Our Culture, Our Value:
The Social and Economic Benefits of Auslan

A research report by Per Capita for Deaf Australia and Deaf Connect

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We acknowledge the traditional owners of country and pay respect to past, present and emerging Elders.

We also acknowledge and respect the members of the Deaf community in Australia, who preserve their rich heritage, culture, and our language; Auslan (Australian Sign Language).
We also acknowledge our custodians of Auslan, promoting awareness, equality, and access through our sign language.
Through Auslan, we inspire future leaders in our Deaf community to continue our legacy and heritage.

View the companion reports and Auslan translations here

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About Deaf Australia

Deaf Australia was founded in 1986 as a peak national advocacy body that represents all Deaf, Deafblind hard of hearing people and others who live in Australia and use Auslan as their language of preference. The focus has and continues to be on developing access to information and accessible communication.

We work with Australian governments and collaborate with key stakeholders to make sure that Australia complies with the United Nations Convention on the Rights of Persons with Disabilities. The CRPD and the Australian Disability Strategy guides our work; we aspire to achieve equity for Deaf people across all areas of life.

About Deaf Connect

Deaf Connect is the largest whole-of-life service provider and social impact organisation for Deaf, Deafblind and hard of hearing Australians. We stand with the Deaf community to build capacity and influence social change while paying respect to history, culture and language.

Our focus is on community and empowerment, supporting Deaf Australians and their families to make choices and actions to thrive in life, while delivering on a national agenda to improve equity for the Deaf community, and to remove systemic cultural and language barriers.

About Per Capita

Per Capita is an independent progressive think tank, dedicated to fighting inequality in Australia. We work to build a new vision for Australia based on fairness, shared prosperity, community and social justice.

Our research is rigorous, evidence-based and long-term in its outlook. We consider the national challenges of the next decade rather than the next election cycle. We ask original questions and offer fresh solutions, drawing on new thinking in social science, economics and public policy.

Our audience is the interested public, not just experts and policy makers. We engage all Australians who want to see rigorous thinking and evidence-based analysis applied to the issues facing our country's future.

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Emma has worked as a researcher at Monash University and the University of Melbourne; in policy and public affairs for SBS and Telstra; and as a senior policy adviser in the Rudd and Gillard Governments. She has a research background and policy expertise in economic inequality, immigration, gender equality, disability inclusion, retirement incomes and social security.

Emma has published reports and articles on a range of policy issues. She is a regular contributor to Guardian Australia, The Age/SMH and the Australian Financial Review and is a frequent guest on various radio programs nationally. She appears regularly as an expert witness before parliamentary inquiries and often speaks at public events and conferences in Australia and internationally.

Emma is the co-author of Per Capita's landmark report Measure for Measure: Gender Equality in Australia, and co-editor, with Professor Janet McCalman, of the collection of essays What happens next? Reconstructing Australia after COVID-19, published by Melbourne University Press in September 2020.

Introduction

The value of language is often taken for granted in both research and policy. Yet language is critical to wellbeing, identity and social inclusion, and vital to economic prosperity. Australia, as a multicultural society, has sought to establish a civic framework that acknowledges the importance of language and cultural identity.

Australia is a signatory to the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), and seeks to support the usage of Auslan, the language of the Deaf, Deafblind and hard of hearing community within Australia. However, while Australia is home to a large Deaf community, and like many other comparable OECD economies has acknowledged the role and benefits of sign language, Auslan is not afforded the same status as are other sign languages within their respective jurisdictions.

Notably, Auslan is a 'community language in Australia', it has no legal recognition, as is increasingly happening for other sign languages employed within both advanced and emerging nations. Indeed, sign languages have official recognition within 72 nations presently. It is also arguable that Auslan has not benefited from the same nurturing environment that has been afforded to legally recognised sign languages in other countries. This has resulted in a dearth of investment and research into Auslan by comparison, at the expense of the Australian Deaf, Deafblind and hard of hearing community. Auslan is a living language like any other and requires investment and support to meet the needs of the Australian Deaf community.

The benefits of Auslan should be self-evident, yet, on current trajectories, its value is under-recognised by policy makers. This, combined with the lack of viable cohort data creates an ongoing risk of future underinvestment in Auslan. Similarly, limited knowledge of the direct and indirect benefits of Auslan and their social return on investment (SROI) hinders the advocacy, engagement and support that is essential to the furtherance of Auslan in Australia.

There is a significant evidence base supporting the assertion that sign language competence is associated with better learning outcomes and employment outcomes (see Humphries et. al 2014, Hall 2017 for worthwhile summaries of the extant findings). Sign language competence is also associated with better cognitive development and better school and tertiary education completion rates among the Deaf community (Ibid, 2014). These benefits will be explained further within this report.

The economic benefits of improved educational outcomes and labour market participation rates are significant: even modest improvements of these among the Deaf and hard of hearing community would result in substantial benefits for the wider Australian economy.

Understanding Deafness through a cultural lens

Members of the Deaf community usually see themselves as forming a linguistic-cultural community, although some may also identify with the disability sector to varying degrees.[1] This is frequently not acknowledged or well understood within Australian society.[2] As noted by the World Federation of the Deaf (2019): "Deaf people consider themselves as a linguistic and cultural group, with highly complex natural languages but the rights of deaf people are however assured through disability policy, legislation and international instruments. Deaf identity is not a monolithic entity, and a person can also have other identities relating to gender, race, disability, socioeconomic status."

Deaf, Deafblind and hard of hearing people may use Auslan as their preferred language in Australia, and it is considered the language of the Deaf community in Australia. It is therefore critical to consider the role of Auslan and its benefits to the Deaf community, and the associated economic benefits more broadly. Deafness is too frequently misunderstood by policy makers, because it is frequently viewed employing a medical-disability model exclusively, with limited regard for the cultural-linguistic lens. This is because there is limited consideration given to the evidence base, and many researchers within policy units possess limited knowledge of the Deaf community.

This report is informed by direct engagement with the Deaf community and the evidence base pertaining to early intervention, Auslan usage, bi-modal bilingualism and the impacts of deafness.

Scope of Research

The present report considers the economic benefits of Auslan accounting for the critical benefits to wellbeing, health literacy, services access and the productivity of the economy. The research seeks to account for the benefits associated with Auslan as a community-enabling and culturally supportive language.

Per Capita's economic evaluation framework and modelling has been developed using publicly available information, as well as data supplied by commissioning entities. The assumptions are based on credible research that has been subject to peer review, with the assumption set then applied to the economic and financial datasets to arrive at our impact estimates.

We employ a scenario forecasting approach, deriving from the literature that explores the impact and benefits of Auslan to consider a scenario where Auslan did not exist, and what the costs and impacts of this significant absence would be. The absence of longitudinal data capturing Auslan capability and language exposure/deprivation data involving an adequate sample cohort, over an adequate time interval, makes primary estimation challenging.

1 This 'identification' may be due to the process of categorisation in civic systems, rather than identification as a member of the disability community

2 For an excellent summary article on Deaf Culture see Carty, B., 1994. The development of deaf identity. In The Deaf Way: Perspectives from the International Conference on Deaf Culture, Washington DC (Vol. 40, p. 43). For a note on the experiences of Deaf Individuals In the health care system see Beaver, S. & Carty, B. (2021). Viewing the healthcare system through a deaf lens. Public Health Research and Practice, 31(5):e3152127

Given this dearth, we rely on shorter episodic research and smaller sample sizes, and therefore there is a degree of uncertainty associated with the estimate set. All studies of this nature evidence a degree of uncertainty and we therefore note that the caution afforded this category of studies be afforded the present report.

While all estimates evidence a degree of uncertainty, we assert that the modelling is based on a sound research base and assumption set and offers a conservative evaluation of the benefits of early language intervention.

Key Terminology

The terms deaf and Deaf will be used according to their cultural definitions amongst the Australian Deaf community, consistent with the extant literature and the guidelines provided by Deaf Australia. People who identify as "culturally Deaf" are more likely to have been born deaf or become deaf early in life, are pre-lingually deaf and use sign language as a primary or preferred mode of communication. Deaf people of the Western world identify as a culture with distinct languages and customs, in the same way that people of any particular ethnic group may identify as belonging to that culture, with specific practices and approaches to communication.

Auslan – Auslan is the name given to Australian Sign Language, which is the natural language signed by members the Australian Deaf, Deafblind and hard of hearing community

Deaf – The use of a capital "D" in "Deaf" is often used to identify a person or a group as sharing the language and culture of the Deaf community. An individual that identifies as Deaf may employ a number of different methods of communication including different modalities, or multiple modalities. However, there is an emerging trend away from this usage of "D" (see, e.g., Kusters et al, 2017), as it can be seen to create unnecessary dichotomies within a community which exhibits considerable diversity. It is most often used when referring to groups or entities such 'the Deaf community', rather than when referring to individuals.

deaf – denotes auditory deafness, clinical deafness rather than referencing Deaf culture and the Deaf community. However, see previous entry for information about changing usage of "d/D".

Bi-modal bilingualism – describes bilingualism which incorporates the use of languages in both oral and signed modalities (herein Auslan and English).

BANZSL – British, Australian and New Zealand Sign Language is a language family, of which British Sign Language, Auslan and New Zealand Sign Language may be considered to be member languages.

HALY – Health Adjusted Life Year: A burden of disability measure based on how many years of life are lost or affected by the condition.

DALY – Disability Adjusted Life Year: A type of HALY method based on accounting for the number of years lost, and number of years impacted by a disability.

QALY – Quality Adjusted Life Year: A type of HALY based on making an estimate of the quality of life, hence the name Quality adjusted life year. The measure includes both a quantity of life and quality of life estimate.

YLL – Years of Lost Life due to disability

YLD – Years of Life impacted by a disability

Cultural dysfluency – People experience cultural disfluency if a culture-based expectation is not met, or where they lack a cogent knowledge of their culture due to separation or a lack of exposure.

Early intervention – the process of identifying risks and engaging in appropriate interventions to minimise the likelihood of adverse consequences for children and young people. Herein, unless otherwise stated the use of the expression pertains to Auslan/Sign language based early intervention

Language deprivation – The deprivation of access and exposure to language. May result in cognitive deficits and 'language deprivation syndrome', a form of language and cultural dysfluency.

Language acquisition – the process of acquiring a first language, sometimes also a second language if it is acquired very early. First language acquisition is acquisition of the native language of the individual. Language acquisition should be distinguished from language learning, which is a more structured process for learning a second or subsequent language.

Research approach

In formulating a viable and appropriate research strategy to undertake the research and associated analysis, we engaged in a series of consultations with a number of different research partners and stakeholders from the Deaf community, the research community and with several peak organisations within the sector.

Presentation of research strategy and methodology to stakeholders

Upon establishing a viable research framework, we initiated a consultation process with representatives of the Deaf community and services sector. During these consultations we outlined the following;

1. The methodological approaches proposed for the research
2. The availability of different data sources (and those that required specific permissions)
3. The approaches available for the dissemination of research

We obtained feedback from the group and sought to reflect this feedback in the research methods to the extent appropriate.

Research Reference and Advisory Group

While engaging in this research we have sought feedback from and consulted with experts from the Deaf community, academia, and health economics. The reference group informed the following aspects of the research.

- Offering insights into new and compelling research
- Offering comment on the DALY and benefits evaluation methods
- Providing support in securing key third party datasets
- Supporting the communication and dissemination of findings

Members of the Research Reference and Advisory Group

We would also like to acknowledge the significant efforts of the reference group.

Dr. Breda Carty – Adjunct Fellow – Macquarie University

Matt Lloyd Cape – Manager – Research and Advocacy – Per Capita

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Jen Blyth – Chief Executive Officer – Deaf Australia

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Expression Australia

Auslan in Australia

In this section, we examine the current use of Auslan within Australia. Firstly, given the well-established linguistic evidence, it is important to summate several critical observations regarding oral and visual-gestural languages such as Auslan. Both modalities of language are capable of affording users' significant cognitive capability development, as well as "nourishing the brain's language mechanism" (Humphries et. al 2014). The importance of early language acquisition cannot be overstated but is often taken for granted by policymakers. Deaf people are uniquely at risk of missing out on early language acquisition and – if the critical early years are missed – of experiencing lifelong language deprivation, because 97% of deaf children are born to hearing parents who may not know Auslan. For this population, investment in first language acquisition is critical to child development. Auslan is the most accessible language for deaf children, will give them access to the resources of the Deaf community and has been shown to support academic attainment, and learning outcomes (Siran & Dettman 2018; and for a summary of international evidence of sign language benefits see inter alia Hall 2017).

Auslan is part of the BANZSL family of sign languages which includes British Sign Language, Auslan and New Zealand Sign Languages. The three languages have the same origins and exhibit significant overlap and shared lexicon, but they are not the same: each is a living language that is continually evolving.[3]

While Auslan is best understood as a language coming from the BANZSL family of sign languages, it continues to change and draw from other sign languages, such as American Sign Language. Its origins lie in 19th century migratory patterns and like any other language it has evolved over time with lexicon expansions adding richness to the language. In the 19th century, British, Irish and Scottish people who were deaf migrated to Australia and brought their sign languages with them. Over time, an Australian sign language developed with its own unique characteristics. Like any other living language, Auslan continues to evolve over time to meet the communication needs of the Deaf community.

