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## Health Website Evaluation - An Aboriginal and Torres Strait Islander Perspective: Assessing Quality and Cultrability of Health Websites in a Covid-19 Pandemic: A Literature Review.

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## Health Website Evaluation - An Aboriginal and Torres Strait Islander Perspective: Assessing Quality and Cultrability of Health Websites in a Covid-19 Pandemic: A Literature Review.

### Acknowledgements

We would like to acknowledge the traditional owners of all the many Aboriginal and Torres Strait Islander Nations that make up the great continent of Australia. We would like to pay our respects to the Aboriginal and Torres Strait Islander Elders past and present, also the young community members, as the next generation of representatives. Disclaimer: In some instances in this paper the term 'Aboriginal' will be used, this will occur when the author is specifically referring to Aboriginal Australians. Indigenous will be used to describe Indigenous groups globally.

## Introduction

Health websites have been used to improve the health and wellbeing of people since the internet was widely available to all the world's populations (Boyer, Selby, Scherrer, & Appel, 1998). The development of websites by health practitioners, hospitals, and governments has continued to grow exponentially over the past 20 years (Kordzadeh & Warren, 2013; Samadbeik, Ahmadi, Mohammadi, & Saravi, 2014; Vega, DeHart, & Montague, 2011). Due to the restriction of movement and gatherings for populations globally, the Covid-19 pandemic has caused a reliance on health information being disseminated via health websites. However, there has been little investigation into the appropriateness of health websites for Aboriginal and Torres Strait Islander Peoples. Developing culturally appropriate online resources is also essential to enable Aboriginal and Torres Strait Islander communities' access to information in an appropriate way, and to ensure that health messages are reaching the target audience.

State and Federal governments have developed online resources using purpose designed websites to provide information to Aboriginal and Torres Strait Islander communities. The Queensland government, via the Children's Health Queensland Hospital and Health Service have developed the "Healthy Hearing program" which provides newborn hearing screening in all birthing hospitals across the state. Families that continue this health pathway are offered family support services through a health website (<https://www.childrens.health.qld.gov.au/chq/our-services/community-health-services/healthy-hearing-program/resources/>). The Queensland Hearing Loss Family Support Service (QHLFSS) is a state-wide service, established in 2007. The QHLFSS was the result of an evidence-based research program and consultation and engagement process with Aboriginal and Torres Strait Islander families and health professionals working in this area. QHLFSS supports a family-centred approach to support parents of children with diagnosed permanent hearing loss. QHLFSS assists Aboriginal and Torres Strait Islander families to understand the diagnosis of hearing loss and the impacts of hearing loss on a child's communication. The services operate collaboratively across various disciplines and agencies in the hearing loss sector. Families are recognised as the centre of the child's development and supporting informed choices. The QHLFSS built on the strength and capabilities of families, by including their resources on the website (<https://www.healthdirect.gov.au/australian-health-services/20140140/the->

[queensland-hearing-loss-family-support-service-townsville/services/townsville-4810-angus-smith](#)).

In 2015, QHLFSS conducted a clinical audit of their files ranging from 2011 to 2014. The results of this audit noted significantly high rates of disengagement with Aboriginal and Torres Strait Islander families at a service level and at various points of the healthy hearing pathway e.g., medical, education and early intervention for childhood hearing loss (i.e., deaf, and hard of hearing). Health providers need to understand that many Aboriginal and Torres Strait Islander families may be required to travel regularly for cultural reasons, and the culturability of websites can help assist information dissemination when families are unable to attend in person. Aboriginal and Torres Strait Islander families may have difficulty with ineffective communication of health providers e.g., understanding health information and navigating health systems. Improving health literacy via culturally appropriate website will likely improve relations and compliance (Harris, 2014). This report led to discussions with health leaders, Aboriginal and Torres Strait Islander health professionals in government, non-government services and the Communication and Media team of the Children’s Health Queensland Hospital Health Service. The discussions resulted in the development of a culturally appropriate website to support families and health professionals working with families in their local community. The resources are accessible, easy to understand, include visual aids and are user friendly, for both families and health workers. There was a consensus decision to move into a different model of health messaging and/or resource development that would be accessible, user friendly and provide health information in an innovative and interactive way (Harris, 2014). This project, initially known as the Indigenous Pathways Project, was developed and funded through the Children’s Hospital Foundation in 2017. The Mipla Binna, meaning ‘Our Ear’ was developed to better service Aboriginal and Torres Strait Islander People in a culturally appropriate way (<https://www.childrens.health.qld.gov.au/chq/our-services/community-health-services/healthy-hearing-program/mipla-binna/>). Mipla Binna is a digital platform for Aboriginal and Torres Strait Islander family’s learning and planning their child’s hearing loss journey. It was designed for families embarking on the hearing loss journey, and worked to build their capacity to understand the relevant points for engagement with services:

- Early detection
- Accessing timely engagement with medical and early intervention services
- Continual engagement with health and education services

The Council of Australian Governments recent review of the “Closing the Gap” initiative in Australia identified less than 50% of the key priority areas have been successful (FaHCSIA, 2009). The challenge of health inequality continues for Aboriginal and Torres Strait Islander communities, and a concerted effort is required across all levels of government and service providers to institute change. There is a need to co-design and co-construct health websites with Aboriginal and Torres Strait Islander communities, to ensure they are culturally appropriate and therefore used by the community they are intended. The Closing the Gap health agenda aims to reform the health agenda to improve health equity for Aboriginal and Torres Strait Islander Peoples (*Closing the Gap, the Prime Minister's Report*, 2018). Improving access to health services and information is vital in empowering individuals and families to make an informed health decision; this includes health resources on websites, and there needs to be investment and evaluation of appropriate health websites, specifically for Aboriginal and Torres Strait Islander Peoples.

The Mipla Binna early intervention services provide education, therapy, and support services to help Aboriginal and Torres Strait Islander children with permanent hearing loss to develop appropriate communications skills prior to school commencing. Depending on the severity of the hearing loss, language development represents a variety of communication methods. The methods most commonly used are speech, writing, gestures, facial expression and Australian Sign Language (Auslan) (<https://www.startasl.com/auslan/>). There is an expectation according to international guidelines that to achieve optimal speech and language outcomes, a child should be diagnosed as early as 12 weeks old. Following early diagnosis, it is recommended to engage with an early intervention service at six months old. Based on these guidelines, by ensuring early and timely access to services, this will expedite the literacy and linguistic development for the child. This will allow a deaf child an equitable opportunity to develop age-appropriate language at the same level as a hearing child. Untimely delays in engagement with services will result in speech and language delays, impacting the child's life through to adulthood (Hearing, 2007). Moeller (2013) endorsed the value of newborn hearing screening programs, establishing a hearing pathway to promote early detection, diagnosis, and timely access to services. In addition, using a family-centred approach is the best practice for families with deaf and hard of hearing children (Moeller, Carr, Seaver, Stredler-Brown, & Holzinger, 2013). Further development of these principles covers several concepts to underpin the family-centred approach model. These cover families, parenting roles, decision-making, self-efficacy, collaborative

approaches and cultural competence (Moeller et al., 2013). The covid-19 virus has made it very difficult for families and children with hearing loss to receive services and there is now a much greater need to have culturally appropriate health websites for Aboriginal and Torres Strait Islander communities.

The Mipla Binna website is a culturally designed, co-constructed health resource targeting Aboriginal and Torres Strait Islander families with children diagnosed with permanent hearing problems i.e., deaf, or hard of hearing. This resource is unique to Queensland Health as the first culturally designed, co-constructed online health resource. The website was released in 2017 and evaluating the impact of this resource is critical to providing evidence of understanding online health information, and perhaps offer an exemplar. It also evaluates how users respond to culturally specific designer elements incorporated into the website design (<https://www.childrens.health.qld.gov.au/chq/our-services/community-health-services/healthy-hearing-program/mipla-binna/>).

Despite there being world-wide consensus that early intervention services for children with a disability should be family-centred, seeking family involvement in intervention is often minimal (Dunst, Trivette, & Hamby, 2007; Kuhlthau et al., 2011). The key principles of family-centred care consider the entire family as a unit, promote family choice and inform the decision-making process (Epley, Summers, & Turnbull, 2014). These principles are also paramount for Aboriginal and Torres Strait Islander communities. Therefore, building health knowledge via culturally appropriate health websites in a Covid-19 era is key in supporting family involvement in interventions that would be a necessary precursor for implementation of family-centred practice. Through the culturability of a co-designed health website, organisations can promote a more family-centred practice without overburdening health professionals (Auert, Trembath, Arciuli, & Thomas, 2012). This will also enhance cultural capacity through digital resources (George, Nesbitt, Donovan, & Maynard, 2012). The term culturability was termed by Geerte Hofstede to describe the impact of culture when using an interface design (Hofstede & Bond, 1984; Hofstede, 2001). The outcomes of this research will determine what factors of technical design and cultural factors enhance health literacy, and health system pathways. As such, the objective of this research project is to evaluate the feasibility of a secure cultural health website through which Aboriginal and Torres Strait Islander communities can receive information about health and management options. Developing a defined digital resource to deliver health information remotely links health information to clients, caregivers, and community, for the

purposes of sharing information, understanding health pathways, and medical specialist interventions. There is evidence that asynchronous technology can promote improved client-clinical interactions, better self-management, planning, and increased family involvement (Finney Rutten et al., 2014; Nazneen et al., 2015). This family engagement and consultation is desperately need with the isolation, restrictions on movements, and face-to-face healthcare, due to the impacts of Covid-19.

