



Do multilingual androids dream of a better life in Australia? Effectiveness of information technology for government translation to support refugees and migrants in Australia

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Abstract

Without high-quality translation of online information about government support and services, refugees and migrants from culturally and linguistically diverse backgrounds in Australia experience a major barrier to improved health, employment, education and social outcomes. Recent advances in the ability of Google Translate, Skype Translator and other forms of machine translation that use artificial intelligence can help translate government information to better support refugees and migrants but they bring the risk of ineffective communication, and exclusion from services that could positively impact on settlement experiences and daily life. Evidence suggests that government agencies are likely to be using human translators for most translation work, but the degree to which any form of information technology is used, how it may be best applied and the associated effects are not known. This study systematically reviewed the peer-reviewed and grey literature to determine effective ways of using information technology for translating government information to refugees and migrants from culturally and linguistically diverse backgrounds in Australia. Included studies were analysed to identify techniques and other characteristics

of translation, information technology and language support more broadly, and outcomes on education, health, social and other refugee and migrant experiences relating to translated information. Our review found a small evidence base featuring studies with strong evaluation demonstrating effective forms of 'language support' for refugees and migrants from culturally and linguistically diverse backgrounds in Australia in a broad sense. However, there is a major gap in knowledge that is contributing to barriers in the use of online government information in Australia. In particular, there is an absence of evidence demonstrating what is effective in the use of machine translation with artificial intelligence, websites and other kinds of information technology for translating government information with refugees and migrants from culturally and linguistically diverse backgrounds. The oversight risks further excluding already marginalised groups from services and support. This paper makes a number of suggestions practitioners can take to address the issue and guidelines for future research.

KEYWORDS

effectiveness, migrant, online engagement, refugee, translation

1 | INTRODUCTION

Information about health, education, employment, social support and other government support and services is increasingly made available online in Australia (Missingham, 2008; Newman, Biedrzycki, & Baum, 2012). Online information is now critical to improving access to and use of services and support available (Gauld, Goldfinch, & Horsburgh, 2010). However, most online content is in English (Mohammad, 2013). The lack of government information online in languages other than English, and/or developed in ways that communicate more effectively based on non-Western attitudes and beliefs, is a barrier to services and support (Cunningham, McCombe, & Sarkozi, 2007). This is a major challenge for the many Australians who are from over 190 different countries, speak more than 300 languages at home and identify with over 100 different religions (Australian Bureau of Statistics, 2017). Difficulty accessing services and support can contribute to poorer health, education, employment and social outcomes (Australian Institute of Health and Welfare, 2016), and reinforce existing inequalities (Newman, Javanparast, Baum, & Hutchinson, 2015). Australia's multicultural population needs better support through more culturally and linguistically appropriate government information online. The need is reinforced by Australian government legislation and guidelines, which aim to help drive more inclusive government services and support (Commonwealth of Australia, 2013a; Disability Discrimination Act, 1992; Racial Discrimination Act, 1975).

This systematic review aims to identify how online platforms and other forms of information technology, such as machine translation using artificial intelligence, computers and websites, can best translate government information to meet the needs of refugee and migrant communities from culturally and linguistically diverse backgrounds in Australia. We argue that more effective translation of government information can help improve social, health, education, financial and other outcomes related to settlement. Although recent advances in the ability of Google Translate, Skype Translator and other forms of machine translation that use artificial intelligence can help translate government information to better support refugees and migrants, they bring the risk of ineffective communication which can reinforce experiences of exclusion and contribute to poorer mental health and related social outcomes. Also, resources and effort may be better spent on other more effective approaches to translation. Rather than assuming these services will naturally result in better access for non-English-speaking service users, our research suggests that a more considered and targeted approach is required to support refugees and migrants in Australia and ensure that translated materials are of the same quality as their English counterparts.

1.1 | Background

Translation plays an important role in the development of culturally and linguistically appropriate government information (Commonwealth of Australia, 2013a). Translation is often imagined for its literary use, such as in the text-based translation of novels and other creative work between languages. The majority of translation work performed in Australia, however, is for marketing communications, and government documents or official documents such as birth or marriage certificates or documents proving identity (National Accreditation Authority for Translators and Interpreters 2017). Translation is not the same as interpreting, which involves appropriately trained professionals who facilitate oral communication between languages, such as in courtroom hearings or health sessions, although they are related activities (Hale, 2011; Yelland et al., 2017). Generally, translation focuses on changing written words and sentences, from one language to another, so that they make sense in a particular context (Hale & Liddicoat, 2015). In Australia, human translators are likely to work on documents used by government agencies as part of the practical delivery of services such as in administration, financial counselling, community health, nursing, multicultural education, social work and settlement support (Centre for Culture, Ethnicity and Health, 2008). Human translators may also work as bilingual staff at government agencies, helping to build long-term relationships with refugee and migrant communities from culturally and linguistically diverse backgrounds, and improving access to language services in rural and regional areas (Federation of Ethnic Communities Councils of Australia, 2016).

Translated government information is vital in the lives of refugees and migrants from culturally and linguistically diverse backgrounds in Australia. Refugees are forced to leave their homeland (Harris & Zwar, 2005) and arrive facing specific challenges associated with settlement that translation helps address. As part of language services, translated government information helps reduce communication difficulties, which can exacerbate stress and mental health issues that refugees experience as a result of torture, war, conflict, persecution and other forms of trauma (Federation of Ethnic Communities Councils of Australia, 2016; Harris & Zwar, 2005). Similarly, appropriately translated medical information is mutually beneficial for refugee patients and health professionals, increasing trust, motivation and comprehension of medical recommendations, reducing the risk of medical errors, and ensuring informed consent and confidentiality (Muela Ribera, Hausmann-Muela, Peeters Grietens, & Toomer, 2008). Having access to basic translated government information about services and agencies also helps with learning where to go or who to call for medical emergencies, legal issues, transport, recreational activities and other aspects of daily life (Cunningham et al., 2007).

Migrants have chosen to move to Australia for a relatively long period of time (Westin, 2003), and are likely to have better access to financial resources and social networks when compared with refugees. Migrants experience similar benefits from translation as refugees. Translation can help reduce issues with language that enable migrants to feel more socially connected and less isolated, have better access to social services and less risk of mental health conditions, and understand more about their new culture (Federation of Ethnic Communities Councils of Australia, 2016).