In addition to Auslan, there are a number of sign languages employed by Australia's First Nations peoples that differ from both English and Auslan. James (2022) notes that within First Nations' communities "In movement and action, in self-expression and song, in deep-rooted tradition and modern constructions, signs are part of everyday, evolving and articulating every aspect of life in bimodal-bilingualism."

3 BSL, Auslan and NZSL all have their roots in a deaf sign language used in Britain during the 19th century. ASL and BANZSL family languages including Auslan are considered unrelated, but there is some overlap due to the use of signs borrowed from ASL by users of the three major BANZSL dialects. It is estimated that BSL, Auslan and NZSL share 82% of their sign lexicon. This figure is approximately 98% when including similar signs in each lexicon.

Green (2022) notes that "In everyday conversation, sign is used for particular cultural and pragmatic reasons. Sign is used in certain gender-restricted ceremonies and in other situations where speaking is disallowed; when hunting (in the desert regions of Australia because speaking could scare off prey and in the far north because making a noise might attract crocodiles); to communicate in noisy environments when speech would not be heard; and for communication between interlocutors who are visible to each other yet out of earshot."

There are many distinct sign languages employed by First Nations communities in Australia. The Yolŋu Sign Languages (YSL), of which there are four dialects, are the sign languages of the Yolŋu people of North East Arnhem Land (AIATSIS, 2022). They are recognised as the languages of the deaf Yolŋu people (AIATSIS, 2022, Adone 2014). James (2022) notes that YSL provides many practical uses from discreet communication, to engaging in communication over distance.[4] YSL, like many sign languages employed by First Nations groups, is endangered.

For a detailed review of First Nations' sign languages usage and statuses, see inter alia O'Reilly (2005), Kwek (1991) and Kendon (1988).

In Murphy (2021) it is noted that "It's important to remember that Aboriginal sign language systems don't follow Auslan grammar or English grammar. They follow the Aboriginal spoken language groups and are culturally bound." "In the Aboriginal Deaf community … you must belong to that cultural group to understand those contextually bound signs" (O'Reilly, 2005). As noted by James (2019) "The ecological and economic circumstances of locality-based culture, of indissoluble links to Country, may have stimulated multilingualism, and therefore the conditions for bimodal-bilingualism across geographically distant groups speaking different languages (James 2019, James, Adone and Bruk 2019)". There are estimated to be over 300 sign languages, with prominent Aboriginal disability cultural trainer and consultant Jody Barney asserting that "Aboriginal sign language systems, they're expressive, they're visual, they're culturally bound, they're old. Their value is priceless … the signs that I use today are the same signs that have been used for 65,000 years"(ABC, 2021).

There is established literature documenting and exploring Aboriginal sign language practices, most notably Kendon (1988), Kwek & Kendon (1991) and more recently O'Reilly (2005). Given the breadth of this research we encourage further exploration and review beyond the short precis included herein. Green et al (2022) offers a worthwhile meta synthesis of the category specific research over the last 20 years. It is apparent that further government funded research and language support would greatly benefit the preservation and continuity of these languages.

It is widely held that deaf Aboriginal and Torres Strait Islander peoples face significant challenges in accessing essential services. Denman (2007) notes that "Deaf Indigenous Australians encounter significant barriers when they seek to access public mental health services in Queensland. If these barriers are to be dissolved to ensure access to the same continuum of mental health care available to hearing English-speaking then a series of education and training, research and resource strategies need to be further addressed."

The dearth of interpreters (and in particular Aboriginal and Torres Strait Islander interpreters) with knowledge of both Aboriginal sign languages and English may make service access challenging for Aboriginal and Torres Strait Islander peoples sign language users (see Appendix 6 – Interpreter shortages, access and public service deficits). The lack of Aboriginal and Torres Strait islander peoples with interpreting capabilities, puts the cultural safety of service delivery at risk. Critical investment is needed to ensure the viable provision of culturally safe and appropriate essential health services and to ensure equality of access.

Deaf culture and the Deaf community within Australia

The Deaf community is diverse and employs several different languages and communication methods. Some members of the community are bi-modal bilingual, with fluency in both Auslan and spoken and/or written English. Others use primarily Auslan and may have limited fluency in English. Some may continue to use educational communication systems such as Signed English (Ozolins and Bridge 1999). It is important to note that, for deaf people, fluency in English does not necessarily mean that they can understand spoken English. Nonetheless the Deaf community shares a common association with Deaf culture, akin to the association that members of other communities, such as members of racial or cultural communities may assert they maintain with regard to other members of cultural or racial cultural groups.

Critical to understanding Deaf culture is understanding the cultural linguistic model that many within the culture ascribe to. This model sees deafness as a key aspect of identity, and sign language as a source of capability enhancement. This lens is a stark contrast from the traditional medical-disability framework that is evident within much of the early research into deafness and is still evident in policy approaches to deaf people today (Humphries et. al 2014, Hall 2017, Beaver & Carty 2021).

Bauman & Murray (2010) introduced the now widely used framework of "Deaf Gain," which posits a two-fold gain arising from deafness. It is considered, firstly, a communication advantage afforded to those who must use means other than verbal language. Deaf people often have more meaningful and intentional connection because they cannot hear, and their use of a visual language can confer other benefits such as enhanced facial recognition. Secondly, Deaf Gain proponents point out that deaf people, their visual language and the environmental adaptations they make also benefit others – e.g., signed languages have helped linguists to redefine the nature and potential of language, and deaf people's early advocacy for captions on film and television media now benefits countless others.

While the medical-disability lens views deaf people as broken, and deafness as disabling, the cultural-linguistic view does not view deafness as a source of stigmatisation, but a source of personal identity and a source of cultural affinity.

4 See James (2022), Yolŋu Sign Language | AIATSIS for more detail

Size of the Deaf Auslan user community and their geographic distribution

The ABS census includes specific questions pertaining to language usage. The census asks, "Does the person speak a language other than English at home?". In 2001 the census reported 5,305 respondents identified that they used sign language. In the 2016 census, a comparable question was asked where 11,047 individuals asserted that they use sign language to communicate at home. The individuals were required to use the 'other language' entry field to note their language usage, rather than select Auslan from a pre-configured option list. This has led many to conclude that the size of the Deaf community is understated within the census data. Reasons for the under representation within the census record include:

- The notion that some Deaf people may not be aware that Auslan was considered a language for census purposes;
- The fact that Auslan is signed rather than spoken;
- Deaf people who regularly use sign language may not use sign language at home when signing with hearing parents or other hearing family members.

This limitation in the census data capture process may be addressed within the most recent census,[5] but 2021 census figures are not available at the time of writing. There are however a number of alternative estimates available.

Early estimates by Johnston (2003) based on school enrolments suggest that the Australian Deaf population was approximately 6,500 individuals. Hyde and Power (1991) estimated the size of the community as 15,400. As noted, the 2011 census presented an estimate of 11,047, bearing in mind the limitations within the data capture process.

For the purposes of this report, we employ the estimate presented by the Australian Network on Disability (2022) and Access Economics (2006), rather than the former estimates, given that these recent estimates appear to be the most robust. Those estimates put the size of the community at 30,000 (Ibid, 2006).

Nonetheless, the sampling methodology of Johnston (2003) appears sound for the purposes of establishing the distribution of the Deaf community. As would be anticipated the community is based largely within Australia's most populous states and cities.

Table 1 – Deaf population distribution estimates

		% of total
New South Wales	Population	27%
	Survey Sample	30%
Victoria	Population	27%
	Survey Sample	24%
Queensland	Population	25%
	Survey Sample	27%
Western Australia	Population	9%
	Survey Sample	6%
South Australia	Population	8%
	Survey Sample	10%
Tasmania	Population	2%
	Survey Sample	1%
Australian Capital Territory	Population	1%
	Sample	1%
Northern Territory	Population	1%
	Survey Sample	1%
Total	Population	100%
	Survey Sample	100%

Note – this table is included to provide representative data pertaining to the distribution of the Deaf community within Australia. Population denotes census data (2016), Survey sample denotes Johnston (2003). The forthcoming census release (2021) will provide a more accurate capture, given the inclusion Source: Johnston (2003) and ABS 2016 census data.

Figure 1 – Residence of Australia's Deaf Community

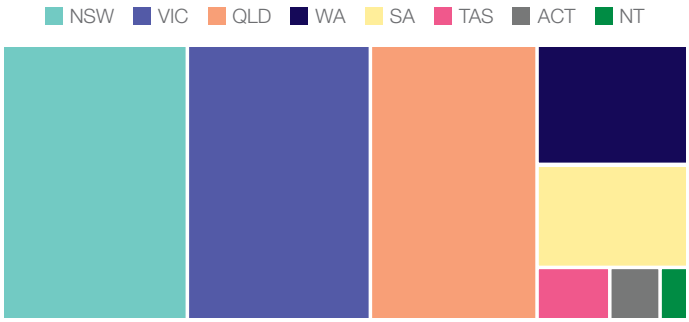


Figure 1 – Distribution of the Australian Deaf community by residence location (source: Census 2016)

The distribution of Deaf Auslan users is broadly consistent with the population distribution. However, for emphasis, the data is somewhat limited and may understate the size of the regional communities. This may skew the results somewhat.

Benchmarking Auslan and other Sign Language usage globally

It is estimated that there are more than 70 million deaf people globally, who employ more than 300 different sign languages and

5 See Media Release – Census 2021 – Deaf Australia

dialects.[6] The use of sign languages is recognised and promoted in the United Nations Convention on the Rights of People with Disabilities (CRPD). The Convention acknowledges the diversity in modalities of communication and seeks to champion equal status and recognition for sign languages and spoken languages. It also maintains the obligations of states to acknowledge and advance sign languages as well as the deaf culture and the linguistic identity of the deaf community.

Signatories to the CRPD should engage in practices and enact policies that:

- provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public (Article 9.2(e))
- and other appropriate forms of assistance and support to persons with disabilities to ensure their access to information (Article 9.2(f))
- and (facilitate) the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means, modes and formats of communication of their choice by persons with disabilities in official interactions (Article 21)
- Persons with disabilities shall be entitled, on an equal basis with others, to recognition and support of their specific cultural and linguistic identity, including sign languages and deaf culture (Article 30.4)
- Persons with disabilities are not excluded from the general education system on the basis of disability, and that children with disabilities are not excluded from free and compulsory primary education, or from secondary education, on the basis of disability (Article 24(a)).
- Facilitating the learning of sign language and the promotion of the linguistic identity of the deaf community Article 24.3(b).
- Ensuring that the education of persons, and in particular children, who are deaf or deafblind, is delivered in the most appropriate languages and modes and means of communication for the individual, and in environments which maximise academic and social development (Article 24.3(c)).
- In order to help ensure the realisation of this right, States Parties shall take appropriate measures to employ teachers, including teachers with disabilities, who are qualified in sign language, and to train professionals and staff who work at all levels of education. Such training shall incorporate disability awareness and the use of appropriate augmentative and alternative modes, means and formats of communication, educational techniques and materials to support persons with disabilities (Article 24.4).

While there are several signatories to the UNCRPD, the approaches of different polities with respect to language recognition, support and enabling policy has varied markedly.

When considering broadly similar OECD countries, particularly high-income OECD members; the use of sign language is higher (in per capita terms) within a small number of high-income OECD countries (Spain, New Zealand and France), than within Australia. However, sign language usage within lower- and middle-income countries has remained higher, than within all the noted high-income OECD countries (see Appendix 7 – Analysis of sign language usage, selected regions). These usage differentials may reflect differences in language supportive practices; essentially the extent to which national sign languages have been acknowledged legislatively, and the degree of investment in national sign languages.[7] A number of high and middle-income OECD countries have officially recognised and endorsed sign language usage and sought to support it through enabling legislation to protect the rights of Deaf communities.

There is limited longitudinal data pertaining to sign language usage, with many census measures likely to understate usage. As noted herein, we employ Hyde and Power (1991) and Australian Network for Disability Network (2022) (see also Kirkness 2020, Access Economics 2006) estimates as our assumed lower and upper estimate ranges. The estimates suggest that, while Auslan usage remains high, it is lower than sign language usage in comparable OECD countries (see Appendix 7 – Sign language usage, selected regions).

Increasing use of Auslan, to adoption levels similar to comparable nations (New Zealand, Holland, USA, France, Spain), is likely to have significant direct and indirect benefits for the Australian economy, through higher levels of educational attainment, positive network effects and higher levels of workforce participation. We explore these benefits within the ensuing sections of this report, and further benefits associated with early intervention within the report titled *"Exploring the benefits of Auslan in early intervention approaches for deaf children"*.[8]

The lower assumed per capita usage levels of Auslan in comparison to ASL (American Sign Language) and NZSL (New Zealand Sign Language) reflect the relative levels of support afforded to each language community through enabling legislation and resource support. Australia's relatively low sign language usage rates are a cause for concern, given the obvious benefits of Auslan usage and the economic disadvantages that flow from our lower utilisation levels. Again, we shall explore the economic consequences of our lower usage rates later in this report. It is however instructive to consider the different policy and regulatory environments within the noted jurisdictions and their role in driving such disparities.

