed to examine the role of libraries and archives in cultural revitalisation across Australia and New Zealand (and North America). Specifically, it looked at the reclamation of dormant Indigenous languages using archival materials (such as vocabulary lists compiled by missionaries, early settlers and explorers), and mechanisms to deal with the complexities of access to digitised Indigenous materials. Indigenous people, librarians, archivists, linguists, and museum professionals came together to share their experiences of working in the field of language documentation and revitalisation.

I attended the conference with two colleagues from the Alexander Turnbull Library. We gave a presentation about our Māori language collections and how we are trying to connect these with interested communities. We talked about how the collections were made available to researchers in digital form, but did not cover who was using them and what they were doing with them – because other than our own interactions with researchers, we really did not know.

Alexander Turnbull Library collections

Library photographic collections were available online from the late 1990s, on the (now defunct) Timeframes website. Although this website did feature some manuscript material, the first large scale collection of the Library's te reo Māori manuscripts to be put online is the nearly three thousand letters in te reo Māori sent to the 19th century politician, Donald McLean – the largest collection of te reo Māori letters known to exist. These were part of the Manuscripts and Pictorial website, launched in 2008, accompanied by working translations and transcriptions ("*Series 2*," 2008).

The Niupepa collection of te reo Māori newspapers, launched in 2002 is the largest collection of on-line te reo Māori published documents ("*Niupepa: Māori newspapers*," 2008). This was based on a microfiche copy of newspapers produced for a Māori audience from 1842-1933, and converted to full text Digital Library by the Digital Library research group at the University of Waikato. The website also features transcripts and English language summaries of the niupepa, making them accessible to researchers not fluent in te reo Māori. The collection was officially released at the 2002 Annual General Meeting of Te Rūnanga o Ngā Kura Kaupapa Māori (the controlling body of Māori medium schools), and

is extensively used (Witten & Bainbridge, 2007). The availability of niupepa online has led to research and scholarship about their content and how they were produced. It is harder to find information about other ways niupepa and te reo Māori material now available online are being used by researchers. There are some instances of the use of early te reo Māori in language teaching. For example, John Moorfield, the author of a series of textbooks for adult learners of te reo Māori, used extracts from niupepa in *Te Māhuri,* his book for advanced students.

Figure 1: *Ngāti Paarau historian Mat Mullany used the National Library's Papers Past website to research Te Waka Maori o Ahuriri and other niupepa (Māori Language newspapers) for the 150th anniversary of the battle of Ōmarunui. This collection was based on images supplied by the New Zealand Digital Library Project, at the Department of Computer Science, University of Waikato.*

What value has this digitisation of Māori language material given to Māori? Traditional ways of trying to measure value of digitisation have been via quantitative metrics, such as the number of hits on websites. These tell us about access but not who is using the material, or how, and what difference it is making to their lives.

Kōrero Kitea

A desire to move beyond access as an endpoint and gain a better understanding of uses and users were key drivers for a research project formulated by staff at Victoria University

of Wellington's School of Information Management, with support and contribution from the Alexander Turnbull Library. The project received funding from the Canadian based international research project InterPARES Trust[2], which seeks to understand a range of challenges relating to digital archives.

The focus of the research was to explore some of the ways digitised te reo Māori collections are being used, and what impacts that use is providing to New Zealand – to the people and communities who use digitised collections. Te reo Māori collections can be used as case studies to better understand impact analysis as a whole, with findings intended to be used to support institutions to better articulate their value proposition. Initially, the survey was going to be based on a list of digitised collections, with questions about how these had been used. This was modified following advice from a Māori Studies academic, who suggested we shift the focus away from our own collections, and look more widely to what digitised collections people are using and ask questions about this.

The name of the project, *Kōrero Kitea*, is a reflection upon the concept of 'kanohi kitea' which means to have a physical presence, or literally, that your 'face is seen'. In its original form, the phrase expresses the importance of meeting people face to face, and to be seen and known amongst Māori communities. The title of this project, referred to the kōrero—or expressions of the ancestors present in archival collections—being discovered by the communities that they relate most to, through the act of digitisation.

A literature review conducted as part of the project, suggested that Māori users see digitised te reo Māori resources as a benefit to language revitalisation, and as learning aids alongside other resources and methods. The review reinforced the feedback mentioned earlier, to focus on users' needs. Related to this was the need to focus on relationships (for example, between users and institutions involved with digitisation), and how these could be reciprocal and collaborative. The project was also keen to apply Kaupapa Māori methodology, which encouraged greater emphasis on hearing and listening to narrative, rather than metrics. This was a challenge, given the survey was online.

The online survey ran from April to May 2016, and collected both quantitative and qualitative data from 83 respondents. The data was used to build up a picture of the use of digitised te reo collections by primary users, including how they share the collections with others. The majority of respondents worked in the education and memory sectors; others worked in arts, in the community, and for tribal organisations. As expected, the survey showed that people are using collections for education, cultural and language revitalisation, as well as Treaty of Waitangi claims research.

A key finding from the research related to whanaungatanga[3], a sense of being connected, and making connections. There was strong evidence that digitisation of te reo Māori collections provides a significant societal impact by supporting a sharing and relationship system among communities and whānau. These relationships exist well beyond the bounds of the access interactions between the memory institution and their customer, and therefore beyond the traditional mechanisms of measuring and reporting on digitisation. This is apparently the first evidence of this phenomenon, and while only

indicative, warrants further exploration and investigation.

A high degree of sharing of information was integral to this observation of whanaungatanga. The survey showed 95 per cent of respondents shared the digitised archives they found. A high proportion (67 per cent) liked being able to share the collection with friends and whānau, and more than half (60 per cent) of the shared collections were shared again by the recipient. This repeated sharing of digitised material is analogous to the multiplier effect in economics, where an increase in spending produces a larger increase in income and consumption.

The sharing is happening via Facebook and other social media sites, as well as libraries and archives. In addition, a quarter of respondents had shared with a tribal repository. Reasons for sharing included whakapapa evidence, learning te reo, use in iwi research (including iwi dialect research), language revitalisation, contribution to community, and to educate others. Throughout the survey, respondents cited a sense of obligation to whānau and community members, as well as to share information to those who had a relationship with it.

The research also sought respondents' thoughts around the extent to which the digitisation process, and digital access and use activities might affect the wairua (or spiritual dimension) of the knowledge in the collections. This might be particularly relevant to sacred knowledge, whakapapa, or genealogical information.

There was a mixed response, with some respondents maintaining the wairua of collections can be affected by digitisation but, this was often outweighed by the benefits (for example, by preserving information for future generations). Generally, accessibility and ease of sharing outweighed concerns over adverse effects on wairua, with many respondents supporting open, sharable, usable digitised collections, while still providing caveats on that position.

The whanaungatanga phenomenon noted earlier, where digital collections are establishing or strengthening the relationships among communities and whānau, exists well beyond the bounds of the access relationship between institution and users. An example of this broader presence was the finding that digitisation supports three key government outcomes for New Zealand: the Māori Language Strategy, the Social Cohesion pillar of the New Zealand Treasury's Higher Living Standards measures, and the Treaty of Waitangi settlement process.

The research findings are also consistent with findings and recommendations of *Ko Aotearoa Tēnei* (2011), a report from the Waitangi Tribunal in response to the Wai 262 Treaty claim lodged in 1991 by six claimants from six tribes. The claim called for recognition of rights around, and control of, traditional Māori knowledge, customs, and relationships with the natural environment. Digitised Māori archives were considered in one part of the report (where the Crown controls mātauranga Māori/Māori knowledge). The Tribunal found that tribes have roles and mana (authority) as kaitiaki (guardians) of their cultural and intellectual property. It also found that institutions have a right to collect and care for taonga (treasures). The Tribunal considered that Māori have a strong Treaty-

based interest in documentary and other mātauranga Māori held by the Crown, but there are also important reasons to maintain relatively free public access, and especially Māori public access.