Information technology can be of great benefit to the translation of government information. Computers, the Internet, mobile devices and software programmes assist translation through their ability to increase the speed of translation (Pym, 2011) and the amount of translated materials (Sahin, 2014). Translated government information made available online is an opportunity to share materials that are up to date, of a high quality and meet the needs of users (Cunningham et al., 2007). People who live in rural and remote areas may be able to access translated government information more easily (Gauld et al., 2010). Some languages also require specific characters and forms of online representation requiring complex technological support (Cunningham et al., 2007).

Translation technology also supports the training of human translators. In training and education, translation technology helps to learn and manage the workflow of translation through the use of online/electronic dictionaries, termbanks, termbases, translation memory systems, corpora, terminology management tools, online document management software, machine translation systems, text-to-speech/speech-to-text tools, optical character recognition programmes and similar forms of technology (Sahin, 2014).

More recently, advances in artificial intelligence and the learning and reasoning ability of machine translation technology, such as Google Translate and Skype Translator, has increased the accuracy of online translation (Shiah 2018; Takahashi & Tanaka-Ishii, 2017; Wu et al., 2016). Machine translation refers to software that automatically translates information from one language into another (Yvon, 2014). The use of artificial intelligence in machine translation expands the technology's ability by training it to learn and work better with rich languages and real data for more accurate translation of sentences, and with great speed (Wu et al., 2016). The instantaneous nature of online machine translation with artificial intelligence has the potential to help more people across the world communicate and share information much easier (Nott, 2017). For refugees and migrants in Australia, and Australian government agencies, who need to support a growing population with many different language speakers, online machine translation with artificial intelligence represents an opportunity to access more and better quality translated materials, quickly.

Yet, there are risks and major issues in the use of information technology for translation in Australia. Artificial intelligence has been found to be ineffective (Miller et al., 2018), particularly when translating complex and nuanced information, such as in health and legal settings (Hale & Liddicoat, 2015). Translation requires an understanding not just of sentences and grammar, but of broader cultural context – such as the use of irony, allusions, colloquialisms and other indirect or more sophisticated forms of creating meaning (Hale & Liddicoat, 2015; NSW Health 2017). A lack of high-quality translation could further reinforce experiences of exclusion and contribute to poorer health, social, education and economic outcomes for Australia's culturally and linguistically diverse population. For example, failing to communicate in culturally and linguistically appropriate ways on social support and health services can have major negative impacts on recently arrived refugees who are likely to experience feelings of cultural displacement and social isolation (Iglesias, Robertson, Johansson, Engfeldt, & Sundquist, 2003; Norredam, Garcia-Lopez, Keiding, & Karsnik, 2009; Van Wyk, Schweitzer, Brough, Vromans, & Murray, 2012). Difficulties in communication with refugees may exacerbate their experience of stress, depression and other mental health issues associated with settlement (Barnes & Aguilar, 2007; Federation of Ethnic Communities Councils of Australia, 2016; Liamputtong, Koh, Wollersheim, &

Walker, 2016). Older migrants may experience similar issues related to stress, depression and social isolation, particularly as they age and revert back to their original language (Federation of Ethnic Communities Councils of Australia, 2016). Additionally, evidence suggests there are barriers to easy access and use of information technology online for some refugees and migrants in Australia (Alam & Imran, 2015; Newman et al., 2012). These are compounded by poor of Internet connections, differential ability to use new and emerging forms of information technology and affordability issues. Existing Australian government policies provide direction on the use of translation as part of service delivery and support (Commonwealth of Australia, 2013a; NSW Health, 2017). They suggest that government agencies are likely to be using human translators for most translation work rather than online machine translation that uses artificial intelligence. What is not clear though is how any form of information technology is used for translation with refugees and migrants across Australia, although past research has been performed in Victoria (Cunningham et al., 2007). Given the recent developments in machine translation using artificial intelligence, there is also a need to establish how it and other forms of information technology may be best applied. Indeed, there have been recent calls for more use of information technology in the translation industry, potentially as a way to improve access to interpreting and translation services (Federation of Ethnic Communities Councils of Australia, 2016), and strengthen the capacity of human translators to meet the demand for translation through improved professional development activities (National Accreditation Authority for Translators and Interpreters, 2017).

A better understanding of the opportunities and challenges in the use of information technology for translating government information is important for addressing the needs of refugee and migrant communities from culturally and linguistically diverse backgrounds in Australia. This review seeks to shed light on what helps with more effective use of information technology for the translation of government information to improve social, health, education, financial and other outcomes related to settlement, and more broadly, the lives of refugees and migrants in Australia.

2 | METHODS

A systematic review is useful for determining ways of improving Australian government services and systems (Klassen et al., 2010) including how to better meet the needs of refugees and migrants from culturally and linguistically diverse backgrounds (Wechkunanukul, Grantham, Damarell, & Clark, 2016). This systematic review synthesises available evidence to assist policymakers, practitioners and researchers to make decisions for developing, implementing, evaluating and performing translation activities that use information technology.

A range of databases were searched (including Academic OneFile, EBSCOhost, Emerald insight, Informit, INSPEC, JSTOR, Ovid MEDLINE, PubMed, ProQuest, ScienceDirect, SpringerLink, Taylor & Francis online, Wiley online library) to identify information technology and the experiences of refugees and migrants in Australia between 1979 and 2018. Search strings used were:

- (refugee) OR (migrant) OR (culturally and linguistically diverse) OR (communities) OR (non-English-speaking background) AND (translation) AND (language) AND (technology) AND (effective) AND (Australia);
- (language services) OR (language support) OR (English language learning) OR (translation assessment) OR (translation evaluation) OR (language learning and translation) OR (translator training) AND (technology) AND (effective) and (Australia);
- (artificial intelligence) OR (information technology) OR (translation technologies) OR (machine) OR (mobile devices) OR (computer-aided translation) OR (interactive translation) OR (neural

machine translation) OR (phrase-based machine translation) OR (statistical machine translation) OR (deep learning) OR (natural language processing) OR (deep neural networks) OR (language crowd sourcing) AND (translation) and (language) and (effective) and (Australia).