New Zealand Sign Language

Sign language usage in New Zealand ranks amongst the highest of any nation within the OECD. While NZSL originated later than Auslan, its usage has remained higher on a per capita basis than Auslan. Auslan received official recognition as a community

6 There is also an international sign system, which is used by deaf people in international meetings and informally when travelling and socialising. It is considered a pidgin form of sign language that is not as complex as natural sign languages and has a limited lexicon.

7 Other relevant factors may include medical intervention rates and the frequency of aural/oral approaches to intervention

8 To access a copy of the report "Estimating the benefits of early intervention", visit the Deaf Connect website

language in Australia in 1991.[9] However, unlike Australia, where Auslan is not recognised as a national language through a specific statute or act of parliament, New Zealand has acknowledged both the importance and value of NZSL through its official recognition as a national language within the New Zealand Sign Language Act (2006).

This decision is not trivial as it serves to formalise the recognition of NZSL and ensure the rights of the Deaf community and impose necessary obligations on civic and legal systems.

British Sign Language

Within Great Britain, BSL received government endorsement and official recognition as a language nearly 20 years ago, but BSL is yet to receive official recognition as a national language. A recent bill introduced into British parliament sought to protect the rights and liberties of the deaf community through official government acknowledgement of BSL as an official national language. The private members bill has received unopposed support and received royal assent on the 28th June 2022 as the British Sign Language Act.

American Sign Language

American Sign Language ranks amongst the most commonly employed languages within the US, as noted with an estimated population of users of 500,000 to 1 million. Unlike Australia where usage within civic processes such as during jury duty[10] is uncommon[11] or implausible, ASL ranks as the language necessitating the third largest cohort of translators for such purposes. This in part has resulted in a larger cohort of translators and sign language users in comparison to Australia. On a per capita basis usage is comparable if employing the lower estimate of usage in the US. This ubiquitous usage of ASL, and availability of translation services within civic processes, has undoubtedly played a role in advancing the usage of ASL, and destigmatising its usage within complex and high stakes scenarios. A further point of difference is the approach of the U.S. tertiary system to ASL, noting that within the U.S. ASL is a popular course of study within many universities, and colleges.

Dutch Sign Language

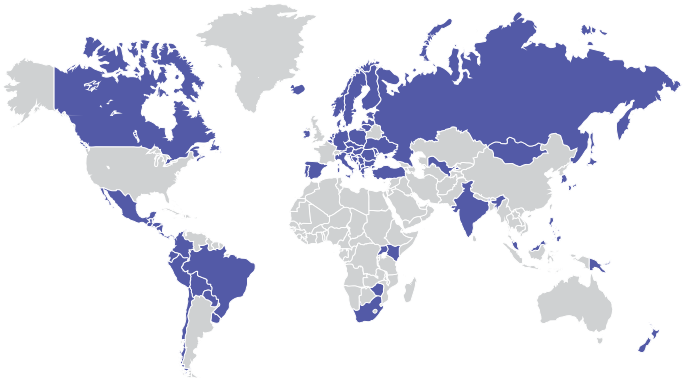
Dutch Sign Language (Nederlandse Gebarentaal, NGT) is amongst the many sign languages recently provided with official language status. The level of usage remains on par with other OECD countries in terms of usage on a per capita basis. NGT is amongst a significant number of OECD languages that have received official language recognition in recent years, with the Dutch parliament enacting enabling legislation in 2020.[12]

French Sign Language

French Sign Language (langue des signes française, LSF) is used throughout France and French speaking Switzerland. It is used at very high per capita rates in comparison to other OECD countries. LSF has been endorsed as a language of instruction for deaf children in schools since 1991.[13] In 2005 the language received official national recognition.

To date there are a total of 72 jurisdictions that have recognised sign language through their constitution, an act of parliament or language council. Australia remains of the few advanced economies presently not acknowledging the national sign language constitutionally or through statute, though as noted Auslan is a recognised 'community' language (Refer Appendices for further clarification on jurisdictions acknowledging national sign languages constitutionally or through statute).[14]

Figure 2 – International recognition of sign language through legislation



Source: World Federation for the Deaf (2022)[15]

This notwithstanding, there has been a significant rise in interest in Auslan amongst children and parents alike in recent years. This is due to the benefits associated with Deaf community participation perceived by parents and plausibly resulting from the increased use of interpreters during press conferences and civic events. Among parents of children who are deaf or hard of hearing, there has been a resurgence of interest in learning Auslan (Kecman, 2019; Ching et al, 2018), attributed to the communal and social aspects of language knowledge (Ching et al, 2019).

9 See Australia's Language: The Australian Language and Literacy Policy, 1991.

10 https://www.ohchr.org/en/press-releases/2016/04/australia-violated-rights-deaf-people-over-jury-service-un-experts

11 https://www.theage.com.au/national/victoria/law-reform-needed-to-allow-deaf-and-blind-people-on-juries-20210115-p56uav.html

12 For a worthwhile note on the acknowledgement of Dutch sign language see It's here, at last! Legal recognition of Sign Language of the Netherlands – Maartje De Meulder

13 https://thegsaljournal.com/2020/06/03/movement-the-evolution-of-the-french-language/

14 Figure one outlines the jurisdictions acknowledging sign languages through rights declarations, statute or decree. Further detail is included in the appendices.

15 Based the studies of De Meulder, M. (2015). The Legal Recognition of Sign Languages. Sign Language Studies, 15(4), 498–506. doi: 10.1353/sls.2015.0018; and Murray, Joseph J. (2020). "The Recognition of Sign Languages in the Achievement of Deaf People's Human Rights" Side Event. 13th Conference of State Parties to the Convention on the Rights of Persons with Disabilities. World Federation of the Deaf.3 December 2020. https://wfdeaf.org/cosp2020-sideevent/

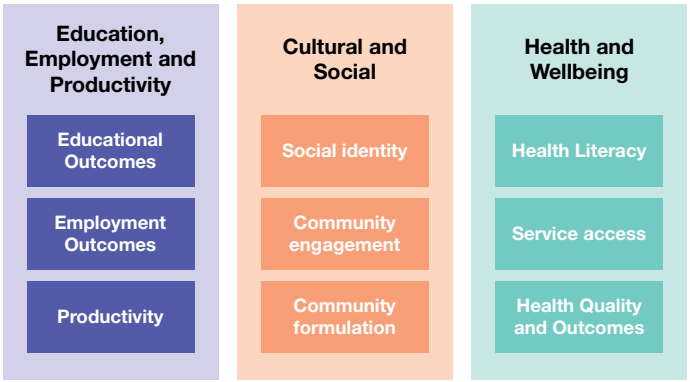
Establishing the benefits of sign language

It is critically important to acknowledge that the material benefits of Auslan outlined below account for the productivity, economic and broad social benefits of Auslan, but that Auslan's benefits with regard to the formulation of culture may be the most significant for the Deaf community.

Some parents have chosen bilingualism to support not only language development and learning, but also social identity and inclusion (Kecman, 2019). This choice aligns with the view of deafness as a cultural and linguistic identity (Chijioke, 2008; McIlroy & Storbeck, 2011; Young, 1999; Riddell & Watson, 2003).

While these benefits are difficult to quantify, they must be considered given the key role of Auslan in community formulation. The benefits associated with Auslan may be categorised into three broad groups.[16]

Figure 3 – The benefits of Auslan access and exposure



This section considers some of these benefits in greater detail, while surveying the extant literature. In the latter segment of this report the economic benefits attaching to the most critical benefits are quantified.[17]

Education, Employment and Productivity benefits of Sign language

The benefits of Auslan to signers is well established in literature, from linguistics to Deaf education (summarised in Hall 2017, Humphries et. al 2014). Understanding these benefits requires an appraisal of the relevant research that makes the role of Auslan in cognitive development, academic achievement and learner testing apparent. The following literature survey outlines the key benefits of Auslan to the noted categories and serves as the basis of the economic benefits estimates presented in the third part of the report.

Early Auslan education and its cognitive benefits

There are multiple modalities of language, and each may be enriching. Too often do individuals, researchers included, assume that references to language are references to spoken language alone. Sign languages are dynamic and equally viable human languages with all the cognitive benefits attributable to spoken languages.

There is a wealth of evidence suggesting that deaf children who have sign language fluency perform better in school academically (Hermans, 2008, Lange, 2013) than those that do not possess sign language fluency, even when accounting for other factors[18], such as parental deafness/hearing capability, the use of assistive technology and/or oral training (Humphries et. al 2014, Padden & Ramsey 2000, Strong & Prinz 2000, Mayer & Akamatsu 2003, Paul 2003, Schick 2003, Allen et. al. 2008, Wilbur 2008).
The timing of language acquisition is critical to these outcomes, as this moderates the early and enduring benefits of language. Sign language capability is associated with better developmental progress, broadly consistent with the progress markers evidenced by hearing children (Cummins, 2007, Humphries et. al 2014, Hall 2017).

Arguably, the greatest deficiency within current intervention strategies is not the viability of any specific intervention per se, but rather their seemingly dichotomous presentation. Many parents are left to feel that they must choose between intervention approaches, often not aware that Auslan may be employed in unison with other approaches. This presentation may cause them to choose a single strategy in isolation. Yet only sign language provides relative certainty of a sound foundation of language, necessary to achieve developmental progress.

Where a child is afforded support only through an oral-aural intervention strategy, there is significant risk, as the evidence suggests that the results of such strategies are both uncertain and highly uneven (see Hall 2017). It is plausible that a child may benefit from an aural-oral strategy, but where such an approach is proven to be ineffective for that child, absent of additional interventions the child is left with an inadequate language foundation, and at significant risk of falling behind both their hearing and signing peers.

Grosjean (2001) notes that "Every deaf child, whatever the level of his/her hearing loss, should have the right to grow up bilingual. By knowing and using both a sign language and an oral language (in its written and, when possible, in its spoken modality), the child will attain his/her full cognitive, linguistic, and social capabilities."

Auslan is a sound, evidence-based intervention method, ensuring that deaf children are afforded a viable modality for speech, and a critical language foundation, reducing the potential for language dysfluency. Consequently, even where a child is engaging with

16 The authors acknowledge that the benefits of Auslan are vastly broader than the benefits outlined within the representative figure, nonetheless the noted benefits rank amongst the most significant from both a social and economic value standpoint, and are the principal elements evaluated within this report.

17 The methods of quantification rely substantially on ABS datasets, WBD estimates and the use of HALY/DALY methodologies.

18 Schick (2007) notes that "Research on bilingual hearing children has shown us repeatedly that learning two (or more) languages has positive outcomes and does not hinder the learning of a second (or third or fourth) language (Hoffmeister, 2000; Kuntze, 1998; Greenwald & Czubek, 2004; Lane et al., 1996)."

an oral-aural intervention, there is immense protective value in Auslan exposure.

The research data calls into question intervention approaches and policy programs that seek to restrict a child's access to sign language, during their early childhood and early school years (Cummins, 2007; Hall, 2017). Given the lifelong adverse consequences experienced by children who grow up without a strong first language conceptual foundation, such policies are clearly vulnerable to a human rights challenge (Cummins, 2007).

Sign language is a source of protection, against language deprivation, whether this is in Auslan or English, or both and the potential ineffectiveness of other strategies. Where a child benefits from alternative interventions and they have engaged with Auslan, they are afforded the benefits of bilingualism. Where their alternative intervention strategy has not yielded the anticipated benefits such as native language knowledge of and acquisition of spoken/written English, Auslan has provided them with a language foundation, and protected them from the risk of dysfluency in later life. The role of Auslan as a source of protection against the unevenness and uncertainty of alternatives, and in support of the success of alternatives should not be discounted.

The benefits of Auslan in supporting capability enhancement and as a protective factor in the life of the child are not addressed sufficiently within the literature, due to the dearth of research funding afforded to such efforts. The evidence base pertaining to sign languages strongly supports the notion that sign languages are a critical protective factor in the life of a deaf child.

Early intervention and language acquisition is vital (Humphries et al, 2014b), and investment in Auslan to enable strong early access and language exposure is critical. It is generally accepted that first language acquisition occurs most successfully in the earliest years of childhood. Where exposure does not occur with sufficient frequency before the age of five the literature suggests that the child is less likely to achieve native like language fluency (Lenneberg 1964, 1967, Mayberry 1994, 1998, Hall & Johnston 2009, Hudson & Newport 2009). Native-like language ability enables more complex language usage and engagement, stronger plausible lifetime literacy, and greater ease in acquiring additional languages over the lifespan.19 There is a significant evidence base supporting the notion that some areas of language acquisition are highly resilient, which means they are readily acquired even at later stages, yet others require early exposure (verb agreement, complex morphology) (see inter alia Goldwin-Meadow, 2003, 2005; Wood, 2007, 2011).