The *Kōrero Kitea* research was a pilot study and further research in this area could include more about whanaungatanga, to consider whether this is more or less prevalent with Māori than other groups. The effects on traditional knowledge transfer where kaumātua, as traditional repositories of knowledge, are bypassed is another area to explore. Lessons from the research include the need to extend thinking and actions beyond access, promoting a better understanding of impact assessment, and considering messages to improve the narrative used by institutions about their collections. For example, highlighting the multiplier effect from the use of digitised Māori language collections. The research also illustrates how the research environment has changed with digitisation. For example, the loss of control over how collections are used. Libraries and archives also need to consider how to build and maintain relationships with researchers, who may not be coming into the library.

Conclusion

Connecting collections with communities is the raison d'être for institutions such as the Alexander Turnbull Library. The *Kōrero Kitea* research gives insights into how this is happening in an increasingly digitally connected world, together with information about the difference access to collections is making in peoples' lives, identity, and well-being. *Kōrero Kitea* shows that digitisation of cultural material is an important ICT mechanism for Māori to engage in matters of education, identity, and language revitalisation. It also suggests that a significant benefit of ICTs is their potential to connect people, whānau, and communities, through the sharing of digital cultural heritage.

Endnotes

1. http://blogs.slq.qld.gov.au/jol/2013/09/27/slnsw-hidden-gems-symposium/

2. InterPARES Trust (https://interparestrust.org/) is based in the Library, Archive, and Information School at the University of British Columbia, Vancouver and is funded by the Social Sciences and Humanities Research Council of Canada.

3. http://maoridictionary.co.nz/search?idiom=&phrase=&proverb=&loan=&histLoanWords=&keywords=whanaungatanga.

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Mukurtu for mātauranga Māori: A case study in Indigenous archiving for reo and tikanga revitalisation

Claire Hall

Introduction

Te Reo o Taranaki has always been an early adopter for trialling new technologies to bolster Taranaki reo revitalisation. Stalwart, Ruakere Hond, recalls two decades ago compiling, on ancient technology, the first language database that would evolve into *He Pūranga Tākupu a Taranaki*, the Taranaki wordlist. The next iteration was trialled in Kete Software[1] in 2007, abandoned soon after, after much tinkering and financial investment revealed it was fundamentally unsuited to mātauranga Māori knowledge management. At that point on the technological continuum, Te Reo o Taranaki's vision outstripped the delivery capability of any software that we might afford. Back then, Te Reo o Taranaki archivist Honiana Love and I wrote of our inaugural, and clearly failing, database project for Te Reo o Taranaki, "Despite the challenges around technical capability and the user-friendliness of our chosen software, we remain committed to the potential for this kind of database" (Hall & Love, 2012, p. 31).

This commitment, and much searching, inevitably led us to Mukurtu. A short while later, developers Michael Ashley and Kim Christen brought their training roadshow to Aotearoa, and offered the best affordable alternative to a bespoke mātauranga Māori database seen thus far. While we are not the only rōpū Māori in Aotearoa working with Mukurtu, we are arguably the most advanced. We entered this phase of development with a very clear strategy, having considered in advance where archiving fits within our wider programme of development. Te Reo o Taranaki's efforts to create a physical archiving space in Taranaki were coupled with our ongoing digital archive development. Our plan reflected critical awareness of our communities' need for an archiving programme responsive to both tangible and intangible preservation and collection-building efforts, through the filter of the language and cultural revitalisation (Hond & Sundgren, 2003).

Why Mukurtu (MOOK-oo-too)?

Mukurtu (Mukurtu CMS, 2017a) is a long-running grassroots project aiming to empower communities to manage, share, preserve, and exchange their digital heritage in culturally relevant and ethically-minded ways. Its relationship with Aotearoa spans the last few years, and a handful of iwi, hapū, and whānau databases have adopted Mukurtu's easy to use, Drupal-based[2], content management system.

It is a Warumangu (Australian Aboriginal) word which means safe keeping place, designed alongside traditional knowledge holders to enable Warumangu people to appropriately share knowledge, stories, and cultural heritage using their own protocols (Mukurtu CMS, 2017b). Mukurtu is not, at its foundations, a mātauranga Māori knowledge management platform. This must be acknowledged, as "IK (indigenous knowledge) mātauranga resides within a different knowledge space altogether for traditional academic disciplines" (Tuhiwai-Smith et al., 2016, pp. 131-132).

Nevertheless, perhaps the beauty and adaptability of Mukurtu is that it is premised on a non-academic, non-classical system of knowledge management. This allows digital heritage content to be organised around traditional narratives and alternative, user-led organising classifications. It also allows for nuanced sharing and access protocols at all levels: by site, by community or subcommunity, by user, or at an item (object or metadata) level. As Christen explains,

> Within Mukurtu CMS, customizable cultural and sharing protocols allow for finegrain management of access within the archive. Protocols may be based on family groups, clans, ritual societies, gender, age, seasonal activities, etc. … [and] are flexible, adaptable and can be changed at any time. The salient point is that the communities themselves decide together how best to share and circulate their cultural materials. For example, if a tribe has traditional access parameters around the viewing of sacred materials limited only to elders, or if some songs should only be heard in specific seasons, …they can use these protocols to determine access within the database itself. (2015, p. 5).

New look for the Taranaki Wordlist in 2017

After languishing in hard copy since its publication in 2008, *He Pūranga Tākupu a Taranaki* is freshly online within Te Reo o Taranaki's new taonga database, see https://puteroutiriata.mukurtu.net.

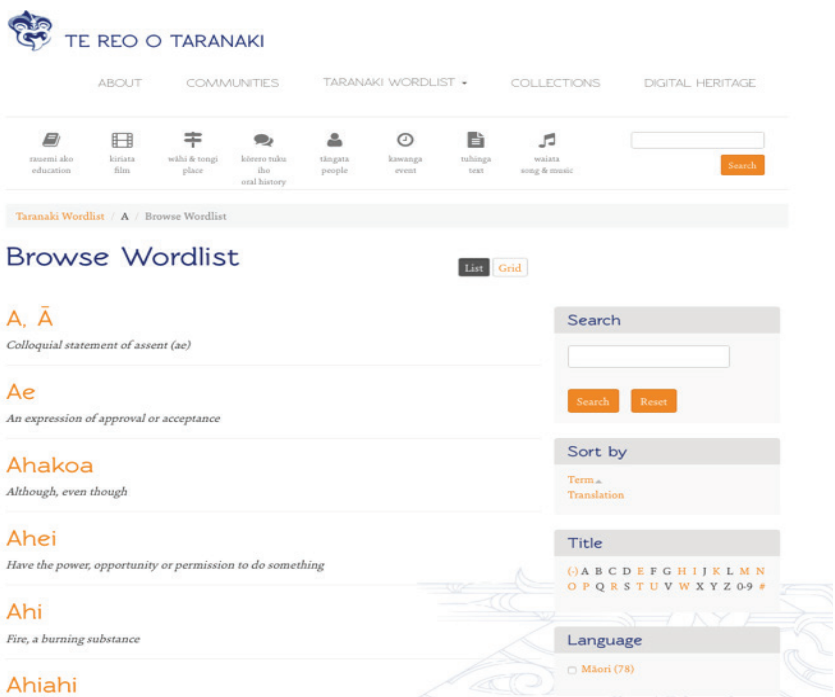


Figure 1: *Te Pūtē Routiriata o Taranaki wordlist screen view.*

The wordlist represents Te Reo o Taranaki's latest round of optimisations to Te Pūtē Routiriata online within Mukurtu 2.0. Development of the glossary function was a key project for Te Reo o Taranaki last year. Supported by Mā Te Reo[3] and developed in partnership with the Centre of Digital Archaeology[4], this functionality entrenched the digital archive as a critical tool in reo revitalisation and was another step towards making Mukurtu more Māori, further shaping its indigenous knowledge management roots to suit mātauranga Māori.

Figure 2: *Te Pūtē Routiriata o Taranaki single word entry screen view.*

The database allows collections of kupu or words to be curated in relation to digital heritage items, or collections. It creates links between wordlist entries and their source files, highlighting the significance in this database of linking provenanced language sources with related items.

For example, three kupu (word) entries (parawa, tīpare and whakawai) and one other digital heritage item (the waiata, *Tangi a Tākū Ihu*) have relational links to the Taranaki waiata *Whakawaiwai Ana*.