Studies included were those in English, conducted in Australia and about refugees and migrants from culturally and linguistically diverse backgrounds, translation and information technology. Studies were excluded if they were not in English, did not focus on the effectiveness of translation using information technology, take place in Australia and involve refugees and migrants from culturally and linguistically diverse backgrounds. Studies had to consider the effectiveness of translation using information technology in meeting the needs of refugees and migrants such as addressing issues of language, literacy levels and differing cultural attitudes/beliefs (Jongen, McCalman, Bainbridge, & Clifford, 2018; McCalman, Jongen, & Bainbridge, 2017).

The grey literature search included documents published on the websites of Australian federal and state government departments, and non-profit agencies and peak bodies who have performed translation and/or related work. These included the Federation of Ethnic Communities Councils of Australia, the National Accreditation Authority for Translators and Interpreters, the Australian Institute of Interpreters and Translators, Australian Policy Online, the Australian Multicultural Education Service, the Centre for Culture, Ethnicity and Health, the Centre for Multicultural Youth and the Special Broadcast Service.

Results of the review are provided in the PRISMA diagram (see Figure 1; Moher, Liberati, Tetzlaff, & Altman, 2009). The results were analysed to identify techniques and other characteristics of translation, information technology and language support more broadly, and outcomes on education, health, social and other refugee and migrant experiences relating to translated information. See Table 1 for the results of studies included in the review.

This review used the Critical Appraisal Skills Programme (CASP) quality assessment tool (Singh, 2013) to assess studies for their strength of evidence, use of translation techniques and approaches and type of settings (see Figure 2). Researchers in Australia have used the CASP tool (Figure 2) previously for reviewing studies exploring the improvement of service provision through engagement with cultural and linguistic diversity in healthcare. As healthcare is a major part of government services and requires high levels of complex and accurate translation for improved health outcomes with refugees and migrants (Hale & Liddicoat, 2015), it is reasonable to assume other government services working with refugees and migrants have similarly complex and high-quality translation needs such as in legal, commercial and educational settings. The similarities in translation needs between government services suggests that the CASP tool is appropriate for assessing the quality of studies relevant to a range of government service provision contexts, studies which are often qualitative. Qualitative research has been used regularly in community-based studies involving relatively small amounts of people who may be hard to reach (Abrams, 2010). The CASP tool is designed to help make sense of qualitative research through systematic analysis, without the use of scoring system (Singh, 2013).

The review also undertook analysis of qualitative research, which helps to generate findings that can be shared and transferred to other forms of research, policymaking and practice. Sharing and transferring qualitative research findings are important when only small amounts of evidence are available (Garcia-Izquierdo, Moreno, & Garcia-Izquierdo, 2010). Also, including qualitative research that explores the experiences of people from refugee and migrant backgrounds can help government services to better address the need to make information more accessible and inclusive (Commonwealth of Australia, 2013a; Disability Discrimination Act, 1992; Racial Discrimination Act, 1975).

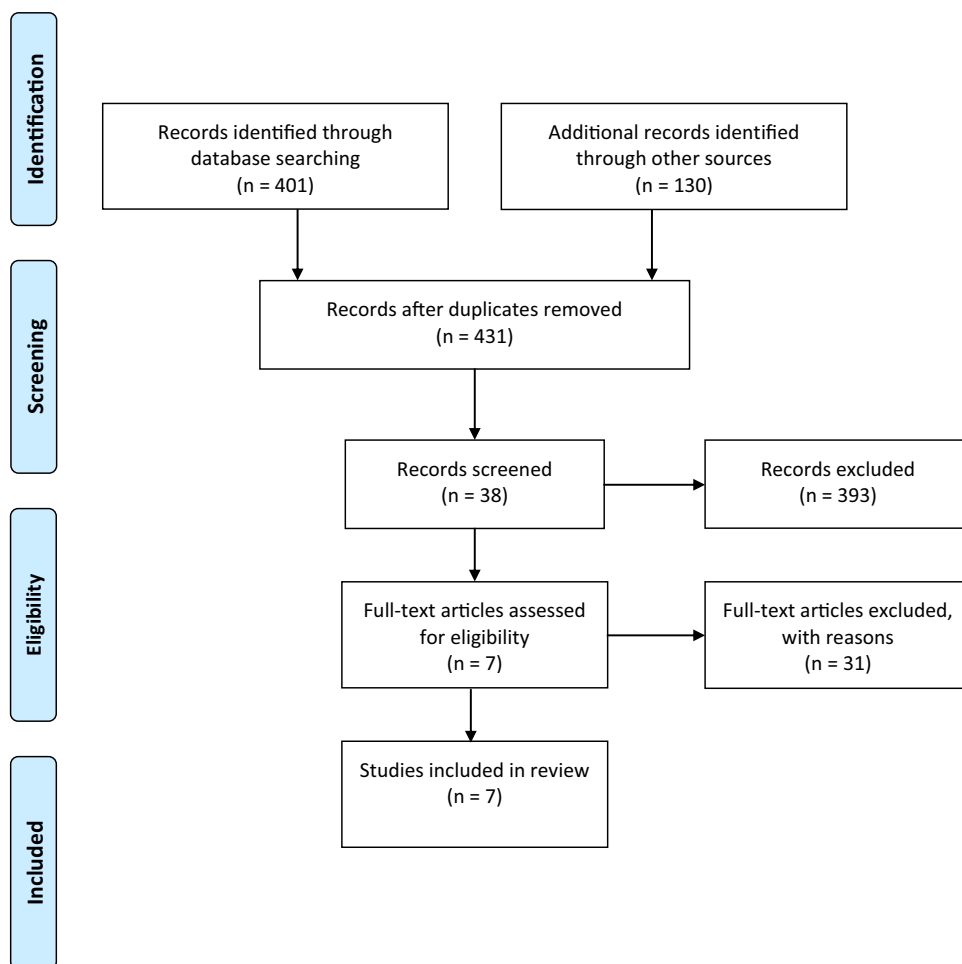


FIGURE 1 Quality assessment criteria (Moher et al., 2009) [Colour figure can be viewed at wileyonlinelibrary.com]