Key finding 1:

Deaf children benefit from early exposure to sign language and parents should not feel the burden of being the only available good sign language role models; equally critical is early exposure to other highly proficient, or ideally, fluent sign language users, and the signing Deaf community. Absent these opportunities, deaf students may only be limited to dyadic groups for sign language communication,[20] which do not approach the richness and complexity of language as used by a larger community.[21]

Key finding 1A:

Sign language capability is positively correlated with academic performance, across a number of academic disciplines.[22]

Benefits of sign language to school and collegiate completion

There is a predisposition amongst all children when they are born to learn a natural language. Immersed in an environment with proficient and accessible linguistic models, using language for real purposes and re-embedded in social contexts, children acquire the rules of language. This holds true for deaf children who, exposed to natural sign languages at an early age, acquire them easily. Such is the case for deaf children born into a culturally and linguistically Deaf family. They have the advantage of receiving a complete language from birth, acquiring native competence in sign language, and learning the beliefs and behaviours of their cultural group.

Deaf students' competence in the language of the Deaf community will assist, not hinder, second language acquisition. It is clear that the degree to which students' language and culture are included in the curriculum (and valued by parents and the wider community) will influence the educational success of minority language students (Gibbons, 1992, Schwinge, 2010). However, deaf students are too often not as well supported as their hearing peers in both integrated and segregated educational settings.

Research conducted with Auslan users suggests that students perform better in testing and retain information more accurately when they receive direct instruction in Auslan rather than transcribed text. Auslan appears to result in far better learning outcomes for deaf learners than alternative modalities. The improvement in testing results was approximately 10% (Livingston et al., 1994; Marschark, Sapere, et al., 2004).

19 Auslan, and sign languages generally, provide learners with a sound language base, and protection against the uneven results of alternative intervention strategies. While alternative strategies many provide significant benefits in many instances, they are unpredictable and are often inconsistent. Auslan provides a low risk and highly protective set of benefits. Auslan may also be beneficial in additional language learning and consequently, bi-modal bilingualism is a viable approach/strategy for deaf children.

20 It is important to acknowledge that the challenges faced by parents of deaf children are far more nuanced than presented by this assertion of findings, it is difficult to capture all aspects and subtlety within any research statement(s), however we feel it is critically important to acknowledge that this finding is non exhaustive when seeking to represent the complex and nuanced challenges faced by parents.

21 For an excellent summation of this position see Humphries (2014) and Hall (2017). Specific studies considering specific languages include, inter alia Sapere et al (2004) Cummins (2007).

22 See inter alia, Baker (2006), Lightbown & Spada (2006), Bialystok et al. (2007), Kushalnagar, Hannay, & Hernandez (2010)

Notably, the use of sign language interpretation outperforms popular digital text display methodologies in initial testing, and performs comparably to digital transcription in retesting. The research strongly suggests that learners benefit immensely from sign language based instruction (Ibid, 1994, 2004).

Key finding 2:

Instruction delivered in Auslan has been found to be associated with better learning outcomes amongst deaf learners, with better testing retention than some technology based alternatives.[23]

Cultural identity, community, and engagement benefits

It remains confounding that some people take issue with the notion of deafness as a cultural construct (Glickman and Gulati, 2010), when the Deaf community is a cultural community with all the benefits that accrue to membership of any cultural community. For an excellent discussion of deaf identity and deaf culture see Carty (2009). This is notwithstanding the fact that deaf people generally spend most of their time living and working with hearing people (Ibid, 2010).

Determining the benefits that are derived from a cultural association is undeniably challenging. While the value of language and culture has been explored in the context of minority languages, the value of sign language and deaf culture from an economic standpoint remains under-explored. An established, albeit small literature engaging with the value of language acquisition, and the value of minority languages within different language regions exists. The lens of evaluation has largely been narrow, with this literature largely exploring the value of language as an enabling force in business and commerce. A critical difference is that this literature tends to focus largely on the notion of bilingualism (generally English and an additional language) through a single language modality (spoken language). Deafness and sign language economic value remain largely unexplored from a personal, cultural, community and commercial value perspective.

There is little known about the benefits of specific languages and dialects from a primary language value perspective, and this is certainly true of Auslan. There is an obvious lack in this regard. However, the evaluation of language is largely from the perspective of language utility maximisation. Non-oral language research is often presented from a position of justification, evidencing the undervaluation of non-oral methods. Deaf people experience sign language and use sign language as their primary language, and consequently, its value extends beyond just its utility in communication. They value sign language first, and the ability to communicate using other mechanisms for communication second.

Sign language therefore has a transformative quality, affording significant capabilities to sign language users, empowering participation in the Deaf community. This cultural membership brings immense psychological/psychosocial value to members, arguably greater than those experienced by members of shared oral language communities, that do not share cultural associations.[24] This transformative nature is critical to understanding the value of Auslan (for a worthwhile discussion of sign language as a source of cultural capital and difference, not disadvantage, see inter alia, Schick, 2007). The benefits of sign language certainly extend beyond the Deaf community with Auslan affording users, and the broader community with a viable method of facilitating dialogue, engaging in personal and commercial exchanges and in trade and commerce. Sign language also serves as an enabling force in supporting social and economic engagement both with and between the Deaf community and the broader community.

Key finding 3:

Auslan enables functional communication, but affords significant cultural benefits to members of the Deaf community. Many parents of deaf children highly value sign language learning because of the community engagement and cultural benefits (Schick, 2007).

Health, Wellbeing and Critical services access

The benefits of Auslan interpreters in service access, and in facilitating health supportive communication and engagement, have been explored extensively in language research (see inter alia, Glickman et al Beaver and Carty, 2021). Critical to understanding the benefits of Auslan in these key dimensions is acknowledging the role of Auslan in facilitating personal engagement with professional service providers. Additionally, even a cursory review of the evidence base makes clear the role of Auslan in promoting a sense of community, and its associated benefits to identity and mental health. In this regard, Auslan as a source of cultural identity is a source of immense health and wellbeing benefit.

Data derived from the Orima Research Auslan User Survey[25] is instructive in assessing service deficits: the survey indicated that there were around 110,000 instances where a professional interpreter was required annually. In only 61% (68,000) of these instances an Auslan interpreter was provided to the service recipient (Orima Research 2003).

23 See Marschark et. al 2006. Benefits of sign language interpreting and text alternatives for deaf students' classroom learning. Journal of deaf studies and deaf education, 11(4), pp.421-437.

24 For a discussion of the benefits of Deaf culture see inter alia, Klaudia, K., 2013. The benefits of sign language for deaf children with and without cochlear implant (s). European Scientific Journal.

25 Data captured through the Orima (2003) study provides estimates of service access and service utlilsation, which is assumed to be largely stable, this assumption makes the estimates conservative.

Benefits of sign language to health outcomes

The research indicates that there are specific difficulties experienced by Deaf patients who use sign language when accessing health care. The experiences of Deaf patients in the United Kingdom and Hong Kong both highlight deficiencies in deaf awareness on the part of the health care providers. (Middleton et al., 2010; Iezzoni et al. ,2004). Furthermore, Pollard & Barnett (2009) found that, in the USA, Deaf individuals are often classified as 'a low-English proficiency group' and public health services are not as readily available. Throughout the literature on health care contexts, the key principles and findings relate to access to interpreters, provider behaviours, use of technology, patient communication and education. The soundness of diagnoses and timing of interventions are also identified as pertinent factors (Humphries et. al 2014).

Deaf people suffer some of the poorest health statuses and health outcomes of the general population in the USA (Barnett 1999), and similar trends are observed within Australia (Remine & Brown, 2010; ABS, 2015, 2018). This includes a higher prevalence of cardiovascular diseases (Ogunjirin 2020), depression and anxiety (Hindley et al. 1994), domestic violence (Merkin and Smith 1995), sexually transmitted diseases (Doyle 1995) and more limited access to health services (Barnett and Franks 2002). Many of these problems are ameliorated by access to sign language.

The absence of sign language usage and exposure, or not sufficiently addressing the language needs of deaf children, may have deleterious consequences for deaf children in the short and long term. Failure to do so increases the risk of depressive disorders and anxiety, as well as behavioural and social disorders (Northern & Downs 2002, Andrews et al. 2003, Schick et al. 2006, Leigh 2009).

Children that have not had their language needs met are more likely to be subjected to abuse, and to be reliant on social services support than those that receive such language support (Sullivan & Knutson 2000, Knutson et al. 2004, Kvam 2004). McKee et al. (2015) found that deaf patients were 6.9 times more likely to have lower general health knowledge compared to hearing patients, suggesting linguistic and social barriers contribute to inadequate knowledge about health.

In the long term, language access is critical for the participation of deaf people in preventive health and health care services (Iezzoni et al. 2004, McKeeet al. 2011, McKee, Schlehofer, et al. 2011), education (Oliva 2004), mental health care (Steinberg et al. 1998), the workplace (Rashid et al. 2011, Haynes & Linden 2012), and social relationships (Gerich & Fellinger 2012).

Sign language, mental health services and mental health outcomes

A number of studies identify that Deaf and hard of hearing sign language users evidence better mental health treatment capacity, and mental health outcomes than those that do not use sign language (see inter alia Horton 2010, Crump & Glickman 2011, Crump & Hamerdinger 2017, Glickman et al, 2021). It is plausible that this may be due to a degree of language deprivation. There is an emerging trend of individuals that have been culturally and linguistically deprived.as more likely to need access to health services (Glickman et al 2021).[26] The implications of this deprivation are significant with such individuals necessitating greater care and resource support (Ibid 2020). Language access and exposure is a remedy for language deprivation, and noting the work of Fellinger et al. (2021); access is likely the improve mental health outcomes and associated costs (see also inter alia, Glickman et al. 2021 and Crump and Glickman 2011).

The work of Fellinger et al. (2011) and Glickman & Pollard Jr (2013) highlights the shortage of empirical research conducted into deaf mental health issues in comparison to other communities, though there are a number of notable studies, a number from OECD members comparable to Australia, that have been contucted in the past 20 years. These studies include those of Bridgeman et al. (2000) conducted in New Zealand, de Graff et al. (2002) conducted within the Dutch population, Fellinger et al (2005) conducted in Austria and Kvam (2007) conducted in Norway. Overwhemingly, the evidence the higher rate of mental health problems within the deaf populations (See Table 2 – Studies of mental health problems in deaf adult populations).

26 The work of Glickman et al. (2021) is particularly noteworthy and is a seminal contribution to the deaf literature. Crump & Glickman (2011), Crump & Hamerdinger (2017) Glickman et al. (2020) assert that language deprivation, essentially a lack of exposure to sign language results in cultural and language dysfluency. Glickman et al (2020) in using this expression (dysfluency) are referring to a phemomena whereby individuals due to limited knowledge of sign language are not able to communicate viably employing sign language, therein they are said to be dysflent in the language. Dysfluency here is not a medical-phenomena but rather a lower level of sign language capability; and this is also noted in Crump & Glickman's earlier work (Crump & Glickman 2011). We do not employ this nomenclature here merely to avoid confusion/ misunderstanding with the use of the term language dysfluency within Australian deaf communities, but acknowledge the authors intent in this statement.

Table 2 – Studies of prevalence rates of mental health problems in deaf adult populations

	Participants	Methods	Comparison groups	Results
Bridgeman et al (2000)	198 members of the deaf community in New Zealand	GHQ-12; BASIS-32; sign-language videos; interviews	GHQ-12 scores in a sample of British deaf people (n=97); BASIS-32 scores in a hearing group from New Zealand	GHQ-12 mean 4·82 (SD 2·57) in deaf participants versus 4·78 (SD 2·95) in control group; 18–25% of deaf participants above the mean BASIS-32 score of New Zealand hearing mental health client groups
de Graaf et al (2002	308 prelingual deaf adults; 211 postlingual deaf adults	GHQ-12; face-to-face interviews	GHQ-12 scores in men and women from the general Dutch population (n=7076)	GHQ-12 total scores of two or higher were reported in: 32·4% of prelingual deaf women, 27·1% of prelingual deaf men, 43·2% of postlingual deaf women, and 27·7% of postlingual deaf men, versus 26·6% of women and 22·0% of men in the comparison group
Fellinger et al (2005)	236 adult members of the deaf community in Upper Austria	GHQ-12; BSI; WHOQUOL-BREF; sign-language versions of the instruments in computerised self administration	GHQ-12 scores in a sample of Austrian general population (n=1408); normative data for German-speaking population for BSI (n=600) and WHOQUOL-BREF (n=2050)	GHQ-12 mean 4·38 (SD 2·53) in deaf participants (women had a mean score of 5·04 and men 3·86) versus 1·16 (SD 2·10) in comparison group; signifi cantly more mental health problems (p<0·01) in deaf participants than in comparison group in BSI and all WHOQUOL-BREF measures, except in the domain of social relationships
Kvam et al (2007)	431 deaf adults, mainly members of the Deaf community in Norway	Three items of the Hopkins symptom checklist assessed with written questionnaires sent by post	Participants in North-Trøndelag Health study (n=42 815)	Signifi cantly (p<0·001) more mental health problems for each item in the deaf than in control group

GHQ-12, BASIS-32, and BSI are instruments that detect mental health problems and psycihatric illness by questionnaires; scores increase with number of symptoms. WHOQUOL-BREF is a quality-of-life questionnaire; scores increase with quality of life. GHQ-12=12 item General Health Questionnaire. BASIS-32=32 item Behavior and Symptom Identifi cation Scale. BSI=Brief Symptom Inventory. WHOQUOL-BREF=World Health Organisation's Brief Quality of Life questionnaire.