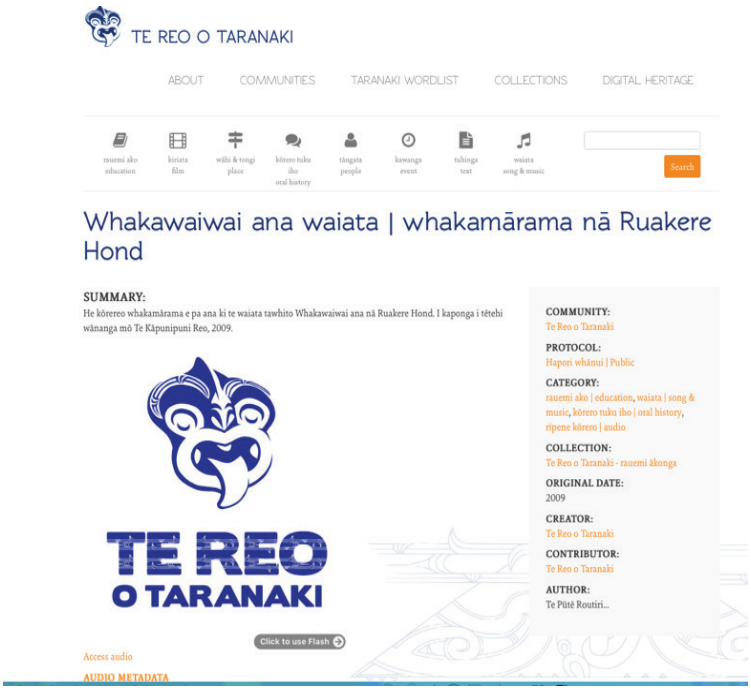


Figure 3: *Te Pūtē Routiriata o Taranaki item screen view (top of entry page).*

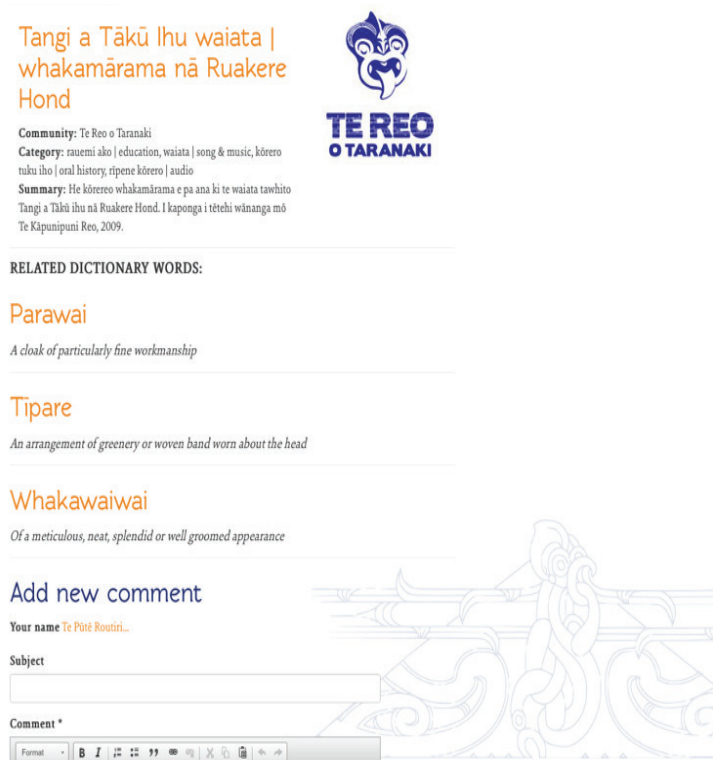


Figure 4: *Te Pūtē Routiriata o Taranaki related item screen view (further down same page).*

Figure 5 shows the back end process for creating these relational links between digital heritage items and kupu.

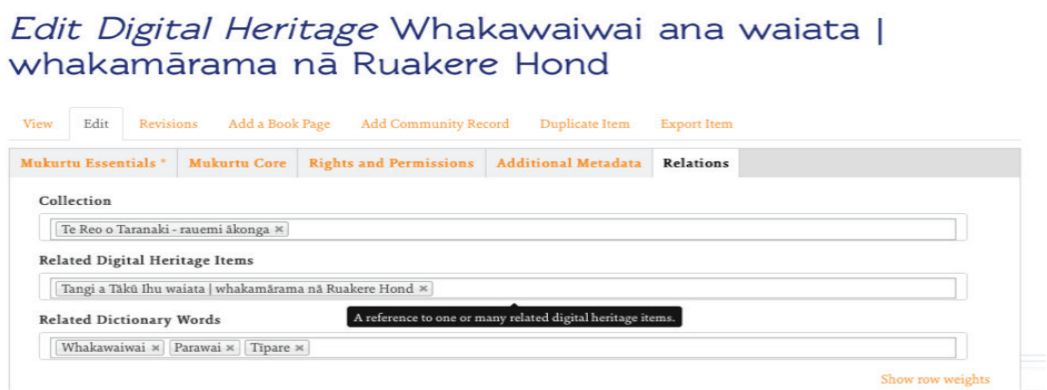


Figure 5: *Creating relational links between digital heritage items and kupu screen view.*

Also note above the layering of core information: *Mukurtu Essentials* represents the crucial layer of metadata for basic arrangement; *Mukurtu Core* elaborates on culture narrative and traditional knowledge descriptions for a digital heritage entry. *Rights and Permissions* includes fields for traditional knowledge labels and licensing options (including Creative Commons variants). The *Additional Metadata* field allows location geo-tagging.

Whakahokinga: Repatriation and recontextualisation

As Taranaki increasingly loses its native speakers, the need to find additional language sources and evidence of traditional language use becomes even more critical. Inherent in this repatriation work is the notion of ethical practice, and emphasising the traditional knowledge rights of Taranaki whānui in relation to mātauranga being analysed as well as the creation of new records.

Christen (2015, p. 1) asserts that one of the most pressing concerns for tribal archivists is managing, preserving, and caring for the large amounts of diverse cultural heritage materials not only in their own collections, but also those that reside in physically distant collecting institutions. Furthermore, reconnecting with such taonga most often includes complex processes of digitisation and digital repatriation.

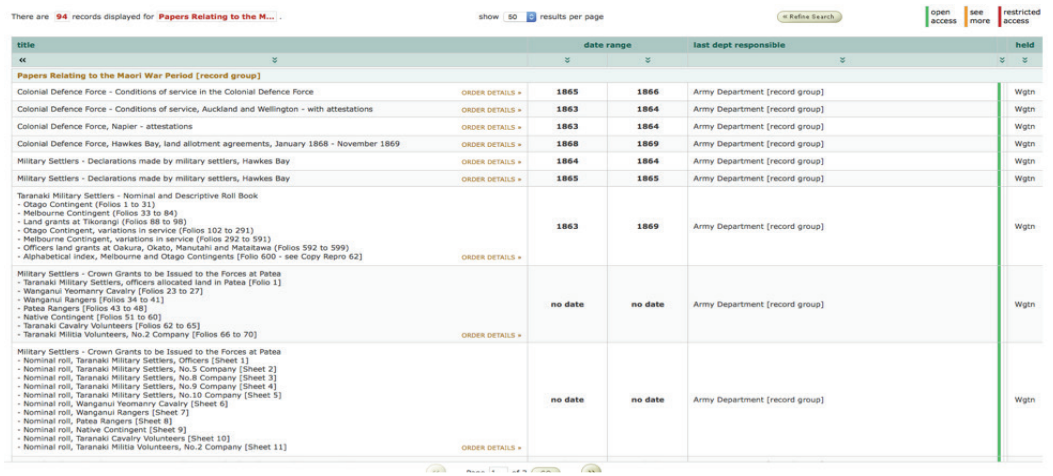
Since 2007, both have been a key component of Te Reo o Taranaki's reo revitalisation strategy. In this context the potential for using the Mukurtu platform to 'bring home' digital heritage mātauranga from other collections is clear. Our first shot at this was a successful project with Archives New Zealand to identify pre-1900 records in Taranaki reo or, those relating to the historical context of Taranaki's muru raupatu, the documented historic land confiscation, and dispossession with the resulting loss of language and culture (Waitangi Tribunal, 1996). A two-year research partnership allowed Te Reo o Taranaki to identify, digitise, and recontextualise catalogue metadata according to our own defined fields. This gave historic documents new meaning, making their searchability more relevant

for those researching Taranaki mātauranga, and particularly to those working in the reo or with aronga Māori research methods.