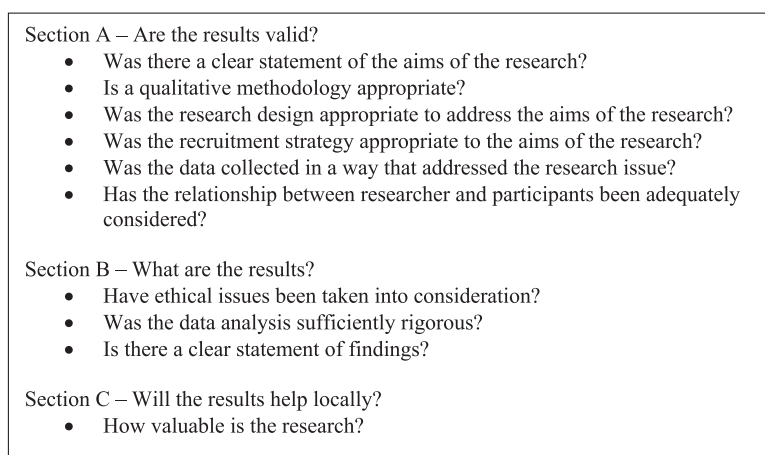


FIGURE 2 Critical Appraisal Skills Programme (CASP) quality assessment tool (Singh, 2013)

TABLE 1 Studies that evaluated the effectiveness of language support with refugees and migrants from culturally and linguistically diverse backgrounds in Australia

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Beatty et al. (2014)	Local and international university students, including those from culturally and linguistically diverse backgrounds.	Population Health course (first year), Edith Cowan University, Perth, Western Australia	Testing the effectiveness of implementing academic socialisation support at the beginning of student transition into higher education. Support activities were general and embedded study skills development (including online learning technology platform, Blackboard); socialisation through communication; a progressive, cumulative approach to assessment; follow-up of at-risk students; and, end-of-semester student feedback	Student response to the unit overall was generally positive, with high rates of student satisfaction reported including improvements in communication and writing skills. Limitations were a lack of longitudinal quantitative analysis to measure performance and support impact; appropriate support for students who irregularly visited or did not visit the campus; participation from students at risk was challenging. Time restraints for students and the broader university culture that does not support broader graduate outcomes were issues.	Qualitative: a case study with practitioner observations on the experiences of a student group participating in academic activities for English language support	Weak

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Cairney and Ruge (1998)	Primary and secondary students, including those from Aboriginal or Torres Strait Island backgrounds, and students from culturally and linguistically diverse backgrounds, such as Arabic, Spanish and Vietnamese and other Asian language speakers	Ridgehaven Girls' High School, South Australia; St Joseph's Catholic Primary School, Australian Capital Territory; Parklands Public School, Tasmania and Woodgate Public School, Queensland	An exploratory study of differences in the language and literacy practices of schools, families and community groups. In particular, the study identified matches and mismatches between the discourse practices of home and school and the impact that any differences have on students' school success. Strategies for language and literacy development included schooling-based activities (homework, playing schools); students engaged in 'school literacy' – e.g. classroom activities, 'how to do tasks' and simulations of real activities, school support and limited use of computers.	The schools adopted innovative strategies to acknowledge and respond to the diverse language and literacy practices of the communities they support. Use of the strategies, in some cases, began to improve literacy outcomes. Issues were identified with specific and local strategies not necessarily translating to another context with the same results; and underlying factors and challenges (e.g. socioeconomic disadvantage) limiting the ability of strategies to accomplish educational change.	Qualitative: case studies (3 primary schools, 1 secondary). Case studies used: observation of literacy practices; video, audio and other documents and artefacts; interviews with students, parents, school and community members; and analysis of school outcome data.	Strong

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Cunningham et al. (2007)	Community members representing 20 emerging and established community and language groups: Arabic, Croatian, Greek, Polish, Somali, Afghan, Eritrean, Iraqi, Portuguese, Sudanese, Burmese, Ethiopian, Italian, Romanian, Turkish, Chinese, Ghanaian, Macedonian, Serbian and Vietnamese	The State Government of Victoria and the policy, practice and other activities shaping the way translated government information is provided online	Research into how multilingual online government information can be created and used in the best way for communities from culturally and linguistically diverse backgrounds. The research explored the results of data from consultations with community members and government/service providers, demographic analysis, technical analysis (scan of websites, examination of international guidelines) and the development of a proof of concept multilingual website	A 'whole of Victorian government' multilingual website has interest and potential usefulness. To develop the site, two factors need to be addressed: the limited use of online translations by communities, partly related to the difficulty of discovering and accessing translations; and the need for appropriate formatting and quality of multilingual information online.	Qualitative: consultations with community members (40 focus group participants, 22 interview participants) and government and language service providers (18); demographic analysis; technical research; and creation of a proof of concept multilingual website	Strong

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Li (2012)	Families of Chinese background	Monash University, Melbourne, Victoria	A study exploring parent-child interactions to identify how they support children's bilingual heritage language development in everyday home contexts. Families who participated each had a four to five-year-old child born in Melbourne. Data were generated over 9 months through videoed interview, photographs and video observations taken by the participants and the researcher.	The study found that effective parent-child interactions are key to the achievement of the positive development of children's bilingual heritage language. Two-way engagement in parent-child interactions is important as it takes into account both parents' demands and children's motives when they interact with each other within everyday family practices showing a shared meaning of the words and activities. The study was limited by challenges such as issues in the use of video equipment for recording data, as well as the small number of families involved in the research, suggesting a need for more work with a greater number of participants.	Qualitative: a dialectic-interactive methodology with multiple methods. Three Chinese-Australian immigrant families participated in the study	Strong

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Pinder (2005)	International postgraduate students from non-English-speaking backgrounds	Academic support programme at an Australian university	Research exploring the experience of providing academic support to international postgraduate students from non-English-speaking backgrounds and factors affecting their university performance. The support was conducted over 20 hr and involved sessions that provided the student analytical tools to monitor and edit English writing, and to establish and strengthen techniques of editing and proofreading as part of the writing process. Addressing the student's short- and long-term learning needs was an important part of the support.	The student received confirmation of candidature, indicating the positive role support played in completion of the degree. Provision was made for ongoing support. Issues identified were as follows: written English would require further development before final thesis submission; the findings of an individual case study cannot be generalised to a broad student group; balancing short- and long-term student goals is challenging; and organisational factors contribute to the effectiveness of language support, such as collaboration and communication.	Qualitative: a case study with practitioner reflections on factors affecting the performance of research students from non-English-speaking backgrounds in universities, focusing on three areas: language, knowledge and identity.	Weak

