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Future-Focused:
Educating in an Era of Continuous Change

Beyond English-only: Towards multilingual instruction with machine translation

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Australian universities face a critical disconnect between the predominance of monolingual instruction and the multilingual realities of the student population at the tertiary level. With one-fifth of the Australian population speaking a language other than English, existing educational paradigms often fail to foster inclusive learning environments that reflect this linguistic diversity present in the student population. The gap necessitates a fundamental shift in language instruction, which must challenge monolingual conventions and accommodate students from more diverse linguistic backgrounds. While generic translation tools are widely available, they frequently produce fragmented or inaccurate outputs, especially when applied to complex academic content. In the absence of a clear national language policy, this concise paper argues that fine-tuned artificial neural networks used in machine translation, when trained on annotated parallel data, can bridge the equity language instruction gap and facilitate the implementation of multilingual instruction as part of a transformative shift led by educators to ensure no student is left behind.

Keywords: multilingual instruction, pedagogy, machine translation, educational technology

Introduction

As universities and tertiary-level institutions increasingly adopt learning management systems (LMS) to expand educational offerings, the enforced 2021 Higher Education Standards Framework (Threshold Standards) requires a shift from the conventional one-size-fits-all monolingual model toward multilingual instruction (Atif et al., 2021; Australian Government Department of Education, 2021; Burrack & Thompson, 2021; Cranitch et al., 2023; Dobinson & Mercieca, 2020). More than 22 percent of the Australian population consists of non-native English speakers, with an estimated 5,663,719 people, including students, speaking a diverse array of Languages Other Than English (LOTE) at home, comprising Mandarin, Hindi, Vietnamese, Cantonese, Punjabi, Greek, Italian, Filipino/Tagalog, and Spanish, as outlined in Table 1.

Table 1
Language used at home (.id – the population experts, 2022)

Australia – Total persons (Usual residence)	2021		2016	
Language Summary	Number	%	Number	%
Speaks English Only	18,303,661	72.0	17,020,418	72.7
Non-English total	5,663,719	22.3	4,858,804	20.8
Not stated	1,455,417	5.7	1,522,684	6.5
Total Population	25,422,797	100.0	23,401,906	100.0

Among the population, over 1.1 million students were enrolled in tertiary education during 2021, with a further 600,000 engaged in vocational training (Australian Bureau of Statistics, 2022a), as outlined in Table 2. To elaborate, the 2021 Australian Cultural Diversity Census revealed that 872,000 (Australian Bureau of Statistics, 2022b) people in Australia, including tertiary-level students, spoke English poorly or not at all,

Table 2
Tertiary-level attendance (Australian Bureau of Statistics, 2022a)

People attending tertiary institutions	Greater Sydney	New South Wales	Australia
Vocational education (including TAFE and private providers)	137,739	207,586	601,901
University or other higher education	288,727	375,032	1,185,450

with Mandarin speakers forming the largest group of people (175,716) with limited English proficiency, as shown in Table 3. This reflects the extent of cultural diversity and, when examined in conjunction with the country of birth and English proficiency levels, provides insights into the linguistic needs of the multicultural population (.id – the population experts, 2022).

Table 3
Top 10 languages with the highest proportion of speakers with low English proficiency, 2021 (Australian Bureau of Statistics, 2022b)

Language	People who used language at home (count)	People with low English proficiency (count)	Proportion with low English proficiency (%)
Khmer	40,037	12,909	32.5
Vietnamese	320,758	97,176	30.5
Hazaraghi	41,678	12,478	30.2
Chaldean Neo-Aramaic	21,684	6,322	29.3
Korean	115,531	31,018	27.0
Assyrian Neo-Aramaic	38,534	10,189	26.6
Mandarin	685,274	175,716	25.9
Burmese	18,849	4,644	24.8
Dari	29,828	7,048	23.8
Cantonese	295,281	69,625	23.7

Canvas, Blackboard, and Moodle are the most common LMSs utilised for formalised course delivery and learning worldwide. The LMSs serve as a unified platform for organising course management, distributing educational content, and facilitating communication, offering a streamlined approach for administrative functions, material dissemination, and interactive exchanges within academic settings (Al-Sharhan et al., 2020). In this context, digital equity happens when individuals have access to the technological tools required for active participation in education. As such, participating in a digitised classrooms means that multilingual students who are instructed only in English may require some equitable considerations to assist in the efficiency and effectiveness of the learning process. (Reisdorf & Rhinesmith, 2020)