## **Aim**

Review literature on digital resources and evaluate health websites based on functionality, navigation, usability. Assess the culturability of website design from an Aboriginal and Torres Strait Islander perspective and develop some evidence-based principles that can be used when designing and developing health websites for Aboriginal and Torres Strait Islander Peoples.

## **Method**

### *Literature Review*

A systematic search of literature which explores essential website evaluation criteria and frameworks for assessing design, functionality, navigation, and usability. In addition, search for website evaluations of global Indigenous culturally appropriate design and content.

### *Search Strategy*

The literature search accessed several databases i.e., Emerald, EBSCOhost, Medline Ovid, CINHAL and Google Scholar.

### *Inclusion*

The search was limited to scholarly peer reviewed journals, designed to improve the quality of papers. Initially only papers available to Deakin University library were included to improve accessibility of papers. Additional searches using Clinical Knowledge Networks Federation accessed through the Townsville Hospital Health Library were included.

### *Exclusion*

Papers not published in English.

Papers that used the terms ‘social media’, and ‘apps’.

## **Key Words**

The initial search keywords were ‘Health’ ‘Website’, ‘Evaluation’, ‘Culturally Appropriate’, ‘Aboriginal and Torres Strait Islander’, ‘Indigenous’ and ‘Native

American'. Following the initial search, additional keywords 'World Wide Web', 'Quality', 'Framework' were used to expand the search.

### **Critical Appraisal Tools**

To evaluate the quality of the publications, a comprehensive critical appraisal of all publications was undertaken. The authors used two evaluation tools, the Critical Appraisal Skills Programme (CASP) and the Joanna Briggs Institute (JBI) tools.

### **Results**

The literature search produced a total of 534 articles; this was reduced to a total of 326 papers, after duplicates were extracted, as this search did not yield significant number of papers in the area of digital technology used by Aboriginal and Torres Strait Islander People. The literature search produced a limited number of articles specifically related to health website evaluations. Many evaluations focus on design, and very few evaluate impact of website information from the customer/end-user perspective as a qualitative approach. There were no papers that specifically targeted Aboriginal and Torres Strait Islander Peoples, and the majority of the papers used qualitative methods and were based on expert opinions (Appendix 1). There were a limited number of articles producing evidence-based for evaluating the cultural appropriateness of website design.

### **Literature Screening**

A screening process was used to select the most appropriate papers for review. Authors SKS and DM independently used the screening process to select papers for final review. Where authors did not agree on any paper for selection, a third reviewer (JC) was consulted to decide final inclusion. A substantial number of articles reviewed were considered not related to the research aims, given the uniqueness of the project. After incorporating the screening process, exclusion and inclusion criteria, the total number of articles selected for review was 14 (Appendix 1).

### **Thematic Analysis**

The thematic analysis identified that Indigenous global presence on the Internet has been extensive, and the most successful examples were developed in collaboration with Indigenous peoples. A comprehensive evaluation of website content is paramount in validating the appropriateness of communication and engagement with Aboriginal and Torres Strait Islander People. A customer/end user model of evaluation is the recommended type of evaluation for websites



intending to target Aboriginal and Torres Strait Islander People. There are significant challenges for Aboriginal and Torres Strait Islander People navigating digital technology and websites, especially those living in rural and remote areas. These difficulties are not being addressed by services or government departments to alleviate these barriers for Aboriginal and Torres Strait Islander People.

## **Discussion**

The future of healthcare systems has been revolutionised, since the inception of the World Wide Web in 1990, and digital technology. Every minute, of every day, the internet continually increases health content, and access to this health information reaches nearly every person on the planet. The dissemination of online healthcare information has demonstrated a powerful reach and proven to be cost effective and immediately available. The Internet ‘World Stats’ displayed in June 2012, show that 2.45 billion people (34.3%) of the world’s population access the internet. In Australia during that time, 12 million people were accessing the internet. The number of internet users increases at a rate of 10% per year, and this increase has been accelerated due to covid-19 virus (<https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/covid-19-whole-of-population-telehealth-for-patients-general-practice-primary-care-and-other-medical-services>). However, there is still little regulation or monitoring of this content, and in many cases this unregulated information has resulted in inappropriate and incorrect information being provided. In Australia, there is a growing interest in the role of e-health and telehealth within the health care system for Aboriginal and Torres Strait Islanders communities, especially during the Covid-19 pandemic (Smith et al., 2020; Wind, Rijkeboer, Andersson, & Riper, 2020; Zhou et al., 2020).