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Slaughter and Hajek (2007)	People from nine community languages: Italian, Greek, Vietnamese, Cantonese, Arabic, Mandarin, Macedonian, Turkish, Spanish and Croatian	State government primary schools in Victoria	A study exploring the provision of languages other than English (LOTE) in Victorian primary schools through analysis of the geographical location of community groups and primary LOTE programmes; and examination of teachers' qualification, time allotment and programme type	The study found that there was more of a match than a mix between LOTE provision and the needs of communities from culturally and linguistically diverse backgrounds in Victoria. Issues identified were as follows: wide variance in the extent of provision and the number of students and schools; some community languages showed considerable growth, suggesting increased demand; changing patterns of demographic concentration were not being matched by corresponding changes in LOTE provision; conflict and discrimination, transient experiences of settlement and perceived issues with compatibility between LOTE and English literacy and numeracy skills; and, the nature of LOTE provision including time per week and supply of adequately qualified teachers.	Quantitative: analysis of statistical information from sources containing information about the provision of LOTE in primary and secondary state schools during normal school hours; LOTE classes through distance education; unpublished data from the Ethnic Schools Association of Victoria and/or language use data from the Australian Bureau of Statistics.	Strong

(Continues)

TABLE 1 Continued

Author and year	Population	Setting	Type of language support study	Outcome indicators or measure	Study design	Study quality
Yelland et al. (2017)	Women in labour from culturally and linguistically diverse backgrounds including Afghan women	Dandenong Hospital, Melbourne, Victoria	Evaluation of an intervention aiming to improve the engagement of interpreters for women in labour. The intervention used were as follows: a working group exploring linguistic needs of women giving birth in the hospital; the plan-do-study-act (PDSA) framework to optimise learning for intervention at scale and sustainability, within the hospital's existing resources and language services; midwives who tested the framework for acceptability and made routine offers of an interpreter including through phone-based support; professional development sessions; and information resources	The engagement of interpreters increased from 28% (21/74) at baseline to 62% (45/72) at the ninth month of implementation. Issues were identified regarding access to information and communication for parts of care beyond consent for procedures including the provision of reassurance to women during labour and improving their ability to ask questions. The collaborative approach helped to support reflection and conversations for communicating differently when working together. Long-term implementation and replication at other services were noted as likely.	Qualitative: information and notes from midwives (9) and hospital staff during feedback processes; maternity data on levels of engagement with interpreters (undertaken retrospectively); and interviews with women of Afghan background (20 of 29). Analysis included frequencies and thematic analysis of comments.	Strong

3 | RESULTS

The review identified a total of 531 studies from the peer-reviewed and grey literature. There were six studies from the peer-reviewed literature that met the review's inclusion criteria. Of the 130 grey literature studies, only one study met the inclusion criteria.

The included studies consisted of six qualitative studies and one quantitative study, all of which evaluated the effectiveness of language support for refugees and migrants from culturally and linguistically diverse backgrounds (Beatty, Collins, & Buckingham, 2014; Cairney, 1998; Cunningham et al., 2007; Li, 2012; Pinder, 2005; Slaughter and Hajek, 2007; Yelland et al., 2017). There was only one study focused on the use of information technology for translation (Cunningham et al., 2007). The studies varied in focus, setting, content, approach, duration and outcomes.

Five studies were based in education settings (Beatty et al., 2014; Cairney, 1998; Li, 2017; Pinder, 2005; Slaughter and Hajek, 2007). One education study was conducted across South Australia, Australian Capital Territory, Queensland and Tasmania and focused on primary and secondary schools (Cairney, 1998). Two Victorian studies were held in primary school (Slaughter and Hajek, 2007) and higher education settings (Li, 2017), with the latter exploring family-child relationships. A Western Australian study also explored a higher education setting (Beatty et al., 2014). One education study did not specify a location (Pinder, 2005). The remaining two studies were held in Victorian health (Yelland et al., 2017) and state government settings (Cunningham et al., 2007).

Four studies were conducted in Victoria (Cunningham et al., 2007; Li, 2017; Slaughter and Hajek, 2007; Yelland et al., 2017). Established community language groups in Australia were represented in all of the Victorian studies, and Asian languages were most common across the studies. The studies included a variety of community language groups including languages spoken by people longer settled and more recently arrived in Australia.

All studies featured the use of strategies and/or operating frameworks from health, education and/or state government legislation and/or policy to guide practice; a place-based approach; techniques and approaches aiming to improve access to language support and language skills and appropriate formats and quality of language information and support. All qualitative studies (six) undertook a form of community engagement.

The characteristics of the included studies are extracted and summarised in Table 2.

All six qualitative studies demonstrated successful community engagement and improvements in health, education, social and/or related outcomes. There were four qualitative studies that showed improvements in written and/or spoken language skills.

The quality of included studies was assessed using the CASP tool and five studies were found to be relatively strong. The five studies demonstrated strength in quality due to consistently strong methodology across the criteria. The studies used consultations, interviews, focus groups, audio and video recordings and/or service or school data to gather evidence for analysis of study outcomes and experiences.

Two projects were case studies that used practitioner observations and were found to be weak in quality due to a lack of a strong methodology (Beatty et al., 2014; Pinder, 2005). Neither study explored the long-term impact of language support for participants and/or evaluated, in a detailed way, the influence of broader organisational structures and factors.

The quality of evaluation was strong across most of the studies. All studies included detailed and appropriate information about their aims and approaches. The studies also reported that the projects addressed the language needs of community members according to data collected from services and/or broader research into the education, health, information and language experiences of refugees and

TABLE 2 Summary - Characteristics of language support for refugees and migrants from culturally and linguistically diverse backgrounds in Australia

Author and year	Aim	Implementation	Outcomes							
	Increasing access to language support	Health, education and/or relevant practice strategy/framework work	Develop appropriate resources, tools and/or guides	Structured language support activities	Face to face and technology based communication	Appropriate format and quality of language information and support	High rates of participation	Improvements in written and/or spoken language skills	Improvements in health, education, social and other outcomes	Improved relationships between educators, agencies, community members and/or other stakeholders
Beatty et al. (2014)	✓	✓	X	✓	✓	✓	X	✓	✓	X
Yelland et al. (2017)	✓	✓	✓	✓	✓	✓	X	X	✓	✓
Cairney and Ruge (1998)	✓	✓	X	✓	✓	✓	X	✓	✓	X

(Continues)

migrants including challenges with English language proficiency, literacy and maintaining homeland languages. Four qualitative studies with strong quality of evaluation explored the experiences of community members in comprehensive ways to determine effective forms of language support, strengthening the conclusions of these studies, based on the evidence collected (Cairney, 1998; Cunningham et al., 2007; Li, 2017; Yelland et al., 2017).