Figure 6 shows how a collection of archival material displays by item in Te Pūtē Routiriata. Note item metadata on the right described in aronga Māori terms as opposed to institutional terms.

Figure 6: *Te Pūtē Routiriata o Taranaki collection item level screen view.*

By comparison, this is how a simple search within the Archives New Zealand Archway catalogue against terms 'Patea, Te Wiremu, land confiscation' provides a less accessible result (see *Figure 7*).



There are 94 records displayed for Papers Relating to the M... show 50 results per page « Refine Search open access see more restricted access

title		date range		last dept responsible	held
«					
Papers Relating to the Maori War Period [record group]					
Colonial Defence Force - Conditions of service in the Colonial Defence Force	ORDER DETAILS »	1865	1866	Army Department [record group]	Wgtn
Colonial Defence Force - Conditions of service, Auckland and Wellington - with attestations	ORDER DETAILS »	1863	1864	Army Department [record group]	Wgtn
Colonial Defence Force, Napier - attestations	ORDER DETAILS »	1863	1864	Army Department [record group]	Wgtn
Colonial Defence Force, Hawkes Bay, land allotment agreements, January 1868 - November 1869	ORDER DETAILS »	1868	1869	Army Department [record group]	Wgtn
Military Settlers - Declarations made by military settlers, Hawkes Bay	ORDER DETAILS »	1864	1864	Army Department [record group]	Wgtn
Military Settlers - Declarations made by military settlers, Hawkes Bay	ORDER DETAILS »	1865	1865	Army Department [record group]	Wgtn
Taranaki Military Settlers - Nominal and Descriptive Roll Book - Otago Contingent (Folios 1 to 31) - Melbourne Contingent (Folios 33 to 84) - Land grants at Tikorangi (Folios 88 to 98) - Otago Contingent, variations in service (Folios 102 to 291) - Melbourne Contingent, variations in service (Folios 292 to 591) - Officers land grants at Oakura, Okato, Manutahi and Mataitawa (Folios 592 to 599) - Alphabetical index, Melbourne and Otago Contingents [Folio 600 - see Copy Repro 62]	ORDER DETAILS »	1863	1869	Army Department [record group]	Wgtn
Military Settlers - Crown Grants to be Issued to the Forces at Patea - Taranaki Military Settlers, officers allocated land in Patea [Folio 1] - Wanganui Yeomanry Cavalry [Folios 23 to 27] - Wanganui Rangers [Folios 34 to 41] - Patea Rangers [Folios 43 to 48] - Native Contingent [Folios 51 to 60] - Taranaki Cavalry Volunteers [Folios 62 to 65] - Taranaki Militia Volunteers, No.2 Company [Folios 66 to 70]	ORDER DETAILS »	no date	no date	Army Department [record group]	Wgtn
Military Settlers - Crown Grants to be Issued to the Forces at Patea - Nominal roll, Taranaki Military Settlers, Officers [Sheet 1] - Nominal roll, Taranaki Military Settlers, No.5 Company [Sheet 2] - Nominal roll, Taranaki Military Settlers, No.8 Company [Sheet 3] - Nominal roll, Taranaki Military Settlers, No.9 Company [Sheet 4] - Nominal roll, Taranaki Military Settlers, No.10 Company [Sheet 5] - Nominal roll, Wanganui Yeomanry Cavalry [Sheet 6] - Nominal roll, Wanganui Rangers [Sheet 7] - Nominal roll, Patea Rangers [Sheet 8] - Nominal roll, Native Contingent [Sheet 9] - Nominal roll, Taranaki Cavalry Volunteers [Sheet 10] - Nominal roll, Taranaki Militia Volunteers, No.2 Company [Sheet 11]	ORDER DETAILS »	no date	no date	Army Department [record group]	Wgtn

Figure 7: *Archway Archives New Zealand online database screen view.*

Whakahoki ki te kāinga: Working with the 'Atkinson Letters'

This year we are celebrating the success of another collaborative effort to 'bring home' a set of Taranaki letters in the care of the Alexander Turnbull Library (Radio New Zealand, 2012). Known colloquially as the 'Atkinson Letters', the 'Maori letters from Taranaki' collected by Arthur Atkinson is one of a number of manuscript collections held in institutions identified as having the potential to contribute significantly towards expanding our archive's research pool of Taranaki mātauranga.

Of particular interest was this collection's Māori to Māori writings, a corpus confiscated from papakāinga for military intelligence during the Taranaki Wars. Building on the Alexander Turnbull Library's efforts to digitise this material and improve catalogue descriptions, Te Reo o Taranaki's role was to bolster community engagement with, and connections to, mātauranga tuku iho within the letters. We did this by transcribing, collecting additional metadata, and providing historical context for a pilot set of letters—around 70, or a third of the overall collection.

The principle focus of this effort was creating a Taranaki reo language learning resource suited to high-level fluency ākonga and rumaki (immersion) learning. Translation was purposefully left out of the scope of work—rather, we aimed to create a resource to foster critical analysis with these taonga within immersion wānanga.

With this work complete and the letters import-ready, the next phase of consultation is to work with Taranaki pouako, kaiako, and iwi leaders to wānanga how the resource may be used within Taranaki whānui for language and history learning purposes. This phase will involve hapori-led dissemination to select groups: Taranaki Iwi (set one), Te Atiawa iwi (set two), and the wider community (students of Taranaki reo and history (set three). This process will be ongoing through 2017, and well beyond. Until this testing and targeted engagement is complete, each letter group will sit within the archive under a strict (non-public) protocol.

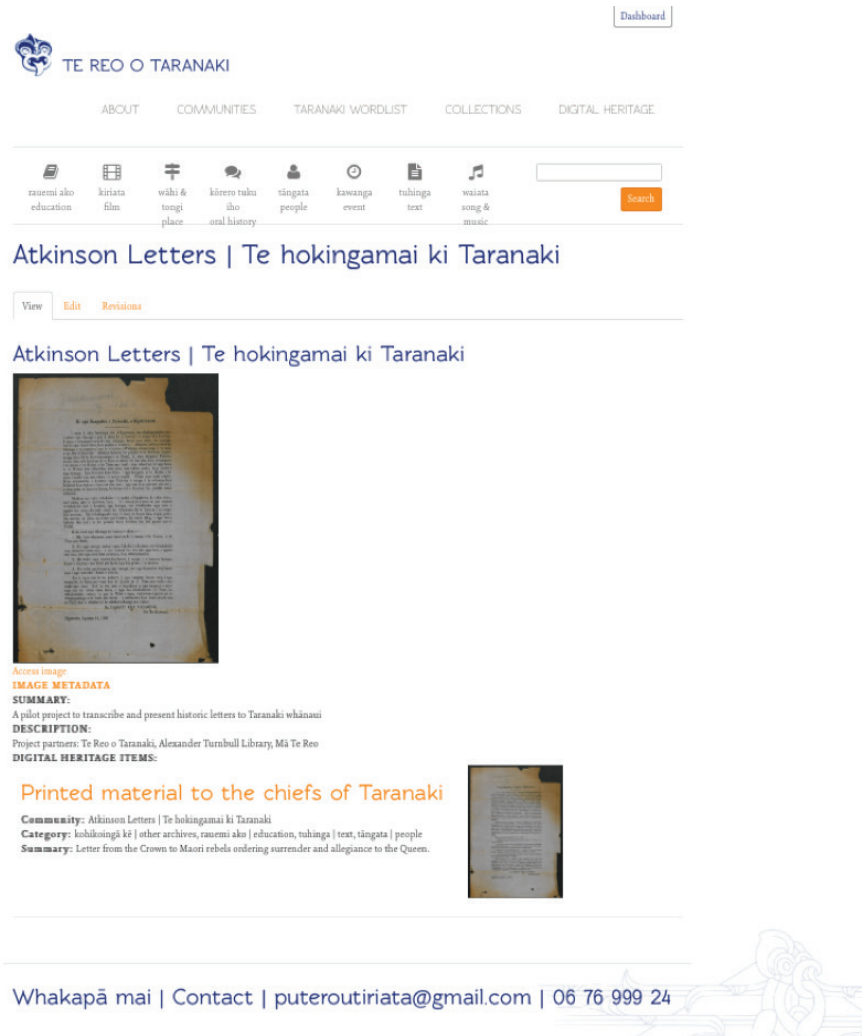


Figure 8: *Te Pūtē Routiriata o Taranaki collection-level screen view.*

In the following screen view (*Figure 9*), note in the metadata mapping on the right hand side: the shared rights acknowledgement; Alexander Turnbull as kaitiaki of the originals; Te Reo o Taranaki as creator of translations and additional metadata. Note also the application of a Traditional Knowledge Label onto the intangible cultural heritage contained within the taonga item.