Among this pervasive internet activity, a significant proportion is related to health issues (Tieman & Bradley, 2013). Deloitte’s Global Health Report Australia summary states the evolution of digital technology in healthcare systems will be the fourth revolution changing the face of health management and services, especially in the face of Covid-19. Technological advancement provides many opportunities to significantly alter healthcare service delivery and address a number of health challenges. From a population health perspective, current systems are struggling to meet the demand of patient’s healthcare needs and increased service demand, especially in rural and remote areas. Digital platforms improve the ability to manage client data and

personalise healthcare plans. Corporations and large institutions around the Australia are working in the digital space, enhancing data systems and medical advancements. Hospitals and health departments are developing digital technology in medical practice e.g., electronic patient records, medical imaging and improving efficiency and effective resources. These advancements are leading to improved access to health service delivery virtually and better treatments with minimum impact to people's busy lives (<https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-hc-outlook-2019.pdf>).

### **Key Theme 1) Indigenous Peoples presence on the Internet**

Dyson (2011) reviews the strength of Indigenous presence on the internet and further examination of challenges to Indigenous participation on the internet. Indigenous peoples across the globe have established a presence on the internet since the mid-1990s. Over 70 countries, 350 million Indigenous peoples, representing 4% of the world population with over 5000 languages and cultural groups have engaged (Dyson, 2011). Dyson & Underwood (2006) found that the most effective websites in reaching Indigenous peoples were developed in collaboration with Indigenous peoples, staff, organisations and communities (Dyson & Underwood, 2006). This has resulted in the development of many Indigenous websites, which has attracted Indigenous communities, organisations and individuals to engage on the internet. The diversity and areas of interest extend from health, cultural development, media, e-commerce, and others. More recently, websites in many countries have been establishing digital libraries to capture local culture and history of Indigenous Peoples (Borgman, 1997). This storing of important cultural material for future generations has been seen by many Indigenous Peoples as a positive use of the internet, increasing participation.

The Mipla Binna web site was developed in collaboration with Aboriginal and Torres Strait Islander staff, sector partners and peak Aboriginal Community Controlled Health Services, who maintained an integral role in discussions throughout the development and inception. Incorporating cultural elements through all areas of design is a fundamental aspect, particularly when targeting cultural groups (George et al., 2012). Georges et al (2012) also targeted Aboriginal and Torres Strait Islander Peoples using focus groups and semi-structure interviews to determine what key cultural requirements were suitable to fulfil the cultural requirements of the local Aboriginal and Torres Strait Islander community (George et al., 2012).

## **Key Theme 2) Most Appropriate Website Evaluation Models**

Conducting a comprehensive evaluation of websites is a crucial step in assessing the validity of this mode of health communication and building an evidence-base to support future digital projects. Website evaluations have no specific method or criteria's when conducting an evaluation (Rafe & Monfaredzadeh, 2012). This literature review identified several reviews that analysed website evaluation methods and developed criteria. These reviews focused on e-bank and e-commerce reviews, and due to the increased uptake of online banking, understanding that obtaining customer feedback is essential in meeting the demands and needs of their consumers. Bloom's hierarchical model of educational objectives stated that evaluation is a fundamental element of the thinking/cognitive process. Thinking skills are critical in evaluations and Bloom considered this the peak of cognitive process, including those of understanding, appreciation, analysis, and synthesis (Dragulanescu, 2002). Health information occurs in many formats and across all levels of health service delivery i.e., primary, secondary, and tertiary levels. The ability to assess how information is received and or understood can be determined using various methods, however, evaluating websites to understand how information is comprehended is a complex process (Dragulanescu, 2002).

Kincl and Strach (2012) refer to the measurement of website quality from a consumers perspective as asymmetric and non-linear, implementing a consumer-product relationship between the user and the website (Kincl & Štrach, 2012). Many website measuring tools are broadly static, proving to be difficult in determining relevant attributes specific to the user's satisfaction. Measuring effectiveness and efficiency are necessary, but there are many insufficient methods used to attaining user satisfaction (Kincl & Štrach, 2012). Kincl's study of website assessments analysed 43 different websites, with 30 participants to evaluate websites using the customer/end-user model (Kincl & Štrach, 2012). The finding of Kincl's research reveal users consistently judge two key areas to determining website quality: content and navigation. Both areas received high responses from participants, as key factors that influence the end-user satisfaction of a website (Kincl & Štrach, 2012). However, the study did not review any health information sites, hospital websites or any other health related sites. The methodology chosen to evaluate the websites was the customer/end-user model, which is not specific to evaluating certain types of website, however, the model can be aligned to assess any website for end-user satisfaction (Kincl & Štrach, 2012). As a high number of evaluations are targeting how to increase the volumes of internet surfers who access sites and

attract end-users to increase online sales, the customer/end-user model would be well suited to evaluate information websites such as Indigenous specific health websites.