One quantitative study analysed statistical information about the provision of language education and language use from recognised sources of data about experiences of language: Victorian Department of Education and Training, Ethnic Schools Association of Victoria and Australian Bureau of Statistics (Slaughter and Hajek, 2007). Although not directly involving community members, it is reasonable to argue the study remains appropriate with regard to its overall aim and approach, according to the CASP tool. The study's conclusions are strengthened by its consistently strong methodological approach, as per the quality assessment criteria.

All the language support activities evaluated in the studies reviewed used evidence-based approaches. The study conducted in a hospital setting addressed a language barrier for patients by improving access to appropriate interpreters (Yelland et al., 2017), which is in line with the National Primary Health Care Strategic Framework (Commonwealth of Australia, 2013b). The two studies exploring student experiences in higher education considered the impact of structured support for improving the language skills of students from non-English-speaking backgrounds within existing education programmes, an approach recommended by the National Strategy for International Education (Commonwealth of Australia, 2016). The two studies performed in primary school, secondary school and/or home environments considered the impacts of support for languages at home and in the classroom, such as structured teaching, homework activities and family interactions, which are recognised forms of support (Housen, 1997; Tannenbaum and Howie, 2002). The study about the provision of language education and language use drew on an appropriate statistical method.

The review found only one study that explored the effectiveness of information technology for translation. The study was conducted in Victoria and focused on how multilingual online government information can be created and used in the best way for communities from culturally and linguistically diverse backgrounds (Cunningham et al., 2007). The study was guided by Victorian state government and international policy and language practice recommendations (Victorian Office of Multicultural Affairs, 2003; World Wide Web Consortium, 2017). Websites and other online forms of information technology were explored in the study, with a focus on the role of hypertext mark-up language (HTML) and PDFs for 'direct access' to text and links to information in the required language; and 'mediated access' to translated information contained within an English language website, often accessed by someone on behalf of a community member from sites such as the Health Translations and Justice Translations directories. A 'proof-of-concept' website was created through the study (Cunningham et al., 2007).

Furthermore, translation was not the main focus of all studies. Translation was a focus in one study (Cunningham et al., 2007). The remaining six studies were focused on various forms of language support that may have involved the translation of information, although to varying degrees, and as part of other activities. Interpreting was the focus of one study (Yelland et al., 2017). Support for English language skills, written and oral, was a focus of two studies (Beatty et al., 2014; Pinder, 2005). Improving access to and use of languages other than English through programmes at school, home and/or local communities was the focus of three studies (Cairney, 1998; Li, 2017; Slaughter and Hajek, 2007).

All the studies demonstrated sensitivity to meeting the needs of refugees and migrants from culturally and linguistically diverse backgrounds. Meeting the needs of refugees and migrants involved the use of preferred forms of communication during projects; interviews, focus groups and/or other

forms of consultations to identify preferred approaches to language support and the development of appropriate programmes and/or information resources.

In the next section, we discuss findings from the review and their implications for research and practice.

4 | DISCUSSION

Our review found that the evidence base on information technology for translating government information has several major shortcomings. Firstly, despite the importance of providing high-quality translations for non-English-speaking groups, the evidence base is small. It is worth nothing though that the majority of studies featured strong evaluations of effective 'language support' for refugees and migrants from culturally and linguistically diverse backgrounds in Australia, in a broad sense, across three settings. The settings were education, health and Victorian State Government websites.

Secondly, the evidence base does not explore the effectiveness of artificial intelligence, websites and other forms of information technology for translating government information to meet the needs of refugees and migrants from culturally and linguistically diverse backgrounds in Australia. For example, most studies were conducted in education settings, and explored teaching programmes, academic skills support in higher education and/or the role of family and home-based activities.

Finally, there is no conclusive evidence of what is effective when using artificial intelligence, websites and other forms of information technology for translating government information to meet the needs of refugees and migrants from culturally and linguistically diverse backgrounds in Australia. Although the field of artificial intelligence is progressing at a rapid pace, how these new technologies are being used – or how they could be effectively used – to support the translation of government service information is unknown.

The evidence base suggests a need for caution when considering the use of information technology, including artificial intelligence, in the translation of government information for supporting the needs of refugees and migrants from culturally and linguistically diverse backgrounds in Australia. At present, it is not clear whether information technology is effective for translating government information. Some research also indicates that there are issues with the use of technology such as artificial intelligence in maintaining the quality and complexity of translation for health, legal and similar purposes (Hale & Liddicoat, 2015). Importantly, research suggests that other forms of language support that include translation as part of their activities may be more effective (Cairney, 1998; Li, 2017; Yelland et al., 2017).

In light of the shortcomings in the evidence base, government agencies may benefit from determining the effectiveness of a simultaneous investment in human translator services, information technology that support the needs of human translator services and machine translation with artificial intelligence. Government agencies may also benefit from developing strategies for guiding translation that integrate human translators and the development of online content in line with existing policies aimed at supporting cultural diversity and information technology accessibility including adherence to international standards. As noted earlier, translation requires an understanding of broader cultural context (Hale & Liddicoat, 2015; NSW Health 2017). These cannot be easily encoded in algorithms for translation, especially when relying on open platforms such as Google Translate, which are not tailored to the translation of government service information.

Furthermore, government agencies could create more direct access to information through greater use of HTML files rather than PDF documents. Files that are HTML have accessible in-language navigation, and improve the usability, accessibility and discoverability of online translated information

(Cunningham et al., 2007). Cunningham's work (2007) suggested that the first step in improving access to information for non-English-speaking groups may in fact be to remove all PDFs from government websites and replace them with HTML files.

In addition to these practical implications, our review also provides guidance for future research. To prevent inequalities in service information and use, there is a need to urgently address the lack of existing Australian research into the effective use of artificial intelligence and other forms of information technology, including websites, for translation. Exploratory research has the potential to identify opportunities and challenges in the use of information technology for supporting the translation of government information to better support the needs of refugees and migrants from culturally and linguistically diverse backgrounds. The findings of recent studies can best guide future research, and in two ways.

In the first instance, research needs to be conducted at a national level that establishes how refugees and migrants use the Internet, including artificial intelligence, websites and other technology, for translated government information, and the ways in which the translation of government information can be improved. National research into experiences with online forms of translated government information will build on the findings of past Victorian research and fill a major gap in knowledge.