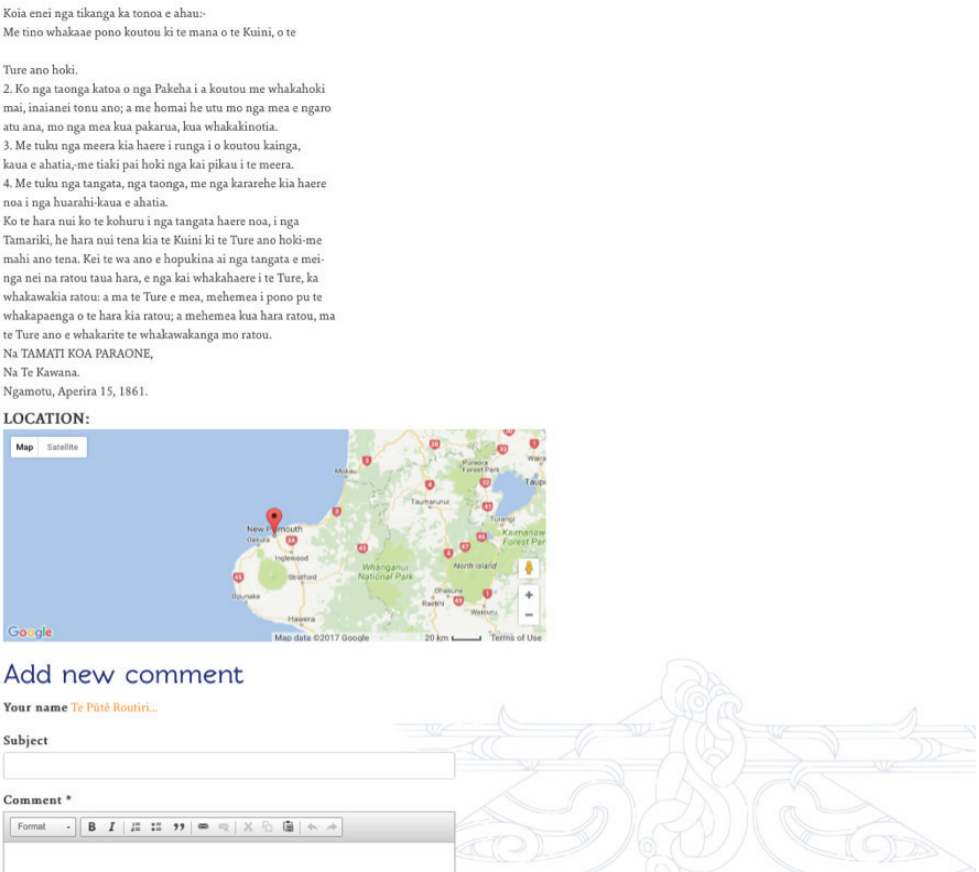


Figure 9: *Te Pūtē Routiriata o Taranaki item-level screen view.*

This pilot project took a year to complete, and reveals great potential for the use of Mukurtu software to connect flax roots communities with taonga tuku iho in institutional collections. There is also as-yet untested potential for institutions to use the database as a tool of repatriation, a means of 'handing back' traditional knowledge to source communities in a safe and managed fashion. Initial conversations with developers indicate much scope for coding to allow Mukurtu to 'speak to' other institutional databases, expediting the process of batch uploads from external collections and leaving source communities free to re-contextualise and reorder mātauranga to suit their own information architecture protocols.

This is good progress towards achieving what Honiana Love, mātauranga archivist, envisaged five years ago as a critical component of a successful iwi digital archive:

> A database could provide immediate access to virtual copies of taonga ...along with kōrero surrounding those taonga, from both an institutional and iwi perspective. This database, administered by iwi with appropriate levels of access and security could be used to facilitate digital repatriation and the establishment of relationships between iwi and the Crown with regard to taonga (Hall & Love, 2012, p. 34).

Challenges and opportunities

Perhaps the greatest challenge for adapting Mukurtu to suit Aotearoa is how to scale it up while keeping its flax roots. In short, how to guard against this platform taking indigenous knowledge mātauranga further without it becoming "...institutionalised away from its indigenous communities and contexts, where it began and where it still informs identities, ways of living and being" (Tuhiwai Smith, Maxwell, Puke, & Temara, 2016, p. 132).

This challenge is also related to conversations around data sovereignty and security of information storage—digital kaitiakitanga. Iwi, hapū, and whānau are yet to have real choices around the safe storage and handling of their intangible taonga. Within Aotearoa, further work is needed around developing flax roots, collaborative (non-proprietary, non-commercial) data storage options. While this is the most expensive option (up to 16 times more expensive than Australia-based data storage and serving), cost should no longer be a barrier to enabling Māori to, independently, retain their mātauranga within Aotearoa.

The potential for Mukurtu is actively being realised with tribal archiving communities overseas. Strong state and community funding for Mukurtu is enabling wide regional rollouts across tribal communities, encouraging uptake and engagement. Washington State University, development hub for Mukurtu software, for example, recently announced new federal funding to expand Mukurtu into regional hubs in Hawaii, Alaska, Oregon, Wisconsin, and Connecticut. These hubs in turn provide training to local tribal archives, libraries and museums (Letizia, 2017).

The same appetite exists within tribal communities in Aotearoa. Engendering collaboration, training, and engagement with a tool like Mukurtu can also be a powerful tool of decolonisation and reconciliation. To conclude, as one of the architects of Mukurtu states,

> The colonial collecting project was a destructive mechanism by which Indigenous cultural materials were removed from communities and detached from local knowledge systems. Much of this material remains today not only physically distant from local communities, but also lodged within a legal system that steadfastly refuses local claims to stewardship of these materials …incorporating Indigenous knowledge systems into library and archive practices will not just enhance relationships and create access to records, but more importantly, it has the potential to decolonize archival practices and modes of access (Christen, 2015, p. 2-3).

Endnotes

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2. http://www.tetaurawhiri.govt.nz/our-work/community-funding/ma-te-reo-contestable-grants
3. https://www.drupal.org
4. https://digitalarch.org

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Lisa Reihana: A continuum of Māori practice

Chloe Cull

In 2007 at the 57th Venice Biennale, Aotearoa New Zealand was represented by Lisa Reihana, (Ngāpuhi, Ngāti Hine and Ngāi Tū), and her exhibition *Emissaries.* The main event was the broadly popular *in Pursuit of Venus (infected)* (hereafter referred to as *iPOVi),* an expansive and immersive multi-channeled video project first exhibited in 2015 at the Auckland Art Gallery to critical acclaim and mainstream success. *Emissaries*, curated by Auckland Art Gallery Director Rhana Devenport, included a meticulously edited *iPOVi* alongside a series of new photographic and sculptural works[1]. It was presented at Tese dell'Isolotto, one of the oldest maritime buildings in the Arsenale di Venezia.

The title, *in Pursuit of Venus*, refers to Captain James Cook's first voyage to the Pacific from 1768-1771 during which he was to observe the 1769 transit of Venus across the sun. Reihana and her production team used CGI and green screen techniques to animate a version of *Les Sauvages de la Mer Pacifique*, an early nineteenth-century wallpaper produced by Joseph Dufour and composed of illustrations of an imagined, classicised, and exoticised Pacific utopia. In *iPOVi*, the animated wallpaper serves as a backdrop to carefully scripted, dramatic vignettes of encounters and conflicts between Pacific peoples and European explorers during the late eighteenth century. In her introduction to the catalogue accompanying the 2015 exhibition of *iPOVi*, historian Anne Salmond writes, "A descendant of Kupe, Lisa Reihana explores the Pacific, guided by Venus (Kōpū), summoning up ancestors, letting them sing and move again in those moments when Captain Cook and his sailors with Joseph Banks and his artists and scientists first came ashore" (2015, p. 2).