Source: Lancet (2012)[27]

The work of Glickman & Crump (2011) is also noteworthy in exploring mental health service delivery; the authors emphasise an emerging challenge in providing viable mental health services to the deaf population given degrees of variability in sign language competence that differ from other populations. Essentially the authors contend that there is less variability in the language competence of spoken language users, than within signing populations.

For emphasis, this variability is not ascribed to any deficiency in sign language or sign language learning, but rather because many sign language users are not given an opportunity to learn sign language until later in life, or after alternative recourses and interventions have been pursued, to the detriment of their learning. Essentially, sign language deprivation gives rise to lower levels of capability.

This work emphasises the importance of sign language competence and supports the notion that earlier sign exposure may be beneficial to users, in both the early and later stages of life. The benefits in health specific, and particularly mental health specific interactions are asserted as significant (see inter alia Horton 2010, Crump & Glickman 2011, Crump & Hamerdinger 2017, Hall 2017, Glickman et al. 2021). Sign language deprivation may result in greater challenges for users, evidencing higher rates of mental health problems, and greater challenges in accessing care, and lower self-efficacy. This diminish capacity to self-advocate is a cause for consternation.

Glickman et al. (2021) also emphasise that culturally dysfluent signing deaf persons, with low sign language capability present greater challenges in mental health diagnosis and treatment and greater health care system costs. The challenges associated with mental health treatment for individuals with low (or no capability) sign language capability may be exacerbated by the presence of co-morbidities. Consequently, investment in sign language access appears to yield short-, medium- and long-term benefits to health care, and reduced care costs.

When considering why deaf sign language users evidence better mental health outcomes, and a greater capacity to self-advocate than deaf non sign language users there are several plausible reasons in addition to those espoused in the existing research. Benefits may be associated with membership to the cultural community, and the perception of deafness through a cultural rather than medical lens, the capacity to more directly engage with health care professionals without the need for assistive technology, and greater overall self-efficacy. Further research,

27 For the full review article see Fellinger, J., Holzinger, D. and Pollard, R., 2012. Mental health of deaf people. The Lancet, 379(9820), pp.1037-1044.

particularly within an Australian context is needed to inform our understanding of this complex set of associations.

Medical service access and service engagement

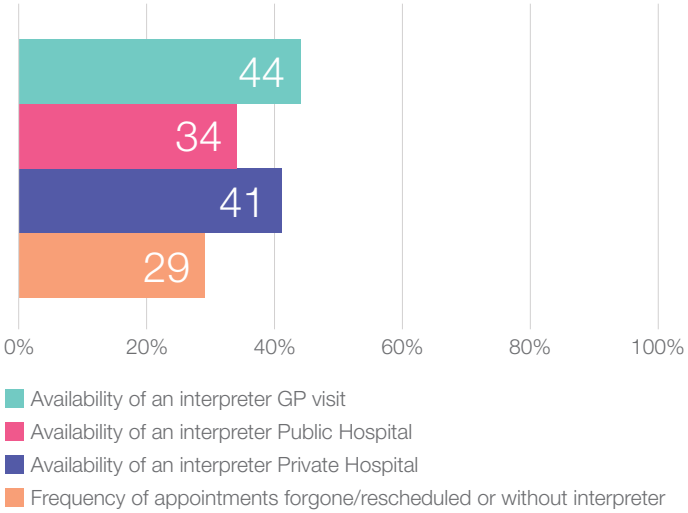
The reasons underpinning the generally poorer health outcomes of Deaf individuals is that there is no accessible health information. Accessing health information when barriers to knowledge acquisition are systematic and, in civic systems and society, broadly present as threats to the acquisition of health knowledge, which is compounded when health information is not in an accessible format.

Researchers have identified that accessing the health care system is moderated by knowledge of the system, which is dependent upon the language and modality of communication of those seeking to engage with the system. Consider for example the delivery of information pertaining to scheduling, diagnosis, treatment, and broader proscription by the doctor. These aspects of health communication and the modality of communication are taken for granted by individuals that are not from the Deaf community. Where services are delivered in a manner not consistent with the needs of the Deaf community this results in significant deficits in service access, quality and health literacy accrued through doctor/patient interaction. Language deprivation undermines patient-physician relationships, and can impact higher cognitive functions such as memory, abstract reasoning and executive function that are essential for engagement in their own medical care (Hall, 2017, Glickman et al. 2020).

Kushalnager et al. (2017), assert that the importance of sign language and interactive health literacy procured through friendship associations are key factors in the health literacy of deaf people. The health literacy benefits of Auslan are assumed to extend beyond the diminution of disability impacts of Auslan usage. Refer to Appendix 1 for further discussion of this finding.

Estimates of the shortfalls in service provision to members of the Deaf community are important, and instructive. Deaf people accessing health services face significant challenges, most notably with accessing interpreting services, particularly in private patient settings. Consequently, Deaf people were found to face significant service shortages.

Figure 4 – Key medical service access statistics



A survey of Deaf Auslan users identified that between 83% and 87% required an interpreter during medical consultations (depending on consultation type), but only 44% of those requiring an interpreter during a doctor's consultation were able to access interpreter support on each occasion they required it. The figures remained similar for consultations within public and private hospitals, with 34% of individuals attending a public hospital appointment and 41% attending a private hospital were not able to access interpreting services as required (Orima, 2003).

Overall, of the 50,000 medical service appointments established by Deaf survey respondents for which an interpreter was required, a professional interpreter was provided in 41% of instances. In 30% of instances family and friends were required to serve as interpreters, while 29% of appointments were either rescheduled or progressed without an interpreter. The use of family members as interpreters in this setting diminishes self-determination and autonomy and may result in misrepresentations and/or the miscommunication of health information. It may also pose specific risks, associated with familial moderation of the behaviours and decisions of the Deaf person.

There is an apparent need to ensure a more culturally affirming and accessible approach to service delivery is resourced, with the benefits to both health literacy and health outcomes self-evident. Culturally affirming service support promotes improved health literacies and better health outcomes. There are immense benefits in terms of self-efficacy for the patient, allowing them to direct their own care. This approach also ensures that the privacy and care management of the individual is self-led rather than being moderated by family, and this is often a concern expressed by members of the Deaf community.

Humphries (2019) notes that a simple and effective way to improve health outcomes is for physicians to recommend to parents of deaf children that they request an interpreter during medical appointments with their deaf child even if the parents do not need an interpreter to interact with the physician. As with adult sign language users, children benefit immensely in participating in health processes and decisions, promoting self-efficacy and development. The benefits to parents are also apparent insofar as interpreters may be able to better communicate medical information to and from children. Humphries (2019) also notes that parents can learn from doctors and interpreters about how to discuss these sensitive matters with their children. Hearing children are able to build self-efficacy though participation in health system interactions and benefit from health specific learnings through such interactions, and deaf children should be afforded the same opportunity. This is better for the family and actively promotes better health literacy.

This report estimates the economic costs to health literacy associated with service deficits in the ensuing segment (Refer Appendix 2). The report also measures the economic benefit to literacy procured through culturally affirming medical service access (Refer Appendix 2).

Key finding 4:

There is a shortage of Auslan interpreters within each state and territory, and this results in many not being able to access services during critical interactions with civic systems and processes.

Key finding 4A:

Auslan interpreting services are critical to the provision of culturally affirming service delivery. While members of the Deaf community are able to access health services, absent of interpreting support community members are deprived of the critical benefits accruing from the patient/provider relationship. This impacts the delivery of diagnosis and associated remedies, as well as depriving the community of the health literacy benefits associated with such interactions. Auslan provisions ensure that service provision is not merely accessible but rather culturally affirming. It is predictable that the service deficits may impact the accuracy of health information shared, given the impacted modalities of communication.

Key finding 4B:

There remains a dearth of culturally appropriate health information and culturally safe service provision made available to members Deaf community. This is predicted to have a significant and deleterious impact on the health literacy of community members.

Estimating the benefits of Auslan

Policy and funding decisions relating to the use of Auslan language are of immense importance as the benefits that accrue to deaf children are evident. However, it is important to appreciate that the implications of such decisions are complex, and no parent should have to forgo Auslan because of their capabilities or the absence of adequate support of early intervention. As noted by Wilkinson & Mortford (2020) "for hearing parents who have just learned that their newborn is deaf, deciding whether to teach their child a spoken language, a signed language, or both may seem to be primarily about how they will communicate with their child, and what type of schools their child will attend. However, the implications are much greater, and will extend across the lifespan."

The established benefits of sign language are significant and extend beyond those afforded through minority language usage generally. Having access to Auslan supports improved academic performance, health literacy, and developmental benefits, in addition to its use as the language of the Deaf community and a source of cultural identity and affirmation.

We estimate the benefits of Auslan by measuring the impact of Auslan language usage on the redress of disability and the benefits of language usage to educational and vocational attainment. The benefits associated with the redress of disability impacts are assumed to capture the benefits associated with language usage as a source of cultural identity and affirmation. Additionally, we estimate service deficits based on service usage data to determine the benefits of greater investment in Auslan language usage and interpreting services.

Auslan and health literacy

Language plays a critical role in health literacy, and this is evident in literacy research. Health literacy is best understood as the extent to which an individual is capable of finding, understanding and utilising information to inform health associated decisions for both themselves and others. Deaf community research suggests that accessible interactive health literacy, and the age at which an individual learns sign language, are key determinants of health literacy within the community. Data also suggests that individuals access health information through associations.[28]

Service utilisation data indicates that the Deaf community accesses health services regularly but face challenges due to the shortage of Auslan interpreters. The initial estimates account for the benefits of Auslan as the principal determinant of health literacy amongst the Deaf community, and as an enabler of accessible interactive health literacy amongst the Deaf community.

Acknowledging that Deaf culture is critical to the sharing of information pertinent to the Deaf community, and health literacy, is central to this methodology. We employ the Deaf community population estimates supplied by the Productivity Commission rather than the Census, given that the census methodology is likely to underestimate population size.

Key benefits estimate:

Employing estimates of the health system benefit associated with improved health literacies, we are able to derive estimates of the benefit of Auslan language to improved health literacy. The methodology is outlined in Appendix 2. **Auslan is estimated to provide an economic benefit of 27 million dollars annually to the Australian economy, associated with improvements in health literacy.**

Secondary and tertiary education completion benefits

There is significant literature on the benefits of sign language in educational settings, including early learning, primary and secondary education. There are also significant benefits to vocational outcomes identified in recent studies.

Compared to deaf spoken language users (those employing oral strategies), Deaf people who used sign language were more likely to be employed with management responsibility and to

28 For a worthwhile introduction to deaf health literacy research see McKee et al.(2015). Assessing health literacy in deaf American sign language users. Journal of health communication, 20 (sup2), pp.92-100. For a summary of key challenges within remote communities see, Terry, D.R., Lê, Q. and Nguyen, H.B., 2016. Moving forward with dignity: Exploring health awareness in an isolated Deaf community of Australia. Disability and Health Journal, 9(2), pp.281-288.

have found their current job by responding to an open call. The opportunities in the labour market might be associated with Deaf culture and use of sign language. Early language support and improved deaf education and support in primary, secondary and tertiary education are of particular importance in this respect (Dammeyer & Marschark, 2016).

Establishing the impact of Auslan on the level of educational attainment is challenging given the paucity of data on the subject. However, there is scope to establish the plausible benefits by modelling the economic benefits attaching to differential frequencies of educational attainment at a cohort level. There is a dearth of data accounting specifically for the completion rates of deaf individuals at a high school level. Consequently, we rely upon ABS estimates of school completion rates at a secondary level.

Individuals with a severe or profound disability evidenced completion rates of 27%, while individuals with a disability (considered non severe/non profound) evidenced a completion rate of 34%. These rates are lower than the rates of completion for individuals with no disability of 67% (ABS, 2022).

Key benefits estimate:

Employing data associated with completion variations within specific cohorts and the return premium associated with higher levels of education, estimates of the education benefit of Auslan language are derivable. The estimation methodology is outlined in Appendix 3. **Total economic benefit associated with Auslan and its benefits to education attainment are $27,740,700 annually.**

Health, Wellbeing and Auslan usage

Critical to determining the economic benefits of Auslan is the acknowledgement that Auslan is arguably more capability-enabling than other languages. The importance of capabilities is discussed broadly in literature (see inter alia Naussanbaum & Sen 1993). While the use of the word 'disability' is unhelpful in discussions of the Deaf community, employing a disability lens to evaluate the impact of Auslan on capabilities provides a mechanism to determine the capability benefits afforded through Auslan usage.