### **Key Theme 3) Customer/End User Criteria for Evaluation**

Dragulanescu (2002) refers to the external provider i.e. customer/end-user relationships model (Dragulanescu, 2002). The article is similar to Kincl's customer/end-user model (Kincl & Štrach, 2012), although the definition of the term 'quality' is seen as a broad term with many potential definitions. The term 'information' is also broad and reflects many different perspectives e.g., text, sound, and images. In addition, 'information' can be sold and purchased as a product, and 'quality' may be represented as a new strategic philosophy of continuous improvement. When 'information' is defined as a commodity and considered being an 'immaterial product', the 'immaterial product' is the 'information product' therefore, the 'material product' is considered to be the product carrier e.g., video, book, or journal, in this instance the website is the 'material product'. The design of the 'material product' is based on the needs of the end-users. The concept that digital material or information developed by Aboriginal and Torres Strait Islander communities maybe considered a 'commodity' or 'immaterial product' for others to commercialise maybe considered inappropriate. Indigenous knowledges in all its forms must be protected and respected through intellectual property and reciprocity. The Mipla Binna website is based on the medical and educational pathway of children diagnosed with hearing loss. The information modules are specific to points of engagement with a service provider on the healthy hearing pathway, from detection, treatment, and rehabilitation services. This design correlates to the fundamentals of basic information needs and knowledge needs, and the need to act to improve their conditions.

To obtain and improve quality of the 'material product' and 'immaterial product', or components of an 'information product', the review highlighted seven areas necessary to be evaluated in assessing the integrity and quality of information provided on the website (Dragulanescu, 2002; Kincl & Štrach, 2012). The two most important aspects of evaluation to consider are 'content' and 'navigation' (Dragulanescu, 2002; Kincl & Štrach, 2012).

### *Content*

- Accuracy - use of consistent language and clear methods where information was collected
- Reliable source and authentic information
- Authority - developer information
- Appropriate links
- Relevant information for your knowledge needs
- Current - available resources, currency of information, application of cultural content
- Density - ability to understand text and graphic, useful to the user

### *Navigation*

- Interactivity - links are operational, timely upload of videos, ability to communicate with author i.e., feedback icon
- Objectivity - goal of the website, the alignment with user's outcome and navigation
- Promptness - URL easy to find and use, change between pages sufficient, direct link to contact website author
- Chat line

### **Key Theme 4) Digital Challenges for Indigenous Peoples**

Aboriginal and Torres Strait Islander communities are faced with challenges using technology and accessing reliable hardware and sustainable infrastructure i.e., the National Broadband Network, internet towers. For many Aboriginal and Torres Strait Islander Peoples living in rural and remote areas, these challenges of cultrability are not being addressed with prompt attention from services or government departments to alleviate these barriers (Dyson, 2011). These challenges and barriers can be eased through building solid working relationships with services and government organisations that have resources, hardware and capabilities of providing access to Aboriginal and Torres Strait Islander communities (AIHW, 2011). The development of websites and portals improves accessibility using a variety of platforms through multiple modes e.g., computer, smart phone, and therefore increasing the cultrability and window of opportunities for Aboriginal and Torres Strait Islander communities to engage.

Minority groups in other countries have sourced funding from government and non-government departments to provide computer centres, which provided an effective method of improving access (Dyson, 2011). In Australia, in many remote Aboriginal and Torres Strait Islander communities, State Libraries are empowering communities through the implementation of

‘Cultural Knowledge Centres’, however, with Covid-19 many libraries are closed, limiting access. These Cultural Knowledge Centres are fitted with computers and internet capabilities to record and maintain Indigenous knowledges within communities. Through this process of culturability, Aboriginal and Torres Strait Islander communities are enabled to build their computer skills and techniques and increase access to the internet, while persevering culture and knowledge (Nakata, Byrne, Nakata, & Gardiner, 2005). There are many challenges for Indigenous Peoples in the digital space, ensuring Indigenous knowledge remains ‘intact’ and authentic. This has also contributed to barriers for a lack in growth of Indigenous presence on the internet, which is paramount for the success of websites. Although many Aboriginal and Torres Strait Islander People have active engagement with the internet, there are growing concerns of continual misrepresentation and misappropriation of Aboriginal and Torres Strait Islander knowledge and culture. As an example, the sale of Aboriginal and Torres Strait Islander art and misrepresentation of Aboriginal and Torres Strait Islander culture on the internet (Dyson & Underwood, 2006). Very important issues of management and ownership of Aboriginal and Torres Strait Islander websites have been raised (Dyson & Underwood, 2006). Equally important to collaborative methods of developing and design culturally specific websites is continuing involvement in the management and maintenance of websites (Dyson & Underwood, 2006). Indigenous knowledge and content should maintain its cultural context e.g., in the case of online sales of Aboriginal and Torres Strait Islander art, displays of artwork with no connection to culture is a misrepresentation of cultural authenticity. Therefore, website designers must ensure information and content is maintained and reviewed on a regular basis, ensuring the culturability of websites. Website evaluations have no universal methods, but the criteria should define the attributes and their relationship to the goal (Rondović, Cerović, Đuričković, & Melović, 2017). There are many reviews on website evaluations models, particularly in education, e-gov and e-commerce. Evaluating health websites may be considered in the early stages of establishing solid evidence, but as the use of digital technology has increased in the past decade and accelerated with Covid-19, evaluation models assessing e-commerce websites, are primarily focused on the content, design, and navigation (Dragulanescu, 2002). The literature examined in this paper has highlighted some evaluation techniques that may be implemented to evaluate and improve health websites for use by Aboriginal and Torres Strait Islander Peoples.

