

Theme 3.

Going digital in the GLAM¹ sector: ICT innovations & collaborations for taonga Māori

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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 1914–1918² 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.);
- GRASAC⁷ 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 Kiwa¹⁴ 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 Mukurtu¹⁵, 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 Archive¹⁶ 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. Europeana¹⁷ is one such platform, capturing Europe’s art heritage and making it accessible via theme-based galleries, blogs and exhibitions. Another, Google Arts & Culture¹⁸ allows collections from partner institutions to be explored and shared via an expansive Google toolkit. While Trove¹⁹ 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 NZMuseums²⁰, 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 NZ²¹, 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 (IMPKT²²) 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 AVIE²³, 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). mARChive²⁴, 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 ALiVE²⁶ (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 Mahuki²⁸ 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 reconciliation²⁹. 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 videos³⁰. 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 whareniui Mataatua³¹. 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 *WWI 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 Tapuwāe 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.dmn.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.nz museums.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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