The impact of disability on life quality has been examined within several disciplines. Examining the economic benefit of any intervention on an ability set requires the use of a quality-of-life measure. Herein, we employ the methodology established by Murray (1990) and WorldBank (1993); to determine the economic benefit of Auslan, specifically a measure of lost health and wellbeing, and the associated gains from Auslan usage.

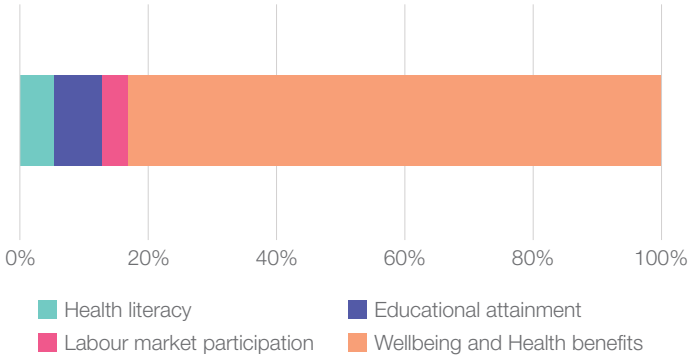
Key benefits estimate:

Employing the noted health adjusted life years method (DALYS), estimates of the benefits accruing to Auslan users are estimated. The methodology is elaborated in Appendix 1. **The total benefit associated with the use of Auslan in its redress of disability impacts is 307 million dollars annually.**

Collective economic benefits of Auslan exposure and usage

The total economic benefits of Auslan are 368 million dollars per year. These benefits are comprised of 24 million dollars in health literacy benefits, 27 million dollars in educational attainment benefits, 13 million dollars in labour market participation benefits and 307 million dollars in overall health and wellbeing benefits.

Figure 5 – Economic benefits of Auslan usage



The per capita benefit to members of the Deaf community is estimated as 12,419 dollars annually. This finding evidences the significant benefits accruing to Auslan language usage for members of the Deaf community. Auslan is capability enhancing and is asserted to improve labour market participation, educational attainment, health literacy and the overall wellbeing of Auslan users. Given the modest investment in Auslan the benefits that accrue to Australian society are significant. Auslan should be viewed as a critical contributor to productivity, and as an investment in employment, literacy and wellbeing.

Table 3 – Economic benefits of Auslan usage, aggregate and per capita

	Economic Benefit	Per Capita
Health literacy	19,781,567.00	652.06
Educational attainment	27,740,700.00	924.69
Access to Financial/ Legal services	12,978,380.14	432.61
Labour market participation	13,782,930.00	459.43[29]
Wellbeing and Health benefits	306,360,000.00[30]	10,212.00[31]
Total Benefits	**380.643.577.00**[32]	**12,688.00**[33]

The costs of existing service deficits

As part of the broader benefits analysis the research established the costs associated with service deficits, specifically service deficits relating to the provision of interpreting services to Deaf community members during medical, financial, and legal service interactions. These deficits may reflect an underfunding of services for members of the Deaf community.

The economic activity lost due to service deficits equates to $1,957,500 for deficits in health service interactions caused by the lack of service availability.

The cost of reductions in attained health literacy levels due to deferred or inadequate health service interactions equates to $6,446,830.

Deficits in legal and financial service interactions caused by a lack of adequacy in financial/legal interaction equate to $2,275,560.

The impact of legal and financial service deficits may be greater as the present analysis does not account for differential savings, investment and legal outcomes due to the differential quality of interactions. There are several further critical services interactions, with allied health providers, civic systems and third-party firms that are not within the scope of this report, yet warrant judicious consideration given that many such services are likely to evidence significant service deficits.

29 The benefits of labour market participation, health literacy and educational attainment accrue to both the individual and the broader economy.

30 This estimate is based on Auslan intervention occurring at the optimal time, in year 1. It is important to acknowledge that when timing is less than optimal, the economic benefits associated with Auslan intervention will be sub optimal, resulting in a lower benefits estimate/value.

31 For emphasis the wellbeing benefits pertain to the enabling quality of Auslan, reducing the impact of disability.

32 The estimates of the change in DALY values are based on a shift from Profound to Severe disability, this Is the smallest step reduction within associated with hearing loss. Consequently, acknowledging that some individuals employing Auslan are at the severe rather than profound threshold level, the estimates may understate the economic value of Auslan. Additionally, the estimates do not include a YLL component.

33 This estimate is the average annual economic benefit to members of the Deaf community, the realised benefits for each person will vary over their lifetime, with educational attainment benefits and labour market benefits realised over the term of employment, while wellbeing benefits may be accrued more consistently over the lifespan. For clarity we present the values as average annual benefits rather than the differential individual year estimates over the life course.

Conclusions

Within this report we draw upon the extant literature to determine the economic benefits of Auslan. The report employs a cultural-linguistic lens to consider the capability benefits[34] afforded to users of Auslan associated with Auslan access, exposure, and usage. The report then estimates the capability benefits of Auslan, through capability enrichment, where increased capabilities result in the redress of the estimated economic burdens arising from deafness.[35]

The report identifies that the economic benefits of sign language are significant, and the findings suggest that the Social Return on Investment of Auslan access and usage are likely to substantially exceed the modest investment required to facilitate language access and exposure. Sign language is critical to the redress of language deprivation, and sign language is seen as critical to the emerging challenges of language deprivation syndrome (Hall, 2017). Auslan is an essential tool in promoting improved health literacy and promoting better educational and vocational outcomes.

Beyond the economic benefits, that are exceedingly high, the cultural benefits of Auslan to the Deaf community are significant. Supporting stakeholders, including educators, policy makers and those facilitating the delivery of civic and community services to deliver culturally appropriate services necessitates an acknowledgement of the critical role of Auslan in all aspects of society. The embedding of Auslan into civic systems is essential in shifting mindsets from 'conscious ableism' to a cultural linguistic view of Auslan that aligns with the values of the Deaf community.

Additional report

The overall benefits of Auslan are substantial, but critical to ensuring that the benefits of the language are greatest requires an acknowledgement of the importance of the timing of language interventions and language access. These issues are explored in greater detail in our report titled "*Exploring the Benefits of Auslan in Early Intervention Approaches for Deaf Children*".

Appendices

The following appendices are included to detail the methodological approaches to estimation employed in this report.

Appendix 1 – The social and economic benefits of Auslan

Appendix 2 – Auslan language and health literacy

Appendix 3 – Auslan users legal and financial service access deficits

Appendix 4 – The impacts of Auslan on Educational attainment

Appendix 5 – Regression estimates from Dammeyer (2016)

Appendix 6 – Interpreter datasets and analysis

Appendix 7 – Sign Language usage estimates and legislative acknowledgement

34 The term 'capabilities' is used here in a manner consistent with the notable work of Martha Nussbaum and Amartya Sen for a useful introduction to this approach and logic consider reviewing Sen's (1979a) "Equality of What?" Tanner lectures. See also Nussbaum, M., 1988, "Nature, Functioning and Capability: Aristotle on Political Distribution", Oxford Studies in Ancient Philosophy (Supplementary Volume), 6: 145–84. 1985d, and Sen, A., (1984) "Well-being, Agency and Freedom: The Dewey Lectures 1984", Journal of Philosophy, 82(4): 169–221.

35 The report employs a research methodology based principally on a DALY (Disability adjusted life year) approach. We consider the approach appropriate to estimate the benefits of Auslan intervention. It is notable however, for emphasis, that members of the deaf community do not necessarily consider themselves disabled, but rather members of a culturally distinct community. The DALY approach relies on estimates of the estimate ed 'burden of disease'. We consider the benefits of Auslan in reducing the 'burden of disease'. These terms are the nomenclature within economics. Economic parlance and health economics does tend to employ language more consistent with the medical approach to deafness rather than the cultural approach. We do not employ the expression burden of disability in the main text but acknowledge that this is the nomenclature of economics.

Appendix 1 – The social and economic benefits of Auslan, a DALY approach

Quantifying the economic benefit of a language is complex, and the literature on the economics of language emphasises this. Challenges associated with assigning value to language capital as a form of human capital are unique, as language is unlike other imbued capitals, it is something that enables all other aspects of social and economic engagement.

Auslan is the language of the Deaf community of Australia, and central to the Deaf culture. However, it is a language that is distinct from English and other sign languages, notwithstanding some shared origins, as detailed within the report. Auslan users see themselves as part of a distinct cultural community, akin to other minority communities, and benefit from a sense of shared belonging to this community. This shared association makes assessing the benefit of the Auslan language similar, but not the same as the valuation of minority languages, of which there is established literature.

Critical to determining the economic benefits of Auslan is the acknowledgement that Auslan is arguably more capability enabling than other languages. The importance of capabilities is discussed broadly in literature (see inter alia Naussanbaum & Sen 1993). While the use of the word disability is unhelpful in discussions of the Deaf community,[36] employing a disability lens to evaluate the impact of Auslan on capabilities provides a mechanism to determine the capability benefits afforded through Auslan usage.

The impact of disability on life quality has been examined within other disciplines. Examining the economic benefit of any intervention on an ability set requires the use of a 'quality of life' measure. Herein we employ the methodology established by Murray (1990) and WorldBank (1993); to determine the economic benefit of Auslan, specifically a measure of lost health and wellbeing, and the associated gains from Auslan usage.

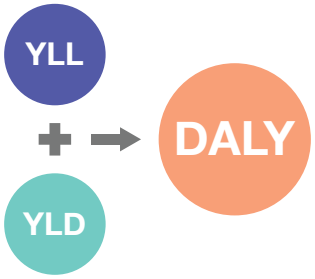
DALY impact of Auslan language usage

The use of loss of wellbeing methodology is consistent with the broader disability impact evaluation literature and has been used in a broad range of studies (Li 2018, Gao 2015). The DALY methodology focuses on the non-financial costs associated with a specific category of disability. Specifically, the DALY method estimates the costs associated with premature mortality and reduced health, by adjusting total life years to account for disability, resulting in the disability adjusted life years measure. The DALYs as with the QALYs approach are both examples of methods of adjusting life years based on health, so called Health Adjusted Life Years methods (HALYs).

The use of the DALY method within evaluations of the costs of disability are replete within evaluation research, and specifically as it pertains to deafness. Emmett et al. (2016) employs the DALY method to evaluate the benefits of Deaf education, with Emmett et al. (2019) employing the approach in the evaluation of Deaf education within Asia. Within Australia, the methods have been employed by AIHW (see inter alia Mathers et al. 1999), Begg (2003) and Deloitte Access (2017) amongst others. A systematic review of the use of DALY methods in the evaluation of the burdens of different categories of disability is provided by Polinder et al. (2012).

The DALY estimate comprises two components, firstly an estimate of premature mortality measured in years of life lost due to premature death (YLL) and morbidity determined by the number of years of healthy life lost because of disability.[37]

Figure A1 – Disability Adjusted Life Years calculation



Estimates of YLD are determined employing disability weights; these weights derive from estimates of the impact of disability on the health of an individual. The weight is proportional to the health impact of the disability and relative to other disabilities. For the purposes of this research, we exclude the impact of co-morbidities, noting that Auslan would likely be beneficial to any co-morbid illness, and consequently the estimate may be seen as conservative. A disability weight of zero denotes perfect health (it is important to acknowledge that while this condition is implausible all states are relative), while a weight of 1 corresponds to the loss of life, the definition of imperfect health in the extreme.

Table A1 – Example Disability weights

Disability classifications	Disability weights
Schizophrenia	0.576
Amputation of finger	0.03
Lower back pain	0.0374

36 This is not a criticism of those that employ the term disability in this context; it is merely an acknowledgement that its use perceives deaf people through a deficit lens, perceiving deaf people as requiring 'fixing' rather than a cultural lens that sees deaf people as capable and Auslan as capability enhancing.

37 We do not include an estimate of premature death, nor assign a cost value to premature death. Therein the estimates do not suggest that Auslan usage results in a longer term of life than the absence of Auslan usage. However, there are a number of studies accounting for the significant psycho-social benefits of Auslan, its potential benefits in health literacy and its cultural value. Nonetheless, the estimates

Consider the noted example weights, representing some of the variation in DW associated with various states and conditions. Lower back pain carries a disability weight of 0.0374, therein an individual with lower back pain loses 3.74% of a year of 'healthy life' due to the incidence of lower back pain. An individual with schizophrenia loses 57.6% of a year of healthy life due to their condition. The estimates allow for the determination of the number of years of healthy life lost within specific cohorts. This is particularly instructive in policy analysis. A further benefit is the ability to translate the estimated DALY to a dollar value estimate of the cost of lost health to society. This is accomplished by employing the DALY value and the value of statistical life. While it must be acknowledged that ascribing value to life in statistical terms is imperfect this method is frequently employed in evaluation studies. Estimate of the value of statistical life frequently employed in health and policy research;[38] the estimate as supplied by the Department of Prime Minister and Cabinet (2021) is $5.1 million in total and $222,000 per year, in 2021-dollar terms.[39]

Estimates of DALY values and the benefits of Auslan

The initial estimates of DALY values are based on disability weights supplied by the Global Disease Burden of Disability Study (GBD 2019). To determine the benefit of Auslan, the disability weights are applied to cohort specific data to determine the extent of the disability in DALY terms. The relevant weights for consideration are noted in Table A2. Larger weights are attributable to greater levels of hearing loss.