### **Limitations of Review**

The literature search produced a limited number of articles specifically related to health website evaluations and very few evaluate impact of website information from the customer/end-user perspective. There were no papers that specifically targeted Aboriginal and Torres Strait Islander Peoples.

### **Disclosure Statement**

No funding was sought or provided for this research, and the authors have no conflict of interest to declare.

### **Conclusion**

Aboriginal and Torres Strait Islander Peoples are actively involved in digital technology and websites, however, their experience on the internet has been challenging and disempowering. The evidence provided alluded to negative experiences and constant challenges to have a growing presence in the digital space. The studies could not provide any evidence of Aboriginal and Torres Strait Islander People's experience of web design or development, which demonstrated positive outcomes or future developments in this area. Digital technology and Aboriginal and Torres Strait Islander Peoples are a new concept and in its infancy, which will require a concerted effort from government and Aboriginal and Torres Strait Islander organisations to invest, explore, and research a digital strategy. The research study is unique in evaluating culturability of a digital resource inclusive of a qualitative perspective. In Australia, the Closing the Gap agenda aims to improve health equality for all Aboriginal and Torres Strait Islander Peoples, and health information needs to be a key area for improvement of holistic health. Improving access to health services is ongoing and constant, the future of health services will be widely affected with the movement towards digitised resources and systems, especially in the Covid-19 era. Therefore, health websites, telehealth etc. designs must be evaluated appropriately. This movement will facilitate a much-needed personalised health service, meeting the health needs of the Aboriginal and Torres Strait Islander community. Medical technology will influence the way health services are shaped in the future. Government and global health organisations are facing difficult challenges with financial constraints, an aging population, and increasing rates of chronic disease and pandemics. Aboriginal and Torres Strait Islander People need more investment in culturability of websites. Improving health, health literacy and health services will take a collaborative effort across all areas of health and education. Indigenous knowledges in all its forms must be protected and respected through intellectual

property and reciprocity with websites and digital resources. With pandemics like Covid-19, the future of healthcare is moving towards e-health and health websites, therefore, Aboriginal and Torres Strait Islander People need to establish a presence and control in the digital space. This research is building a foundation for research evidence to contribute to investing in Aboriginal and Torres Strait Islander e-health initiatives.

## Recommendations

All health websites intended for Aboriginal and Torres Strait Islander people should be evaluated and continually reviewed. Research and further development in digital technology targeting Aboriginal and Torres Strait Islander health consumers need to continue at state and national levels. State and national organisations must work towards developing a governance strategy to continue developing cultural safe resource and uphold the cultural value, integrity, and authenticity of Aboriginal and Torres Strait Islander knowledge.

## References

- AIHW, A. (2011). Australian Institute of Health & Welfare. *Headline indicators for children's health, development and wellbeing, 2011*.
- Auert, E.-J., Trembath, D., Arciuli, J., & Thomas, D. (2012). Parents' expectations, awareness, and experiences of accessing evidence-based speech-language pathology services for their children with autism. *International Journal of Speech-Language Pathology, 14*(2), 109-118.
- Borgman, C. L. (1997). Multi-media, multi-cultural, and multilingual digital libraries. *D-Lib, 3*(6).
- Boyer, C., Selby, M., Scherrer, J.-R., & Appel, R. (1998). The health on the net code of conduct for medical and health websites. *Computers in biology and medicine, 28*(5), 603-610.
- Closing the Gap, the Prime Minister's Report*. (2018). Retrieved from Canberra: <https://closingthegap.pmc.gov.au/sites/default/files/ctg-report-2018.pdf>
- Dragulanescu, N.-G. (2002). Website quality evaluations: criteria and tools. *The International Information & Library Review, 34*(3), 247-254.
- Dunst, C. J., Trivette, C. M., & Hamby, D. W. (2007). Meta-analysis of family-centered helping practices research. *Mental retardation and developmental disabilities research reviews, 13*(4), 370-378.