Figure 1: *In Pursuit of Venus [infected] (still). 2015-2017. Multi-channel video, HD, colour, sound. Auckland Art Gallery Toi o Tāmaki, gift of the Patrons of the Auckland Art Gallery, 2014. Image courtesy of the artist and Auckland Art Gallery.*

Figure 2: *in Pursuit of Venus [infected](installation view, Auckland Art Gallery). 2015-2017. Multi-channel video, HD, colour, sound. Auckland Art Gallery Toi o Tāmaki, gift of the Patrons of the Auckland Art Gallery, 2014. Image courtesy of the artist and Auckland Art Gallery.*

iPOVi is a triumph in many ways, not least because Reihana has spent over three decades developing and honing her skills as an installation artist, photographer, animator, and filmmaker. A self-professed "tech geek" (Devenport, 2009, p. 8), Reihana readily adopted new and varied media early in her art practice, since graduating in 1987, from the newly established intermedia department at the University of Auckland's Elam School of Fine Arts. Film and photography have subsequently taken precedence within Reihana's practice, and as such, she has been included in several exhibitions that recognised her as a technological innovator, and valued her role in representing and reinterpreting Māori imagery, histories and myths to reflect new generations of urban Māori identities. [2]

Reihana's career trajectory, starting in the mid-1980s with daring, often politically charged short films and animations, is interesting in itself. Her practice has undergone a series of shifts and transformations over the last two decades, leading to her current level of international success. A politically literate artist with much to say, Reihana has made and continues to make work that reflects and pushes against the social, cultural, and political contexts of its making. Reihana is particularly well known for two series of work—*Native Portraits*, commissioned for the opening of the Museum of New Zealand Te Papa Tongarewa in Wellington in 1997, and *Digital Marae*, first exhibited at the Govett-Brewster

Art Gallery in 2007. Both series reinterpreted visual representations of Māori gods and ancestors, and recreated features of Māori architecture, using still and moving photographic images to turn gallery spaces into contemporary marae or wharenui. Frequently described as being key moments in her career, they are important examples of the evolving nature of contemporary Māori art at the time.

Figure 3: *Digital Marae: Marakihau. 2001. Colour digital print on aluminium Govett-Brewster Art Gallery, acquired with assistance from the Govett-Brewster Foundation. Image courtesy of the artist and Govett-Brewster Art Gallery.*

However, two smaller, lesser-known works by Reihana are, I would argue, more illustrative of the ongoing relevance of her work. *Wog Features* (1990) and *A Māori Dragon Story* (1995) have maintained their socio-political relevance, highlighting the "continuing currency of many of the concerns raised in the work" (Cunnane & Huddleston, 2017). So much so, they have been revisited in group exhibitions in New Zealand in 2016 and 2017 at ST PAUL St Gallery and the Govett-Brewster Art Gallery respectively. These low-budget, lo-fi works, utilising stop animation and puppets, are a far cry from the high production value evident in iPOVi, reflecting the technological landscape of the late 1980s and early 1990s. This essay will consider Reihana's career in terms of technological innovation, with particular regard to the enduring nature of these two early films.

During the late 1980s and early 1990s, a new generation of young Māori artists had begun to emerge. These urban-living, university art school graduates, such as Michael Parekowhai, Peter Robinson, and Reihana, rebelled against the notion that Māori art was that which was Māori in appearance or included explicit references to traditional Māori symbolism or concepts. Although their practices differed greatly, these artists all shared in a movement away from the ideas and philosophies of an earlier generation of Māori artists, represented by the Māori artists and writers group, Ngā Puna Waihanga (established at Te Kaha marae, Bay of Plenty in 1973). According to White (2012, p.2), these so-called 'Young Guns'[3] "challenged the collective authority and ideologies of Ngā Puna Waihanga", representing instead an "urban Māori avant-garde" and questioning definitions of contemporary Māori art.[4]

In 1988 Reihana made public these views by exhibiting one of her early films *Touched by your presence* (1983) in *Nga Toi o te Iwi - Nga Hua o te Iwi*—an exhibition of contemporary Māori art at the National Library, Wellington. *Touched by your presence,* a sensual and texturally rich short film, juxtaposes images of classical sculpture and architecture with footage of an attractive, semi-naked young man. A poem about love echoes within an ominous accompanying soundtrack. By including *Touched by your presence* in *Nga Toi o te Iwi,* Reihana rejected traditional definitions of Māori art, reclassifying it as that produced by an artist of Māori descent. Equally, with this work Reihana asserted herself as a feminist artist for the first time, identifying the camera as a tool to critique the nature of looking and being looked at. Looking back more than twenty years later, Reihana commented that her early adoption of photographic and video technologies was a means to "transgress culture in a respectful way" (Devenport, 2009, p.12),

> I seized upon twenty-first century technologies because they sit outside traditional rules, the photographic process came from there, it replaces the wood and I use the computer as my carving tool. Traditionalists might see this as a provocative act, but there are precedents. (p.12)

Wog Features, produced by Reihana during her residency at the Australian Centre of

Photography in Sydney, was one of her first films to gain recognition in New Zealand. *Wog Features* employs the stop-motion technique of pixilation, creating a jarring and intentionally clunky effect, reinforced by the hip-hop sound track composed by George Hubbard. Like many of Reihana's early films, *Wog Features* uses humour and pop culture references and imagery to bring issues of identity politics to light. Directly drawing on the style and tone of the children's TV series *Playschool*, Reihana critiques the reinforcement of racial and gender stereotypes within pop culture. Dancing minstrels in blackface, golliwog dolls, and a repetitive rap constructed of the racial slur 'wog' are combined with images of Reihana herself, reimagined each time in different cultural guises—reference to her 'ethnically ambiguous' appearance that is often incorrectly identified. Produced between the years of Australia's bicentenary and New Zealand's sesquicentenary, *Wog Features* challenges, unpacks, and dismantles the racial and gender stereotypes that were active in New Zealand and Australia at the time. A collector of racist toys and souvenirs, Reihana couples these with puns and plays on words, using the language of racism and sexism against itself.

Figure 4: *Wog Features (still). 1990. Single channel video, standard definition (SD), 4:3, colour, stereo sound, 7min 50sec duration. Auckland Art Gallery Toi o Tāmaki, purchased 2005. Image courtesy of the artist and Auckland Art Gallery*

Figure 5: *Wog Features (still). 1990. Single channel video, standard definition (SD), 4:3, colour, stereo sound, 7min 50sec duration. Auckland Art Gallery Toi o Tāmaki, purchased 2005. Image courtesy of the artist and Auckland Art Gallery.*

In 1990, *Wog features* was included in an exhibition of contemporary Māori art at Artspace in Auckland titled *Choice!*. Curated by George Hubbard. *Choice!* included work by just seven artists most of whom were recent art school graduates (including Michael Parekowhai, as well as Diane Prince, Darryl Thomson, Jacqueline Fraser, Rongotai Lomas, and Barnard McIntyre). According to Brunt (2005, p. 215), *Choice!* "ushered into the nation's art galleries the so-called 'new Maori art'…giving it its first self-conscious and articulate platform". Not so coincidently, *Choice!* opened in the same year as a much larger exhibition of Māori art, *Kohia ko Taikaka Anake,* at the National Art Gallery (now Te Papa Tongarewa). Curated by Ngā Puna Waihanga founding member Paratene Matchitt, alongside artist Sandy Adsett, and curator Tim Walker, *Kohia Ko Taikaka Anake* was somewhat of a climax to a modern Māori art movement that dated back to the 1950s. Māori modernism saw a young generation of Māori artists strive for a contemporary vision that integrated Western artistic traditions with traditional Māori forms and motifs, all the while maintaining links to Māori cultural traditions. According to Brunt, *Choice!* was a direct critique of this exhibition, and the more conservative attitudes towards Māori art it represented.