Secondly, targeted research into how information technology may best support the Australian language services industry would also be beneficial. The National Accreditation Authority for Translators and Interpreters has noted the potential for innovative use of information technology in supporting translation across Australia including the professional development activities of human translators (National Accreditation Authority for Translators and Interpreters, 2017). Research exploring how artificial intelligence and other information technology can be effectively embedded into the training, education and professional development opportunities for human translators could help to maintain the quality of translation work in Australia, while also adhering to translation standards, without compromising the work of people in the language services sector.

Research in this area needs to expand the size and diversity of participants in language support projects for education, health and other government services more broadly. The number of participants in higher education settings was relatively small, located in two states and their cultural and linguistic backgrounds was not clear. Studies based in primary, secondary and home settings involved a greater number of participants from a variety of communities recently and longer settled in Australia, and located in more states across the country. However, some education studies are over 10 years old, and did not reach all areas of Australia. Also, there was only one study conducted in a health setting, and it focused on women from Afghan background. Recent population data suggest that Australians speak more than 300 languages at home (Australian Bureau of Statistics, 2017). Evaluating the experiences of a much greater number of participants is required to better understand what helps support the language needs of Australia's growing multicultural society including those longer settled as well as more recently arrived.

Finally, there is an opportunity to determine how changes to higher level policies and systems could positively influence the conditions of life so that access and use of language support, including translation activities, is easier and more effective. The review found studies exploring the effectiveness of language support at local levels including individual universities, schools and community areas. Connecting work at a local level with policy and/or structural changes addressing housing, employment, health and other relevant settlement pathways may be effective (Badland et al., 2014). Additionally, higher level policies that help to build relationships between government services and the interpreting and translations sector may help strengthen existing language support across Australia, and better leverage effective approaches (Federation of Ethnic Communities Councils of Australia, 2016). Partnership-based work between the health and legal sectors, where complex and accurate translation

is required as part of support for refugees and migrants (Hale & Liddicoat, 2015), and government agencies responsible for the development of information technology in service provision, could be a viable strategy for identifying more effective forms of practice.

5 | CONCLUSION

There is a major gap in knowledge that is contributing to barriers in the use of online government information in Australia. The absence of evidence demonstrating what is effective in the use of machine translation with artificial intelligence, websites and other kinds of information technology for translating government information with refugees and migrants from culturally and linguistically diverse backgrounds risks further excluding them from services and support. As more government information becomes available online, there is an increased risk of worsening education, health, financial and social challenges associated with settlement. However, the impact of information technology for translating government information with refugees and migrants from culturally and linguistically diverse backgrounds across Australia is unknown. New research and evaluation projects are required. Our systematic review provides guidance on future research, as well as a number of practical steps that can be taken in the meantime by practitioners. Overall, the research indicates the need for major investment in both understanding and implementing effective translation policies and practices. Without this investment, groups already experiencing marginalisation on the basis of cultural and linguistic differences will be further excluded from society and critical government services.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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REFERENCES

- Abrams, L. S. (2010). Sampling 'hard to reach' populations in qualitative research: The case of incarcerated youth. *Qualitative Social Work*, 9(4), 536–550.
- Alam, K., & Imran, S. (2015). The digital divide and social inclusion among refugee migrants. *Information Technology & People*, 28(2), 344–365.
- Australian Institute of Health and Welfare. (2016). *Australia's health 2016*. Canberra: Author.
- Australian Bureau of Statistics. (2017). *Cultural diversity in Australia, 2016*. Canberra: Author.

- Badland, H., Whitzman, C., Lowe, M., Davern, M., Aye, L., Butterworth, I., ... Giles-Corti, B. (2014). Urban liveability: Emerging lessons from Australia for exploring the potential for indicators to measure the social determinants of health. *Social Science & Medicine*, *111*, 64–73.
- Barnes, D. M., & Aguilar, R. (2007). Community social support for Cuban refugees in Texas. *Qualitative Health Research*, *17*, 225–237.
- Beatty, S., Collins, A., & Buckingham, M. (2014). Embedding academic socialisation within a language support program: An Australian case study. *The International Journal of the First Year in Higher Education*, *5*(1), 9–18.
- Cairney, T. & Ruge, J. (1998). *Community literacy practices and schooling: Towards effective support for students*. Canberra: Department of Employment, Education, Training and Youth Affairs.
- Centre for Culture, Ethnicity and Health. (2008). *Bilingual staff research project report (No. 4)*. Carlton: Author.
- Commonwealth of Australia. (2013a). *Multicultural language services guidelines for Australian government agencies*. Canberra: Author.
- Commonwealth of Australia. (2013b). *National primary healthcare strategic framework*. Canberra: Author.
- Commonwealth of Australia. (2016). *National strategy for international education 2025*. Canberra: Author.
- Cunningham, A., McCombe, C., & Sarkozi, A. (2007). *Community languages online: Current practice and future directions of multilingual information on Victorian government websites*. Melbourne: State Library of Victoria.
- Disability Discrimination Act. (1992). *Disability discrimination Act 1992*. Canberra: Parliament of Australia.
- Federation of Ethnic Communities Councils of Australia. (2016). *Australia's growing linguistic diversity: An opportunity for a strategic approach to language services policy and practice*. Deakin: Author.
- Garcia-Izquierdo, A. L., Moreno, B., & Garcia-Izquierdo, M. (2010). Applying information theory to small groups assessment: Emotions and well-being at work. *Spanish Journal of Psychology*, *13*(1), 309–328.
- Gauld, R., Goldfinch, S., & Horsburgh, S. (2010). Do they want it? Do they use it? The demand side of e-Government in Australia and New Zealand. *Government Information Quarterly*, *27*(2), 177–186.
- Hale, S. (2011). *Interpreter policies, practices and protocols in Australian courts and tribunals: A national survey*. Melbourne: Australasian Institute of Judicial Administration Incorporated.
- Hale, S., & Liddicoat, A. (2015). The meaning of accuracy and culture, and the rise of the machine in interpreting and translation. *Cultus: The Journal of Intercultural Mediation and Communication*, *8*, 14–26.
- Harris, M., & Zwar, N. (2005). Refugee health. *Australian Family Physician*, *34*(10), 825–829.
- Housen, A. (1997). Developing second language from primary school: Models and outcomes. *International Journal of Bilingualism*, *1*, 73–76.
- Iglesias, E., Robertson, E., Johansson, S. E., Engfeldt, P., & Sundquist, J. (2003). Women, international migration and self-reported health. A population-based study of women of reproductive age. *Social Science & Medicine*, *56*, 111–124.
- Jongen, C., McCalman, J., Bainbridge, R., & Clifford, A. (2018). *Cultural competence in health: A review of the evidence*. Singapore: Springer.
- Klassen, A., Miller, A., Anderson, N., Shen, J., Schiariti, V., & O'Donnell, M. (2010). Performance measurement and improvement frameworks in health, education and social services systems: A systematic review. *International Journal for Quality in Health Care*, *22*(1), 44–69.
- Li, L. (2012). *Family involvement in preschoolers' bilingual heritage language development: A cultural-historical study of Chinese-Australian families' everyday practices* (PhD thesis). Clayton VIC: Monash University.
- Liamputtong, P., Koh, L., Wollersheim, D., & Walker, R. (2016). Peer support groups, mobile phones and refugee women in Melbourne. *Health Promotion International*, *31*(3), 715–724.
- McCalman, J., Jongen, C., & Bainbridge, R. (2017). Organisational systems' approaches to improving cultural competence in healthcare: A systematic scoping review of the literature. *International Journal for Equity in Health*, *16*(1), 78.
- Miller, J. M., Harvey, E. M., Bedrick, S., Mohan, P. & Calhoun, P. (2018). Simple patient care instructions translate best: Safety guidelines for physician use of Google translate. *Journal of Clinical Outcomes Management*, *25*(1).
- Missingham, R. (2008). Access to Australian Government information: A decade of change 1997–2007. *Government Information Quarterly*, *25*(1), 25–37.
- Mohammad, M. (2013). *Overcoming the Barriers by Non-English Speaking Background (NESB) Communities in Accessing Australian Government Information Systems - The NESB Model (PhD Thesis)*. Sydney NSW: University of Western Sydney.

- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*, 6(7), e1000097.
- Muela Ribera, J., Hausmann-Muela, S., Peeters Grietens, K., & Toomer, E. (2008). *Is the use of interpreters in medical consultations justified? A critical review of the literature*. San Diego, CA: PASS-International.
- National Accreditation Authority for Translators and Interpreters. (2017). *Annual report 2016/17*. Author.
- Newman, L., Biedrzycki, K., & Baum, F. (2012). Digital technology use among disadvantaged Australians: Implications for equitable consumer participation in digitally-mediated communication and information exchange with health services. *Australian Health Review*, 36(2), 125–129.
- Newman, L., Javanparast, S., Baum, F., & Hutchinson, C. (2015). *Evidence review: Settings for addressing the social determinants of health inequities*. Melbourne: VicHealth.
- Norredam, M., Garcia-Lopez, A., Keiding, N., & Karsnik, A. (2009). Risk of mental disorders in refugees and native Danes: A register-based cohort study. *Social Psychiatry and Psychiatric Epidemiology*, 44, 1023–1029.
- Nott, G. (2017). Machine translation faces final frontier: Worldly wisdom. *Computerworld*, 10 July.
- NSW Health. (2017). *Interpreters – standard procedures for working with health care interpreters*. North Sydney: Author.
- Pinder, J. (2005). Effective language support for international/NESB postgraduate research students: Reflections on a case study. *TESOL in Context*, 15(2), 24–29.
- Pym, A. (2011). What technology does to translating. *The International Journal for Translation & Interpreting Research*, 3(1), 1–9.
- Racial Discrimination Act. (1975). *Racial Discrimination Act 1975*. Canberra: Parliament of Australia.
- Sahin, M. & Dungan, N. (2014). Translation testing and evaluation: A study on methods and needs. *The International Journal for Translation & Interpreting Research*, 6(2), 67–90.
- Singh, J. (2013). Critical Appraisal Skills Programme (webwise). *Journal of Pharmacology and Pharmacotherapeutics*, 4(1), 76–77.
- Slaughter, Y., & Hajek, J. (2007). Community languages and LOTE provision in Victorian primary schools: Mix or match? *Australian Review of Applied Linguistics*, 30(1), 7.1–7.22.
- Shiah, T. (2018). High Bandwidth Memory: The Great Awakening of AI. *Electronic Design*, 66(2), 24–28.
- Takahashi, S., & Tanaka-Ishii, K. (2017). Do neural nets learn statistical laws behind natural language? *PLoS One*, 12(12), e0189326.
- Tannenbaum, M., & Howie, P. 2002. The association between language maintenance and family relations: Chinese immigrant children in Australia. *Journal of Multilingual and Multicultural Development*, 23:408–424.
- Van Wyk, S., Schweitzer, R., Brough, M., Vromans, L., & Murray, K. (2012). A longitudinal study of mental health in refugees from Burma: The impact of therapeutic interventions. *Australian & New Zealand Journal of Psychiatry*, 46, 995–1003.
- Victorian Office of Multicultural Affairs. (2003). *Improving the use of translating and interpreting services: A guide to Victorian government policy and procedures*. Melbourne: Department for Victorian Communities.
- Wechkanukul, K., Grantham, H., Damarell, R., & Clark, R. A. (2016). The association between ethnicity and delay in seeking medical care for chest pain: A systematic review. *JBIC Database of Systematic Reviews and Implementation Reports*, 14(7), 208–235.
- Westin, C. (2003). *Migrant. Dictionary of Race, Ethnicity and Culture*. Thousand Oaks, CA: SAGE.
- World Wide Web Consortium. (2017). *WC3 standards*. Cambridge, MA: Author.
- Wu, Y., Schuster, M., Chen, Z., Le, Q. V., Norouzi, M., Macherey, W., ... Dean, J. (2016). *Google's neural machine translation system: Bridging the gap between human and machine translation*. Ithaca, NY: Cornell University.
- Yelland, J., Biro, M. A., Dawson, W., Riggs, E., Vanpraag, D., Wigg, K., ... Brown, S. (2017). Bridging the language gap: A co-designed quality improvement project to engage professional interpreters for women during labour. *Australian Health Review*, 41(5), 499–504.
- Yvon, F. (2014). Machine translation. *Oxford bibliographies: Linguistics*. New York: Oxford University Press.

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