- Dyson, L. (2011). Indigenous peoples on the Internet. *The handbook of internet studies*, 11, 251.
- Dyson, L. E., & Underwood, J. (2006). Indigenous people on the web. *Journal of theoretical and applied electronic commerce research*, 1(1), 65-76.
- Epley, P., Summers, J. A., & Turnbull, A. (2014). Characteristics and trends in family-centered conceptualizations. In *Family support and family caregiving across disabilities* (pp. 90-106): Routledge.
- FaHCSIA. (2009). *Closing the Gap on Indigenous Disadvantage: The Challenge for Australia*. Canberra ACT: Australia Government
- Finney Rutten, L. J., Agunwamba, A. A., Greene, S. M., Mazor, K. M., Ebbert, J. O., St Sauver, J. L., & Dearing, J. W. (2014). Enabling patient-centered communication and care through health information technology. *Journal of Communication in Healthcare*, 7(4), 255-261.
- George, R., Nesbitt, K., Donovan, M., & Maynard, J. (2012). *Evaluating indigenous design features using cultural dimensions*. Paper presented at the Proceedings of the Thirteenth Australasian User Interface Conference-Volume 126.
- Harris, S. a. S., KumSing. (2014). *Data analysis of Aboriginal and Torres Strait Islander clients*. Retrieved from Queensland:
- Hearing, J. C. o. I. (2007). Year 2007 position statement: Principles and guidelines for early hearing detection and intervention programs. *Pediatrics*, 120(4), 898-921.
- Hofstede, G., & Bond, M. H. (1984). Hofstede's Culture Dimensions: An Independent Validation Using Rokeach's Value Survey. *Journal of Cross-Cultural Psychology*, 15(4), 417-433.  
doi:10.1177/0022002184015004003
- Hofstede, G. H. (2001). Culture's Consequences, Comparing Values, Behaviors, Institutions, and Organizations Across Nations/by Geerte Hoffstede.
- Kincl, T., & Štrach, P. (2012). Measuring website quality: asymmetric effect of user satisfaction. *Behaviour & Information Technology*, 31(7), 647-657.
- Kordzadeh, N., & Warren, J. (2013). Toward a typology of health 2.0 collaboration platforms and websites. *Health and Technology*, 3(1), 37-50.

- Kuhlthau, K. A., Bloom, S., Van Cleave, J., Knapp, A. A., Romm, D., Klatka, K., . . . Perrin, J. M. (2011). Evidence for family-centered care for children with special health care needs: a systematic review. *Academic pediatrics, 11*(2), 136-143. e138.
- Moeller, M. P., Carr, G., Seaver, L., Stredler-Brown, A., & Holzinger, D. (2013). Best practices in family-centered early intervention for children who are deaf or hard of hearing: An international consensus statement. *The Journal of Deaf Studies and Deaf Education, 18*(4), 429-445.
- Nakata, M., Byrne, A., Nakata, V., & Gardiner, G. (2005). Libraries, Indigenous Australians and a developing Protocols strategy for the library and information sector. *Australian Academic & Research Libraries, 36*(2), 185-199.
- Nazneen, N., Matthews, N., Smith, C. J., Rozga, A., Abowd, G. D., Oberleitner, R., . . . Arriaga, R. I. (2015). Use of a novel imaging technology for remote autism diagnosis: a reflection on experience of stakeholders. *Procedia Manufacturing, 3*, 293-300.
- Rafe, V., & Monfaredzadeh, M. (2012). A qualitative framework to assess hospital/medical websites. *Journal of medical systems, 36*(5), 2927-2939.
- Rondović, B., Cerović, J., Đuričković, T., & Melović, B. (2017). THE IMPORTANCE OF OBSERVING THE DIFFERENCE IN WEBSITE EVALUATIONS OBTAINED FROM DIFFERENT PERSPECTIVES. *International Journal for Quality Research, 11*(2).
- Samadbeik, M., Ahmadi, M., Mohammadi, A., & Saravi, B. M. (2014). Health information on internet: quality, importance, and popularity of Persian health websites. *Iranian Red Crescent Medical Journal, 16*(4).
- Smith, A. C., Thomas, E., Snowsall, C. L., Haydon, H., Mehrotra, A., Clemensen, J., & Caffery, L. J. (2020). Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). *Journal of Telemedicine and Telecare, 1357633X20916567*.
- Tieman, J., & Bradley, S. L. (2013). Systematic review of the types of methods and approaches used to assess the effectiveness of healthcare information websites. *Australian journal of primary health, 19*(4), 319-324.