Early in 2017, 27 years after it was first exhibited, *Wog Features* was included in another group exhibition, *Still, like air, I'll rise* at Auckland University of Technology's ST PAUL St Gallery. Regarding the inclusion of *Wog Features,* curators Abby Cunnane and Charlotte Huddleston wrote,

> Reihana's *Wog Features* (1990) was made at a time when identity politics were in the foreground of contemporary art. This was also a time when biculturalism was prominent in political discussions around nationhood in Aotearoa New Zealand… Revisiting Lisa Reihana's *Wog Features* 27 years after it was made, and taking the work as a starting point, this exhibition acknowledges the tone of defiance surfacing again in a series of contemporary works, and sets out to amplify this by bringing these intergenerational voices together. (2017)

Named after a poem by civil rights activist and poet Maya Angelou, *Still, like air, I'll rise*, brought together six female artists whose works take on racial and gender oppression and the ongoing 'essentialising stereotypes' (Cunnane & Huddleston, 2017) that exist as a result. Key to these works is sense of rebellion and provocation, no better exemplified than in Reihana's *Wog Features*.

In 1995, following her time in Christchurch as the Trustbank Canterbury Artist in Residence, Reihana produced the short film, *A Māori Dragon Story.*[5] Reihana used handmade puppets and props to tell the Waitaha legend of a female taniwha (sea dragon) at Ohikaparuparu (Sumner, South Island), as told to Pākehā historians by Teone Taare Tikao (Ngāi Tahu) in the early twentieth century. Like *Wog Features,* Reihana's use of animation techniques and puppetry references the conventions of children's entertainment, appearing light-hearted and whimsical on initial viewing. And yet, the film's unsettling lack of dialogue, eerie soundtrack and filmic techniques elevate this film to something much more powerful and cinematic than any children's animation of the time. This dramatic tale of utu (revenge) and death was interpreted by Reihana, according Tamati-Quennell (1999, p. 159), "with all the drama and blackness of a Shakespearian tragedy".

Figures 6-10: *A Maori Dragon Story (still). 1995. 16mm animation transferred to DVD, 15 minute duration. Govett-Brewster Art Gallery. Images courtesy of the artist and Govett-Brewster Art Gallery.*

In 2016, *A Māori Dragon Story* was included in the exhibition *All Lines Converge* at the Govett-Brewster Art Gallery in New Plymouth. It was exhibited alongside existing collection works and new commissions, brought together to encourage questions and conversations about the nature of the Gallery's history of collecting. The exhibition also drew attention to the enduring significance of many of the Gallery's older collection works, not least Reihana's *A Māori Dragon Story*. Reihana's respect for Māori history, and commitment to good story telling, made for compelling viewing within this contemporary context.

Just a year and a half prior to *A Māori Dragon Story's* inclusion in All Lines Converge, that first exhibition of *iPOVi* opened at the Auckland Art Gallery to captivated audiences, following more than six years of development, and 28 years since Reihana graduated from Elam. According to Devenport (2015, p. 9), "*in Pursuit of Venus* has forged new visual languages both technically in the complexity of its digital capture and construction, and poetically in the interplay of narrative that unfolds within its fictive, scripted habitat". Every frame of the 32 minute long, 25 metre wide panorama, held over eight million pixels of information, all the while drawing viewers into the dramas being depicted—moving them beyond the role of spectator.

The differences between *iPOVi* and Reihana's early films in terms of animation techniques and film technologies are significant. *Wog Features* particularly, is a product of the socio-political and cultural climate of the late 1980s, and the technologies available for emerging artists like Reihana. However, film technologies aside, the issues interrogated by Reihana in *Wog Features* still provide rich and relevant content for artistic exploration, as is made evident by its inclusion in *Still, like air, I'll rise*. Reihana's continuing commitment to this content has seen her consistently reclaim and decolonise the images and language of colonisation and prejudice. As is evident in the success of *iPOVi*, the reactivation of Māori and Pacific histories and legends continues to be an essential action, and Reihana's evolving use of film and new media has enabled her to discover new ways of performing this action. Mason wrote of Reihana's work, "The artist's genius is her ability systematically to represent a continuum of Māori practice, thus bringing ancestors to life by imagining new ways to extend history and heritage" (2004, p. 56). Looking forward and back from Mason's description of Reihana's work, it applies as much to her significant contribution to the 57th Venice Biennale, as it does to her experimental beginnings.

Endnotes

1. A catalogue accompanies Reihana's exhibition at the Biennale: Reihana, L. (2017). *Emissaries*. Auckland: Auckland Art Gallery Toi o Tāmaki.

2. Such as: *Choice!* (1990), Artspace, Auckland; *Pu Manawa: A celebration of whatu, raranga and tāniko* (1993), Museum of New Zealand Te Papa Tongarewa, Wellington; and *Techno Māori: Māori art in the digital age* (2001), City Gallery Wellington.

3. Art historian and curator Jonathan Mané-Wheoki coined this term to describe this generation

of young Māori artists as those who experienced national and international success following their active and willing engagement with "more advanced forms such as kinetic art, computer art, video art and conceptual art to which these new technologies have given rise" (Mané-Wheoki, 1999, unpaginated). Implicit in Mané-Wheoki's label for this group was a sense of provocation, and the recognition that Māori art was undergoing some radical, but necessary, changes in the lead up to the new millennium.

4. In 2001, Reihana exhibited alongside several artists of this generation in *Techno Maori* at City Gallery Wellington. Her place in this exhibition, curated by Deidre Brown and Jonathan Mané-Wheoki, cemented her status as a technological innovator. The exhibition aimed to create a "snapshot of Māori life in a digital age" (Brown, 2001), but equally revealed the enthusiasm with which many Māori artists had adopted digital technologies as a medium.

5. The film was exhibited in 1997 as part of the New Zealand Film Archive (now Ngā Taonga Sound and Vision) exhibition, *Animates: hands on Kiwi Animation*.

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Tusk: Emergent Culture

Matariki Williams

Launched in 2015 by Matariki Williams and Nina Finigan, *Tusk – Emergent Culture*[1] is an online platform for people entering GLAM institutions to contribute constructively, in their own voice, to the sector. As a foundational manifesto the website asserts that:

> *Tusk is our place to engage in a productive, critical manner.*
> *Tusk is our place to test, provoke and prompt for positive change.*
> *Tusk is where we share our voice. It is relevant, current, smart, worthy and humorous.*
> *Tusk is for us. It is our community.*
> *It is a principal intent for Tusk to contribute to strengthening the cultural sector from the ground up.*

Operating in an online space has afforded us the freedom that an analogue platform would not have as it has the ability to be immediately responsive, and we can adjust it whenever we need to. Having this adjustable format means that the website, and our social media channels to a lesser extent (Twitter[2] and Facebook[3]), can be a testing ground for ideas. The online format enables Tusk to develop quick victories as well as identify quick failures.

The manifesto point about allowing our contributors to speak with their own voice is an important aspect of Tusk. The need for these voices to have autonomy inspired the genesis of the site in the first place. However, it is equally important that the articles published reflect the manifesto above. They need to be 'prompts for positive change' and it is within our editorial mandate to not publish writing which does not answer to that point.

An important part of raising the visibility of Tusk has been through presentations given at conferences and hui including the Museums Australasia conference 2016, Kāhui Kaitiaki[4] May 2016, and the National Digital Forum[5] 2016. The latter presentation saw us win two awards at the concluding ceremony: the 'Big Takeaway Award for the talk which inspired people to try something new or different in their practical work', and the 'Great Collaborator Award for creating a collaborative space which values diversity and promotes voices from across the sector'. Given our commitment to supporting people who are entering the sector, the author has also given presentations on the website to the Victoria University of Wellington Museum and Heritage Studies programme since 2016.

The landscape in which the site exists however, is not without tension as it exists within a sector where the funding from central government has stagnated (Ministry for Culture & Heritage, 2017), and there is a feeling among employees that they are overworked. This is a reality of the sector, which, the site sits within. Tusk itself is self-funded and subsequently does not have the ability to pay contributors. To further reality check the situation, the GLAM sector is infamous for its low pay, never-ending contract cycles, and a culture of expectation that getting a foot in the door requires unpaid work.

Coupling this with the underrepresentation of Māori in museums (Service IQ, 2015) has meant that ensuring the presence of Māori in our online platform further increases the workload of a sector already stretched. In a 2017 article in Tusk, Naiomi Murgatroyd[6] discusses the remuneration challenges for GLAM institutions based on a 2012 report from the Ministry for Culture and Heritage that states the average salaries in the arts sector are approximately $13,000 lower than the general average salaries in New Zealand.