Table A2 – Selected disability weights - GBD Study 2019

	Disability weight
Moderate	0.027
Severe	0.158
Profound	0.204

To estimate the benefit of Auslan to members of the Deaf community regarding improved wellbeing, it is assumed that Auslan in its capability enhancing capacity, therein, its ability to facilitate communication, community cohesion and inclusion, would reduce the extent of the evidenced disability. The usage of Auslan is assumed to diminish disability severity by one level, from profound to severe. Absent of Auslan, many Deaf persons would be reliant on non-native languages such as English, interpreters/transcription, tools, and technologies, rather than the communities' language of choice. The counterfactual level of disability and the new level of disability were applied to cohort data to determine the benefit of Auslan on disability severity.

The annual benefit per person equates to a 4.6% absolute improvement in DALYs, in nominal terms.[40] This equates to a value of improved wellbeing of 10,212 dollars per year. The total benefit of Auslan in terms of improved community wellbeing equates to 307 million dollars annually.

38 Our method excludes a benefits component associated with the benefits of Auslan to life expectancy, not because such a benefit does not exist but rather for conservatism in estimation. The estimates only account for the role of Auslan in affording greater capabilities through the life course, and consequently the role of Auslan in the redress of disability during the term of life.

39 We do not apply an inflationary factor to the 2021 estimates, as its application is redundant given the presentation of the benefits is 2022 (Start of Year) terms. The overall variation where employing a standard inflationary factor would be approximately 2-3%, countered by the discount factor. Note, Eq.F.1. ((1.03)^1) x ((1.03)^-1); the benefits estimate are in end 2021 or start 2022 terms.

40 As the estimates are in annual terms, there is no benefit in adjusting for timing effects that would equate to 2-3%; as the VSL estimate is already in 2021 terms. The adjustment to VSL to bring it to end 2022 terms, would directly counter the adjustment for benefits timing. Eq.F.1. Benefits estimate End 2021 or Start 2022 terms ((1.03)^1) x ((1.03)^-1)

Appendix 2 - The Auslan language, and health literacy; an enabling and empowering tool for health literacy

Health literacy is the extent to which an individual is able to find, interpret, and employ information; and access services to inform and support health related decisions for themselves or other persons. Research suggests that interactive health literacy, and the age at which an individual learns sign language are key determinants of health literacy.

The purpose of this brief appendix is to outline the methodological approach to impact evaluation employed within this report, to establish and benchmark the health literacy impact of Auslan usage. The proposed approach leverages the available datasets and acknowledges the dearth of data captured by government pertaining to service utilisation of Auslan, and its application within service settings, at a service user level. There is also a dearth of counterfactual data, which makes the use of traditional statistical methods (specifically MANOVA, Synthetic Design, Difference in Differences) implausible. Such approaches will become plausible when a data capture process involving community specific data capture is initiated. However, this notwithstanding, a robust evaluation of the impact and use of Auslan language on health literacy remains plausible, using the existing health literacy evidence base. The methodology is based on the findings of Kushalnager et. al. (2017), that asserts the importance of sign language and interactive health literacy procured through friendship associations as key factors in health literacy of deaf persons. The health literacy benefits of Auslan are assumed to extend beyond the diminution of disability impacts of Auslan usage, as outlined and estimated in Appendix 1.

Table A3 – Critical health literacy parameters amongst deaf persons

Variable	Beta	T	P
Parent education	–0.135	–0.876	0.389
Race	0.143	0.894	0.379
Age onset of deafness	0.057	0.371	0.714
Hearing level	–0.336	–1.781	0.087*
Parent hearing status	0.089	0.473	0.640
Age learned ASL	–0.464	**–2.690**	**0.012****
Age learned English	–0.168	–1.037	0.309
FHL	0.180	0.939	0.356
IHL-Family	–0.031	–0.186	0.854
IHL-Friends	0.392	**2.386**	**0.025****

Source: Kushalnager et. al. 2017

Note: ASL refers to American Sign Language; *, **, *** denotes significance at the 0.1, 0.05 and 0.01 level respectively

The modelling methodology acknowledges the critical role of Auslan in health literacy. Herein, Auslan is determined to be a critical enabler of health communication, both Interactive health literacy (IHL) communication with friends and critical health communication with health practitioners. The work of Greene et al. (2017) identifies that practitioner patient interactions play a key role in moderating health literacy costs. Auslan is critical to interaction with practitioners with many members of the Deaf community found to not attend practitioner meetings when an interpreter is not available (Orima, 2005).

Estimates of health literacy impact

A survey of the literature revealed that most studies evidenced costs of limited health literacy of between $143 and $7798 at a user level. System wide estimates equated to between 4.5% and 11% There is a dearth of research concerning the cost effectiveness of HL interventions.

Table A4 – Estimates of health expenditure reduction

Study	Effect size	Context
Weiss (2004)	7798	Overall care
Weiss (2004)	6214	Inpatient care
Howard (2005)	1551	Overall care
Howard (2005)	1543	Inpatient care
Saunders (2006)	143	Outpatient care
Saunders (2006)	736	Overall hospital care
Green et al (2019)	675	Overall medical care
Green et al (2019)	11%	Percentage reduction in health expenditures
Spycher (2006)	3%	System wide reduction
Vernon et al (2007)	4.5-10.3%	System wide reduction

Note: All studies employ U.S. data beyond Spycher (2006), which employs Swiss data.

Methodology

Having identified cost estimates from within the health literacy research literature, we selected an estimate that presented as the most generalisable from the predominantly OECD based literature, rather than construct a weighted average effect size, given that the weighted average estimates derived largely from North America cost indicators. Consequently, favouring a system cost reduction estimator, that was calculated as a percentage of total cost was deemed favourable. The system estimator does not perfectly disentangle the fixed and variable cost elements but is nonetheless favourable over the substantially larger weighted estimators.

Service utilisation data indicates that the Deaf community accesses health services regularly but faces challenges in comparison to other communities due to the shortage of Auslan interpreters. The initial estimates account for the benefits of Auslan as the principal determinant of health literacy amongst the Deaf community, and as an enabler of interactive health literacy amongst the Deaf community. Acknowledging that the Deaf culture is critical to the sharing of information pertinent to the Deaf community is central to this methodology. Herein, we employ the Deaf community population estimates supplied by the Productivity

commission rather than the estimates of Johnston (2003) or the census given that the census methodology is likely to understand population size.

Initial estimates

Estimate 1. Appointment method

Eq1.(Total Auslan users × (1-u) × Effect size)
= Total health literacy value

Employing the estimates of Green et al (2019), and the aggregate participant count data, we are able to estimate the total value of the health sessions as a source of intervention/education that improves literacy. The initial estimate assumes that each Auslan user benefits from one health service visitation per year. While the existing literature suggests a visitation rate of greater than a ratio of 1:1, we employ the lesser of the Orima estimate (50,000 visits) and the 1:1 ratio of Auslan users to appointment estimate (30,000). u denotes the frequency of Auslan users not requiring assistance in a medical setting. To account for this cohort, and the diminution of the plausible literacy effect, the user cohort is multiplied by (1 – u). This results in a conservative estimate of service demand, and literacy benefits.

Total annual literacy value = $21,000,667
(Appointment method)

Estimate 2. System wide estimator

Employing the system rate of cost reduction estimated by Greene et al (2019), equating to 11%, we are able to apply the rate of system expenditure reduction to the per capita cost of healthcare. The annual per capita cost of health expenditure is 7,485 in 2018/2019 (per the AIHW). We do not employ the 2019/2020 estimates due to the impact of COVID on health expenditure. For ease of interpretation and clarity's sake, these estimates do not account for intra year timing effects. The term u denotes the frequency of Auslan users not requiring assistance in a medical setting. To account for this cohort, and the diminution of the plausible literacy effect, the user cohort is multiplied by (1 – u).

Eq2.(Per Capita AUD healthcare expenditure)
× (Percentage reduction in health expenditure)
= AUD Effect size

Eq3.(Total Auslan users × (1-u) × AUD Effect size)
= Total health literacy value

Total annual literacy value: $18,562,465
(System estimator method)

Measuring the impact of health service deficits

As noted by Phillips (2018) "Without an interpreter, communication between Deaf individuals who use Auslan as their preferred language and others is compromised. Using notes, lip-reading, or an unqualified interpreter means that a Deaf person receives less favourable service. At best, misunderstanding occurs and at worst, life threatening consequences may result."

The existing estimates are based on the absence of shortages in translator availability. Data suggests that there are often shortages in Auslan interpreter availability. This means that some members of the Deaf community are not able to access health services with an interpreter or forgo attendance. The following estimates account for the health system costs associated with these deficits.

Initial estimates of health service shortages derive from the work of Orima (2003). Auslan user survey data indicates that there were around 50,000 appointments with a health practitioner, of those appointments only 71% were conducted with an interpreter or family member capable of interpreting present. The remaining 29% were either rescheduled or proceeded without an interpreter. The estimated shortages are therefore approximately 14,500 interactions/appointments.

The cost of the shortages to economic activity are calculable as the forgone activity, equating to approximately $1,957,500.

If we assume that the forgone activity results in a health literacy deficit, then based on the work of Greene et al 2017, the deficit would equate to the rate of forgone activity multiplied by the value of health literacy within the cohort requiring Auslan translation. This equates to approximately $6,446,830.50

Eq5.(Total Auslan users × (1-u) × Effect size) × Reschedule rate
= Total lost literacy

Appendix 3 – Auslan user Financial and Legal service access and services deficits, what are the costs to the economy

Access to legal and financial services is of unquestionable importance. The following estimates seek to quantify the extent of forgone economic activity that is consequential to insufficient access to interpreters during personal appointments with legal and financial services professionals.

The estimates derive from the initial datasets of the Productivity Commission and Auslan user surveys conducted by Orima Research. Legal and financial services are not accessed by appointment as frequently as medical appointments. Notably, per Orima (2003) 58% did not engage with or access any legal or financial services within the Auslan user survey, while 14% said they did not require an interpreter.

If we assume that the benefit conferred to the member of the Deaf community must be greater than the cost of the service conferred than the economic cost to the deaf community equates to a minimum of 2,275,560, assuming that the meetings are forgone, or deferred to the next year.

The corresponding benefits of Auslan access to users that are able to viably utilise legal and financial services is significant. Employing the rate of service utilisation and associated costs of service access we are able to determine the benefits size associated with Auslan access for individuals accessing financial and legal services. The total annual benefit associated with professional services access 12,978,380.

Appendix 4 – The impact of Auslan on educational attainment

There is significant literature on the benefits of sign language in educational settings, including early learning, primary and secondary education. Establishing the impact of Auslan on the level of learner attainment is challenging given the paucity of data on the subject. However, there is scope to establish the plausible benefits by modelling the economic benefits attaching to differential frequencies of educational attainment at a cohort level. There is a dearth of data accounting specifically for the completion rates of deaf individuals at a high school level. Consequently, we rely upon ABS estimates of school completion rates at a secondary level. Individuals with a severe or profound disability evidence completion rates of 27%, while individuals with a disability evidenced a completion rate of 34%. These rates are lower than the rates of completion for individuals with no disability of 67%. While there are alternative estimates of the impact of educational attainment on the income or responsibilities of deaf persons, most rely upon very small cohorts, and given the availability of ABS data, accounting for impairment effects, the ABS data was preferred.

Consistent with our earlier estimates, we assume that Auslan usage results in a diminution in the extent of disability from the profound level to the moderate level. Therein, absent of Auslan it is asserted that the impact and extent of disability for school aged children would be greater, and result in poorer completion rates.

This assertion is strongly supported by the literature that shows the benefits of sign language for cognition, collegiate performance, and academic achievement.

Estimates of increase in level completions

$$[0.34\text{-}0.27] \times 30{,}000 = 2100$$

$$[0.17\text{-}0.11] \times 30{,}000 = 1800$$

Key estimates and assumptions

i. The Net increase in high school completions 300

ii. The Net increase in collegiate completions 1800

iii. The Value of income premium for higher education 37.6%; (Forbes et al 2010)

iv. The Value of income premium for secondary school completion 11.5%; (Forbes et al 2010)

Value of increased completions

Total economic benefit = 27,740,700

Sign language capability and workforce outcomes

For all Australians, there is a clear link between average education level and occupational attainment; Deaf Australians are no different (Willoughby, 2011). Sign language has been found to support both better educational outcomes but also better vocational outcomes. Determining the economic benefit associated with Auslan as an enabler of workforce participation is beneficial. Data shortages preclude the direct estimation of the impact; however, we can derive estimates of the impact from ABS datasets. Employing counterfactual data pertaining to the workforce participation and employment rates of individuals from different disability groups we are able to derive a set of plausible estimates of Auslan impacts.

Sign language studies have presented significant evidence of the association between sign language knowledge acquisition and employment outcomes. Sign language capability is the key determinant of employment outcomes, with language capability strongly associated with improved employment prospects, and evidenced outcomes. Importantly, these benefits are assumed distinct from the benefits of improved educational attainment levels. Essentially this increase is not contingent upon greater levels of educational attainment.