- Vega, L. C., DeHart, T., & Montague, E. (2011). Trust between patients and health websites: a review of the literature and derived outcomes from empirical studies. *Health and Technology, 1*(2-4), 71-80.
- Wind, T. R., Rijkeboer, M., Andersson, G., & Riper, H. (2020). The COVID-19 pandemic: The 'black swan' for mental health care and a turning point for e-health. *Internet Interventions*.
- Zhou, X., Snoswell, C. L., Harding, L. E., Bambling, M., Edirippulige, S., Bai, X., & Smith, A. C. (2020). The role of telehealth in reducing the mental health burden from COVID-19. *Telemedicine and e-Health*.

## Appendix 1 Summary of Literature

Author(s)	Title	Journal	Method	Sample	Country
A. C. Smith, E. Thomas, C. L. Snoswell, H. Haydon, A. Mehrotra, J. Clemensen and L. J. Caffery, Journal of Telemedicine and Telecare, 2020, 1357633X20916567.	Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19)	Journal of Telemedicine and Telecare 2020, Vol. 26(5) 309–313	Opinion Peace	N/A	Australia
T. R. Wind, M. Rijkeboer, G. Andersson and H. Riper, Internet Interventions, 2020.	The COVID-19 pandemic: The 'black swan' for mental health care and a turning point for e-health	Internet Interventions 20 (2020) 100317	Opinion Peace	N/A	Europe/ Australia/ America
X. Zhou, C. L. Snoswell, L. E. Harding, M. Bambling, S. Edirippulige, X. Bai and A. C. Smith, Telemedicine and e-Health, 2020.	The Role of Telehealth in Reducing the Mental Health Burden from COVID-19	TELEMEDICINE and e-HEALTH 377 VOL. 26 NO. 4 APRIL 2020	Opinion Peace	N/A	China
J. Tieman and S. L. Bradley, Australian journal of primary health, 2013, 19, 319-324.	Systematic review of the types of methods and approaches used to assess the effectiveness of healthcare information websites	Australian Journal of Primary Health 19(4) 319-324	Systematic review	NA	Australia
L. Dyson, The handbook of internet studies, 2011, 11, 251.	Indigenous peoples on the Internet	The handbook of internet studies, 2011 - books.google.com	Opinion peace	N/A	Australia
L. E. Dyson and J. Underwood, Journal of theoretical and applied electronic commerce research, 2006, 1, 65-76.	Indigenous People on the Web	JTAER / Journal of Theoretical and Applied Electronic Commerce Research / VOL1 / ISSUE 1 / APRIL 2006	Opinion Peace	N/A	Australia
C. L. Borgman, D-Lib, 1997, 3.	Multi-Media, Multi-Cultural, and Multi-Lingual Digital Libraries	D-Lib Magazine, June 1997 ISSN 1082-9873	Opinion Peace	N/A	America
R. George, K. Nesbitt, M. Donovan and J. Maynard, 2012.	Evaluating Indigenous Design Features Using Cultural Dimensions	Australasian User Interface Conference (AUIC2012), Melbourne, Australia	Qualitative evaluation	N/A	Australia

V. Rafe and M. Monfaredzadeh, Journal of medical systems, 2012, 36, 2927-2939.	A Qualitative Framework to Assess Hospital / Medical Websites	Springer Science+Business Media, LLC 2011	Qualitative evaluation	N/A	Iran
N.-G. Dragulanescu, The International Information & Library Review, 2002, 34, 247-254.	Website Quality Evaluations: Criteria and Tools	Volume 34, Issue 3, September 2002, Pages 247-254 2002 Elsevier Science Ltd.	Opinion Peace	N/A	Romania
T. Kincl and P. Štrach, Behaviour & Information Technology, 2012, 31, 647-657.	Measuring Website Quality: Asymmetric Effect of User Satisfaction	Behaviour & Information Technology on 23 Feb 2011 Taylor & Francis	Opinion Peace	N=103	Czech Republic
M. Nakata, A. Byrne, V. Nakata and G. Gardiner, Australian Academic & Research Libraries, 2005, 36, 185-199.	Libraries, Indigenous Australians and a Developing Protocols Strategy for the Library and Information Sector	Australian Academic & Research Libraries Routledge Taylor & Francis Group	Qualitative evaluation	N/A	Australia
B. Rondović, J. Cerović, T. Đuričković and B. Melović, International Journal for Quality Research, 2017, 11.	THE IMPORTANCE OF OBSERVING THE DIFFERENCE IN WEBSITE EVALUATIONS OBTAINED FROM DIFFERENT PERSPECTIVES	International Journal for Quality Research 11(2) 419-436 ISSN 1800-6450	Quantitative evaluation	N=735	Montenegro
A. AIHW, Headline indicators for children's health, development and wellbeing, 2011, 2011.	Headline indicators for children's health, development and wellbeing	Australian Institute of Health & Welfare	Government Report	N/A	Australia