Problematising Monolingual Instruction in Digital Education

The entrenched dominance of monolingual instruction directly contradicts Target 4.5 (Unterhalter, 2019) of Sustainable Development Goal (SDG) 04 (Assembly, 2015), which calls for inclusive and equitable quality education for all students. Even the European-developed Content and Language Integrated Learning (CLIL) program (Baker, 2014), adopted in the state of Queensland (Smala, 2022), is

insufficient to meet the diverse linguistic needs of the international student population (Dobinson & Mercieca, 2020; Veliz & Chen, 2024), as shown in Figure 1. Consequently, the equity gap in language instruction persists, as the monolingual model, prioritises English-only instruction, and the bilingual model, which centers on two dominant languages, remain inadequate for addressing the diversity of the tertiary student population in the classroom (Major, 2018).
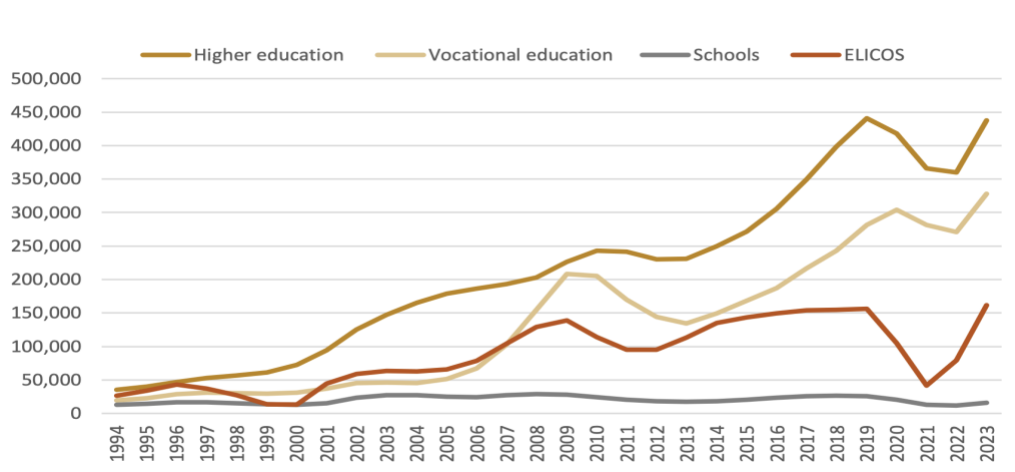

Figure 1. International student enrolments by education sector, 1994 to 2023 (Norton, 2024)

As part of the 2030 Agenda, 193 countries committed to providing all students equal access to early childhood, primary advanced technology which can pave the way for educators to transcend the monolingual divide (Duarte & der Meij, 2022). This can be done by embracing LMS-embedded Artificial Intelligence (AI)-driven tools (Van Laere et al., 2017), which can reduce barriers by fostering an inclusive and equitable learning environment for every non-native English-speaking student (Boeren, 2019). In so doing, the language instruction shift aligns with the SDG 04 goals while signaling to designers and developers an awareness to consider the limitations inherent in existing educational technology tools and pedagogical frameworks that constrain students' autonomy in navigating learning materials (Sulecio de Alvarez & Dickson-Deane, 2018).

Framing The Challenge

Given the lack of a national language policy which guides how languages are used and managed within a specified context regardless of where the discussion occurs (i.e., institution, community and/or country level) (May, 2017), open-source Neural Machine Translation (NMT) models offer a viable solution to mitigate monolingual instruction bias in Australian tertiary institutions when fine-tuned without incurring high computational costs (Steigerwald et al., 2022).

The use of annotated parallel data is also critical to guide the translation of learning materials and the course instructions into the selected language. The technique involves adapting an NMT model to discipline-specific course content, assessments, and guidelines, utilising high-quality manually annotated instructional parallel data in the source (English) and the corresponding target (non-English) language (El Idrysy et al., 2024). Based on the generated output and automatic evaluation metrics, further model fine-tuning, where necessary, is crucial to align the data with the language needs of non-native English-speaking students.

To evaluate the NMT model performance, the Bilingual Evaluation Understudy score (BLEU) will inform how closely the machine-generated translations align with the human reference data. In addition, the Character-level F-score (CHRF) would measure the extent to which the generated educational content matches the human reference. The Cross-lingual Optimized Metric for Evaluation of Translation (COMET) will also assess whether meaning and context are preserved or distorted during the translation process (Popović, 2015; Rei et al., 2020; Vaswani, 2017). Non-native English speakers will evaluate the output through human evaluation to identify areas for further refinement (Escribe, 2019).

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Divergent perspectives exist among educators regarding the benefits of multilingual education, including the view that the method complicates curriculum delivery and the concern that it places additional demands on teachers (Noble & Watkins, 2024), with arguments shaped by institutional norms (Duarte & der Meij, 2022) and personal beliefs (Portolés & Martí, 2020). Conversely, other educators advocate for inclusive language strategies (Gilham & Fürstenau, 2020) to accommodate the diverse student population (Bosch et al., 2025).

Recommendations and Future Work

While the debate continues, this concise paper makes a provocative claim that the transformative shift from monolingual to multilingual instruction (Meier, 2017) requires a collaborative effort and targeted preparation (Liyanage & Tao, 2020). This paper recommends the need for a framework that considers the language diversity of the growing multicultural student population to inform pedagogical design. The framework, initially as a discussion point, should also consider user interaction and the need to expand across educational settings while equipping educators with the support and training required to lead inclusive multilingual instruction in an increasingly diverse learning landscape. Albeit it is not clear who should be burdened with some or all of the effort and preparation, what is clearly known is that there is a need to empower educators to lead the change and foster an equitable learning environment. To say this, the common phrase of leaving no student behind will be true in an era defined by technology (Van Laere et al., 2017).

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