Given the broader literature on Auslan language and educational outcomes, we assume that Auslan usage and the associated benefits give rise to the redress of the impact of disability from the profound/severe level to the moderate level. Corresponding ABS employment data may then be employed to estimate the overall impact.

[Change in labour force participation rate × Deaf population] × Change in employment rate × Percentage part time = Increase in part time employees

[Change in labour force participation rate × Deaf population] × Change in employment rate × Percentage full time = Increase in full time employees

Table A5 – Increase in Participation

Part time increase	Full time increase
180.78618	261.23382

Value of economic benefit is determined by multiplying the increase counts by the minimum wage

Table A6 – Economic Benefits of Labour market participation

Part time	Full time	Total
3,543,192.18	10,239,738.78	13,782,930.97

The total economic benefit associated with improved labour market participation and labour rates is $13,782,930.

Appendix 5 - Regression estimates from Dammeyer et al. (2019)

Logistic regression with part of workforce (=1) or not (=2) as independent variable for DHH participants, US sample

	Block 1				Block 2				Block 3			
Variable	***b***	***SE***	***p***	***Exp (B)***	***b***	***SE***	***p***	***Exp (B)***	***b***	***SE***	***p***	***Exp (B)***
Gender (1 = male)	1.534	.562	.006*	4.638	1.596	.569	.005*	4.933	1.900	.638	.003*	6.687*
Age (years)	.011	.022	.613	1.011	-.002	.023	.926	.998	-.007	.025	.785	.993
Level of educational attainment (range 3–6, 6 = PhD)	-.559	.309	.070	.572	-.568	.318	.074	.567	-.684	.369	.064	.505
Additional disability (1 = yes)	-1.083	.523	.038*	.339	-.957	.544	.078	.384	-.877	.597	.142	.416
Degree hearing loss (range1–4, 1 = mild)					.774	.592	.191	2.168	.719	.584	.218	2.053
Age hearing loss diagnosed (years)					.007	.076	.922	1.007	-.014	.093	.876	.986
CI use (1 = yes)					.902	.579	.119	2.465	1.156	.596	.053	3.178
Spoken language skill (range 1–6, 5 = very good)									-.194	.186	.296	.824
Sign language skill (range 1–6, 5 = very good)									-.739	.316	.020*	.478
Written language skill (range 1–5, 5 = very good)									.742	.467	.112	2.100
–2 log likelihood	111.999				107.047				98.885			
Husmer-Lemeshow	5.691				5.150				7.065			
X^2	df = 8				df = 8				df = 8			
Cox & Snell R^2	.108				.137				.181			
Nagelkerke R^2	.189				.239				.318			

Source: Dammeyer, J., Crowe, K., Marschark, M. and Rosica, M., 2019. Work and employment characteristics of deaf and hard-of-hearing adults. *The Journal of Deaf Studies and Deaf Education, 24*(4), pp.386-395.

Appendix 6 – Interpreter shortages, access and service deficits

Data supplied by NAATI strongly suggests that there will be insufficient Auslan interpreters to meet the needs of the Deaf community in Australia. This skills shortage undermines the effectiveness of the NDIS and results in a diminution of NDIS benefits for participants.

This threatens to reduce the effectiveness of the NDIS for Deaf and DeafBlind people, and carries risks around quality, timeliness, cost and work health and safety (Deaf Society, 2015).

As noted by proponents of greater resource support to arrest the skills shortage, Auslan interpreting is a unique skills shortage area. Notably as asserted by the Deaf Society (2015) "Many skills for work in the disability sector can be acquired in months or even weeks. Auslan, like any other language, takes years to learn to fluency."

The interpretation of Auslan and English is critical to the quality of life of the Deaf community. Translation services enable Deaf people to engage with key aspects of broader society, facilitating critical societal interactions as well as civic engagement and economic participation. Therefore, the use of National Accreditation Authority for Translators and Interpreters (NAATI) accredited interpreters is actively supported by Deaf Australia and several other peak bodies.

State and Federal mandates frequently necessitate that accredited interpreter services are utilised and procured by government-funded entities. In 2011 the Premier of NSW issued advice that organisations receiving funding from any NSW government department are expected to ensure that "… interpreter services are provided to clients when needed, and that appropriate translated materials are made available to support service delivery, promote workplace safety, and encourage business and commerce". (Deaf Society, 2003).

Table A7 – Number of Auslan interpreters, by State/Territory and accreditation level

Auslan Interpreters (March 2022)										
Total Auslan Certifications	**ACT**	**WA**	**TAS**	**VIC**	**NSW**	**QLD**	**NT**	**SA**	**Other**	**Total**
Recognised Practising Interpreter	0	0	0	1	0	0	0	0	0	**1**
Certified Provisional Interpreter	8	67	7	137	107	101	1	33	0	**461**
Certified Interpreter	1	10	7	58	47	46	2	18	0	**189**
Certified Conference Interpreter	0	0	0	1	1	1	0	0	0	**3**
Total	**9**	**77**	**14**	**197**	**155**	**148**	**3**	**51**	**0**	**654**

Source: NAATI 2022

The vast majority of accredited Auslan interpreters reside in Victoria and New South Wales, with a genuine dearth of accredited interpreters in other states, particularly in NT where culturally appropriate interpreters such as First Nations interpreters are even more vitally needed. Consequently, there remains a critical shortage of interpreting services for members of the Deaf community seeking to access civic services and care services. This has significant implications for Deaf persons seeking to access health services, given the lower levels of health literacy and generally poorer health outcomes evidenced by individuals that are Deaf in comparison to the mainstream population. Please note the figures from Table 2 and 3 should be considered in Aggregate, as theirs is a new framework for accreditation being implemented.

Table A8 – Number of interpreters by State/Territory and region (new framework)

Deaf Interpreters (March 2022)										
Total DI Practitioners	**ACT**	**WA**	**TAS**	**VIC**	**NSW**	**QLD**	**NT**	**SA**	**Other**	**Total**
Recognised Practising Deaf Interpreter	0	7	0	9	8	8	0	3	1	**36**
Certified Provisional Deaf Interpreter	0	8	0	7	4	6	0	2	0	**27**
Total	**0**	**9**	**0**	**9**	**11**	**8**	**0**	**8**	**0**	**45**

Source: NAATI 2022

Appendix 7 – Sign Language users per 1000, selected regions (OECD and Non-OECD)

Table A9 – Sign language users per 1000 persons

Nation	Sign language users per 1000
Bangladesh	3.5682
Pakistan	3.5682
India	3.5682
Indonesia	3.2904
Russia	4.9617
Brazil	2.8227
Spain	11.0452
Egypt	4.6319
America	1.3957
Iran	3.8694
Turkey	3.5571
Japan	1.0013
Mexico	1.0083
France	1.4839
Britain	1.1902
Germany	0.9611
Malaysia	1.8538
Poland	1.0013
Italy	0.6717
Uruguay	5.7587
Hong Kong	2.6731
Holland	0.8600
Australia	1.1679
New Zealand	3.9329

Source: Ethnologue (2016/2017), WorldBank World Development Indicators (2016-2022) and PerCapita calculations

Note: There is some variation in the base year data with values based on available datapoints, given data availability at the time of authorship, this variation is not predicted to be materially impactful on the estimates.

Table A10 - Sign language year of Sign language recognition

Country	Year of Sign Language Recognition
Albania	2014
Austria	2005
Bangladesh	2013
Belgium	2003, 2006 and 2019
Bolivia	2009
Bosnia and Herzegovina	2009
Brazil	2002 and 2005
Bulgaria	2021
Canada	2019
Chile	2021
Colombia	1996
Costa Rica	2020
Croatia	2015
Cyprus	2006
Czech Republic	1998 and 2008
Denmark	2014
Ecuador	2008
El Salvador	2014
Estonia	2007
Finland	1995
Germany	2002
Greece	2017
Guatemala	2020
Honduras	2013
Hungary	2009
Iceland	2011
India	2016
Ireland	2017
Italy	2021
Japan	2011
Kenya	2010
Kosovo	2010 and 2014
Latvia	1999
Lithuania	1995
Luxembourg	2018
Malaysia	2014
Malta	2016
Marshall Islands	2015
Mexico	2005
Mongolia	2016
Netherlands	2020
New Zealand	2006
Nicaragua	2009
North Macedonia	2009
Norway	2021
Panama	1992
Papua New Guinea	2015
Paraguay	2020
Peru	2010
Philippines	2018
Poland	2011
Portugal	1997
Republic of Korea	2015
Romania	2002
Russian Federation	2012
Serbia	2015
Slovakia	1995
Slovenia	2002
South Africa	1996
Spain	2007 and 2010
Sweden	1981, 2006 and 2009
Turkey	2005
Uganda	1995
Ukraine	2004, 2017 and 2019
Uruguay	2001
Venezuela (Bolivarian Republic of)	1999
Uzbekistan	2020
Zimbabwe	2010

Source: World Federation for the Deaf (2022)

Appendix 8 – Sign Language Policy and Legislation in New Zealand

Much like within Australia, many Deaf people in New Zealand identify as members of a distinct linguistic and cultural group; these individuals often use New Zealand Sign Language NZSL as their first or preferred language, in the same way as Deaf people in Australia use Auslan. Whether a Deaf person identifies with the Deaf community is a personal choice.

As noted within the report, NZSL is an official language in New Zealand. It has been recognized in New Zealand both unofficially and officially for a number of years. This recognition is most notable in the enactment of the NZ Sign language Act that was passed in 2006 in order to promote and maintain the use of NZSL (See s 3 NZSL Act).

As an official language NZSL may be used in legal proceedings, and sign language usage is actively supported and cultivated by government, to ensure adherence to the act. The Act makes NZSL an official language and provides for the use of NZSL in legal proceedings.

This is a key divergence from language policy in Australia that sees sign language as a 'community language', noting that languages have traditionally not been recognized expressly in statue in Australia in the same manner as New Zealand.

The Act sees the deaf community as a "as the distinct linguistic and cultural group of people who are Deaf and who use NZSL as their first or preferred language, and people who are Deaf and who identify with that group.

The Act establishes critical principles for the use of sign language within several critical settings, and notably the principles seek to guide government pertaining the promotion of access to government information and services within the Deaf community.

The principles reinforce each other and broadly as they pertain to government departments seek to facilitate and support the following;

1. Consultation on matters relating to NZSL;
2. Using NZSL to promote services and provide information; and
3. Making services and information accessible to the Deaf community.

The Act considers what is reasonably practicable as dependent on the circumstances. Therefore, this means "weighing the anticipated benefits of a potential course of action against the anticipated costs or disadvantages". The Act does not however encourage a narrow focus, and government guidance actively asserts that principle 1 was not intended to be narrow in interpretation.

The guidance pertaining to giving effect to the legislation notes that "In every case, departments should use their genuine best endeavours to give effect to the principles when exercising their functions and powers consistent with the purpose of promoting and maintaining the use of NZSL."

TABLE A11 – Principles of the NZSL Act

Principle 1 The first principle is that the Deaf community should be consulted on matters relating to NZSL (Section 9(1)(a) NZSL Act). This would include work to develop policies on NZSL interpreting or translation. This obligation is placed on the chief executive of the department. The Act says that the required consultation is to be "effected by the chief executive" consulting – to the extent that is reasonably practicable – with the persons or organisations that the chief executive considers to be representative of the interests of the members of the Deaf community (Section 9(2) NZSL Act). While the obligation to consult applies to matters relating to NZSL this should not be interpreted in a narrow way. As a matter of good practice, departments should consult the Deaf community on any matters that will impact on them as citizens or residents, including their ability to access services. General consultation processes should be accessible to the Deaf community.
Principle 2: Using NZSL to promote services and provide information The second principle is that NZSL should be used in promoting government services and providing information to the public. This means that information promoting government services should, where reasonably practicable, be translated and made available in NZSL videos. Departments provide a huge amount of written information to the public. Careful planning (and consultation with the Deaf community) is needed to determine what information should be provided in NZSL.
Principle 3: Making services and information accessible to the Deaf community The third principle is that Government services and information should be made accessible to the Deaf community through the use of appropriate means (including the use of NZSL). This means that departments should arrange and pay for NZSL interpreting services when meeting with Deaf people, and translate information into NZSL. However, it is not limited to that.
"Appropriate means" can include any other designs or accommodations that should reasonably be made in order to make government services and information accessible to the Deaf community.

Source: NZ Government Guidance on bringing effect to the NZSL Act

Together these principles actively promote better policy formation through improved approaches to consultation, a focus on accessibility of information, and a notably a pertinent focus on access.

Unlike Australia's community language policy, the NZSL Act serves as a strong enabling force to facilitate better use of NZSL in civic processes, legislative proceedings, in service access and in the formulation of policies pertinent to the Deaf Community of New Zealand. The scope and focus of the Act may be instructive in the design of inclusive language policies and or the enactment of future language protections through legislation.

For an excellent precis of New Zealand sign language consider the following studies;

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