These statistics show the sector itself is built on the unpaid work of an already overextended workforce. Making matters worse amongst the reported salary inequity mentioned above is that, in general average salary statistics, Māori women earn 13% less than Pākehā women, and 23% less than a man of any ethnicity. As a wāhine Māori working in a museum, this is not the most inspiring landscape to work amongst, yet it is through the *Tusk* platform that contributors are able to influence the narrative of the sector and redress some of the prominent power and pay inequities. Of our most regular contributors, the majority identify as women with a minority of those identifying as Māori. Given that I am one of the co-founder/co-editors and have the access to our social media accounts, mine is the most prominent Māori voice on the site and I have written extensively about my experience as a wahine Māori in the sector.[7]

Further ways in which Tusk effectively presents Māori voices, bringing a great richness of kōrero, are our Tuakana[8], On the Level[9] and Ringatoi[10] profiles. Each of the profiles feature standardised questions and for Tuakana these are posed to people in the sector who have influenced and supported our contributors and ourselves. As the Tuakana section tagline states, "A Tuakana is someone for us to learn from in a reciprocal way. Tuakana inspire us and make the sector a welcoming and supportive place." There is an evident correlation between the gender split in our regular contributors and our Tuakana profiles in that the majority of both are women, and the Tuakana profiles do have a higher rate of ethnic diversity. From these profiles it is clear that identifying as Māori in a museum environment has a significant influence on the way in which each of the respondents undertakes their work and how they interact with their colleagues.

To illustrate this point, it is best to use the words of our respondents, as per the following excerpts from Tuakana profiles.

Janeen Love, Exhibitions Content Developer at Auckland War Memorial Museum on the day-to-day challenges faced as a wahine Māori in a museum workplace, "Balancing being a Māori working in a museum and working to my job description (and sometimes the only Māori in the village/meeting room)." She also describes the inherent value of a tuakana/teina relationship, "Mā te tuakana e tōtika te teina, mā te teina e tōtika te tuakana. Help keep the sector real. Trade your knowledge *your perspective is valuable* with tuakana. Understand your own mana and bring that to the hui."[11]

Leanne Tamaki, Researcher (Māori Content) at Manatū Taonga | Ministry for Culture and Heritage on her hope for the sector to boldly acknowledge te ao Māori in a tangible way, "Prioritising the importance of Māori culture and heritage so that it is a

given. Moving recognition beyond box ticking, compartmentalisation or a 'nice-to-have'. Helping us along the pathway to where we compassionately and easily embrace, celebrate and integrate things Māori. Also recognising that the benefits in doing this are many. It's not privileging one over another; it is but another window through which to see. It is an opportunity for growth and it should be taken."[12]

Tryphena Cracknell, Development Co-ordinator at Hastings City Art Gallery on what she thinks new people bring to the sector, in reference to the Emerging Museums Professionals group and Tusk, "Something that stands out for me in both of these examples is that they are founded on a natural expectation that Te Tiriti be honoured in theory and in practice. Feels like the future is in good hands."[13]

Chanel Clarke, Curator Māori at Auckland War Memorial Museum on the challenges museums face in gaining relevance in Māori communities,

> Becoming irrelevant if we haven't already. My roots are in a very small settlement that in times past prospered and was considered the food bowl of the north. Unfortunately this community is now one of the most depressed in the country topping the charts across all socio-economic and health indicators for Māori.
>
> While, as a museum, we could pat ourselves on the back for performing outreach work at the tribal festival and reconnecting whānau with their museum held taonga. I do wonder what the point of it all is when the biggest question on the minds of our rangatahi is not 'wow this taonga belonged to Chief so and so but where is the after party at?' We might think we have contributed to the overall health and cultural well-being of a community but let us not kid ourselves here. Our communities are suffering from systemic issues that will take more than a few taonga transported out for a day or a weekend to fix.
>
> It concerns me too that as Māori we have lost, to an extent, the intergenerational transfer of knowledge and learning. As museums, do we have a role to play in this? Is it even our job to fix the ills of society? One thing I know for sure is that it will take out of the box thinking and a genuine commitment to the long-term aspirations of iwi rather than one hit wonders. But I'll leave that thinking to you young guns![14]

A recurring theme in the responses from wāhine Māori in the sector is the tension they each feel about working in museum spaces. The way in which they talk about the presence of their culture in their work, regardless of whether it is part of their role, is an important reminder. For Māori, working in a sector built on culture and heritage, we are often asked to provide expertise that has come from being Māori as separate to the parameters laid out in our job descriptions. This discomfit has seen dialogue in these Tuakana profiles requesting to have cultural competency built throughout the sector. However, they also acknowledge that they do not need to fix all the problems now, as, there is a generation of workers coming up behind them who can continue to build on what they have achieved.

One of the questions asked of each Tuakana is what they see emerging people contributing to the sector and most answers are a variation of the same answer: they bring energy, innovation, new ideas and a fresh perspective. These answers led to the establishment of the On the Level (OTL) profiles to provide a space for peers to present this fresh perspective in their own words. Again, the majority of the respondents are women with a minority of these identifying as Māori. In a similar vein to the Tuakana, the *OTL* respondents are influenced by their culture as much as they are by their ages. Interestingly, unlike the *Tuakana*, their culture was presented as a point of strength that spurs them forward wanting only for there to be more Māori in the sector and greater recognition of what it means to work truly biculturally.

Again, it is in their own words that these opinions are most powerful.

Bridget Reweti, Exhibitions Officer at Pātaka Art + Museum, independent artist[15] and one quarter of Mata Aho collective[16] on what first got her hooked on being part of the sector, "Art! But I also remember the first time I went into Te Āhuru Mōwai, Te Whare Pora and what was the Pounamu store at Te Papa. It was a pivotal experience that cemented my decision in wanting to work with our taonga Māori, people and narratives. I love going into those collection stores. Te Whare Pora especially is one of my favourite places because it holds such a wealth of knowledge about Māori women's skills, adoption of new technologies and extremely high standard of quality in making."[17]

Chloe Cull, previously of the Govett-Brewster Art Gallery on positive change she would like to see in the sector, "I would like to see more Māori students studying art history in Aotearoa and moving on to work in art galleries."[18]

A more recent addition to the website is our Occasional column, which features our first respondent in the Ringatoi artists' profiles.

Sarah Hudson is an artist who works both independently[19] and as one quarter of the Mata Aho collective[20]. Responding when questioned about the difficulties she has faced as an artist, here she describes the most pressing issue for her,

> Burnout. High demand, high pressure, short time-frames, burnout. (Some) Institutions talk about 'artist burnout', but I have only had one gallery where they were actually like, 'oh nah yeah, come back to us when you're not so busy and look after yourself bebe'. Well, they may not have put it like that but, it felt really good to not have felt wrung out after an exchange.[21]

Hudson's response shows that issues which affect people in museums, are similarly felt by people working in the art world. These issues were some of the main driving factors behind establishing *Tusk*. Working in roles where you feel like you do not have the ability to affect positive change can be demoralising. Eking out space, by establishing our own platform, has empowered us as well as our contributors in a way we had not expected. More importantly, by presenting te reo Māori and Māori viewpoints, it is our hope that it will increase the

exposure to, and representation of, Māori perspectives as we feel it is imperative that the understanding of these perspectives is deepened and the burden which many Māori staff feel that they carry, is shared.

Endnotes

1. https://www.tuskculture.com
2. https://twitter.com/TuskCulture
3. https://www.facebook.com/TuskCulture
4. A network of Māori staff working in Aotearoa's museums and galleries
5. http://www.ndf.org.nz
6. https://www.tuskculture.com/writing/paysisterssameasmisters
7. https://www.tuskculture.com/contributors
8. https://www.tuskculture.com/tuakana
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17. https://www.tuskculture.com/on-the-level/bridgetreweti
18. https://www.tuskculture.com/on-the-level/2016/8/3/on-the-level-chloe-cull-1
19. https://www.sarahhudson.co.nz
20. https://www.mataahocollective.com
21. https://www.tuskculture.com/occassional/ringatoisarahhudson

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