The Perception and Utilization of AI-Powered Language Translation Tools for Communication among International Students.

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ABSTRACT

This study explores how international students perceive and use AI-powered language translation tools, emphasizing their role in enhancing social integration, academic performance, and communication. The survey which included 851 international students as well as the subsequent regression analysis indicate that higher academic levels and perceived translation accuracy correlate with increased use for both personal and academic purposes. Additionally, students with prior experience using AI translation tools are more likely to continue using them. However, students with higher language proficiency tend to use these tools more for academic purposes but less for general communication and are less likely to recommend them. The study also highlights the importance of helpful features in AI translation tools, such as text translation, speech translation, instant camera translation, and offline translation, which significantly impact user satisfaction and frequency of use. These findings underscore the necessity of providing resources and training on AI translation tools to support international students, thereby improving their educational experience and enhancing communication.

Keywords: AI, Language, International, Students, Communication

INTRODUCTION

Background

The way people use and interact with technology has changed significantly in recent years due to the application of artificial intelligence (AI) in various fields. One significant area where AI is being used is in language translation tools, which are becoming more advanced and accessible. These tools are very helpful for people, companies, schools, students, universities, and organisations operating in multilingual environments because they use artificial intelligence algorithms to provide instant translation and improve communication across multiple languages.

Research orientation

As an international student who has spent six years studying abroad, I have observed that language barriers often hinder international students' ability to perform academically, integrate socially, communicate, and maximise their time abroad. While traditional language learning and translation methods are helpful, AI-powered language translation technologies offer an extra layer of support. However, the extent to which international students view these tools as helpful and actually use them has not been fully studied. This study aims to fill this gap by looking at the perspectives and usage patterns of AI-driven language translation tools among international students.

Significance of the study

This research holds great importance for academic establishments, developers of technology, and the global community of international students. Acquiring knowledge about how international students use and view AI

translation tools can help academic institutions improve their support offerings. The findings of this study can give insight to educators on how to assist international students in overcoming language difficulties, improving their academic performance and overall educational experience, as well as in communicating effectively. Understanding how their peers use and interpret AI-powered language translation tools can provide international students with important insights. With this information, students can utilise these technologies more wisely when it comes to their social and academic lives. Making the most of these resources can improve interactions, reduce feelings of loneliness, and improve the experience of studying abroad. Through its examination of a relatively unexplored area, this work further enhances the academic literature and provides a foundation for future research.

METHODOLOGY

Research design

The purpose of this study is to examine how international students perceive and use AI-powered language translation tools in their academic and daily lives. This study employs a mixed-methods approach to provide a thorough understanding of the study objectives by combining both quantitative and qualitative data. Conducting a survey to gather data on the perceptions, effects, and usage patterns of AI-powered translation tools is the quantitative aspect. The subject matter was further enhanced by the addition of existing literature. International students enrolled in higher-education institutions make up the target group. A stratified sampling technique was employed in their selection process to guarantee a diverse range of age, gender, academic attainment, and language proficiency. This method makes it possible to include a variety of viewpoints and experiences.

Data collection methods

A survey covering numerous areas, such as demographic information, usage trends, and perceptions, was conducted. The survey was circulated via social media platforms to international student communities and groups, with the goal of encouraging them to share it with other international students in order to achieve a wide reach. To summarise the survey data, this study will use econometric methodologies, such as regression analysis.

Demographic Information of Participants

The survey specifically focused on international students enrolled in higher education and received responses from a total of 851 participants. The respondents' age distribution was as follows: 48.4% (412) of the individuals fell into the age range of 18-23 years old. 32.2% (274) were between 24-29 years old. 12.6% (107) were aged between 30-35 years. 3.3% (28) were in the age range of 36-41 years. 2% (17) were 42 years old or more. Lastly, 1.5% (13) were under the age of 18.

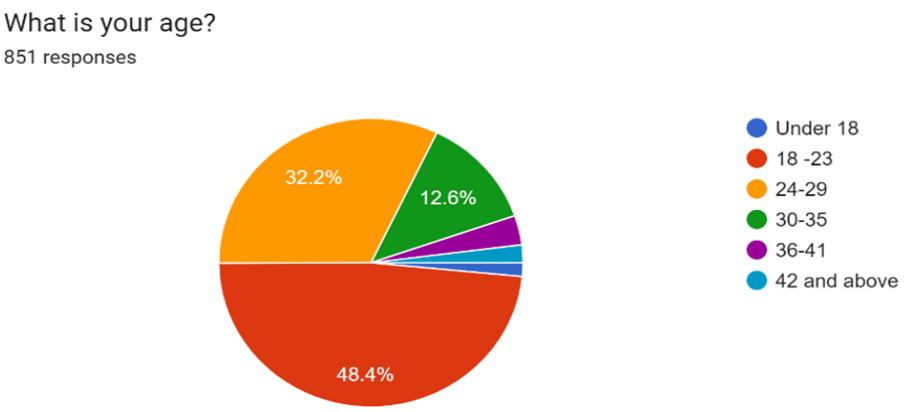

Figure 1

The gender breakdown showed that 52.4% (446) of the respondents were male, while 47.6% (405) were female.

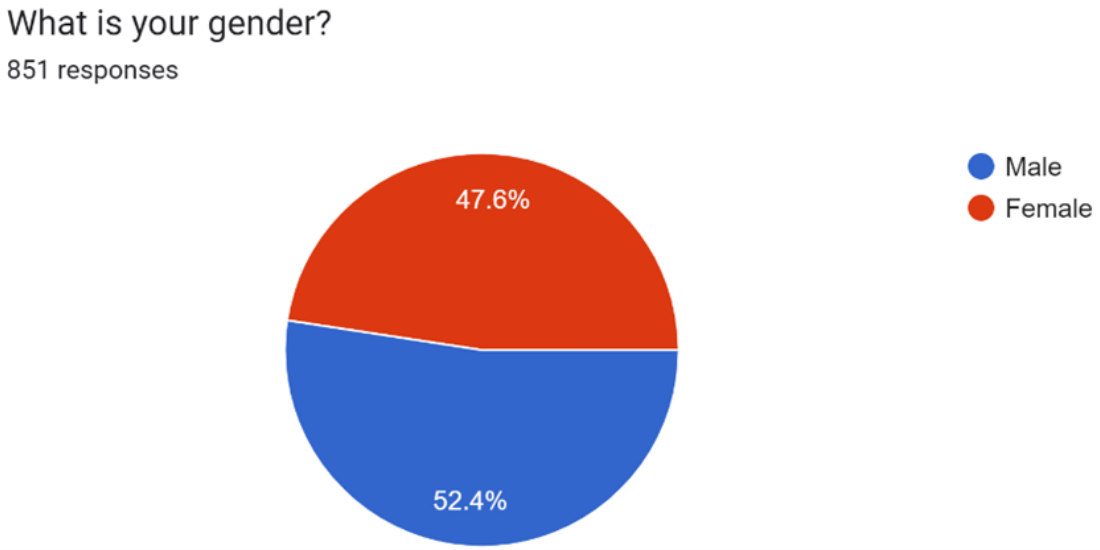

Figure 2

In relation to academic levels, 762 participants provided this data: 52.2% (398) of the students were pursuing a bachelor's degree, 23.8% (181) were pursuing a master's degree, and 24% (183) were pursuing a PhD. Regarding language skills, 74.5% (634) of individuals were at a beginner level in the primary language of instruction, 16.6% (141) were native speakers, 4% (34) were at an advanced level, and 4.9% (42) were at an intermediate level.

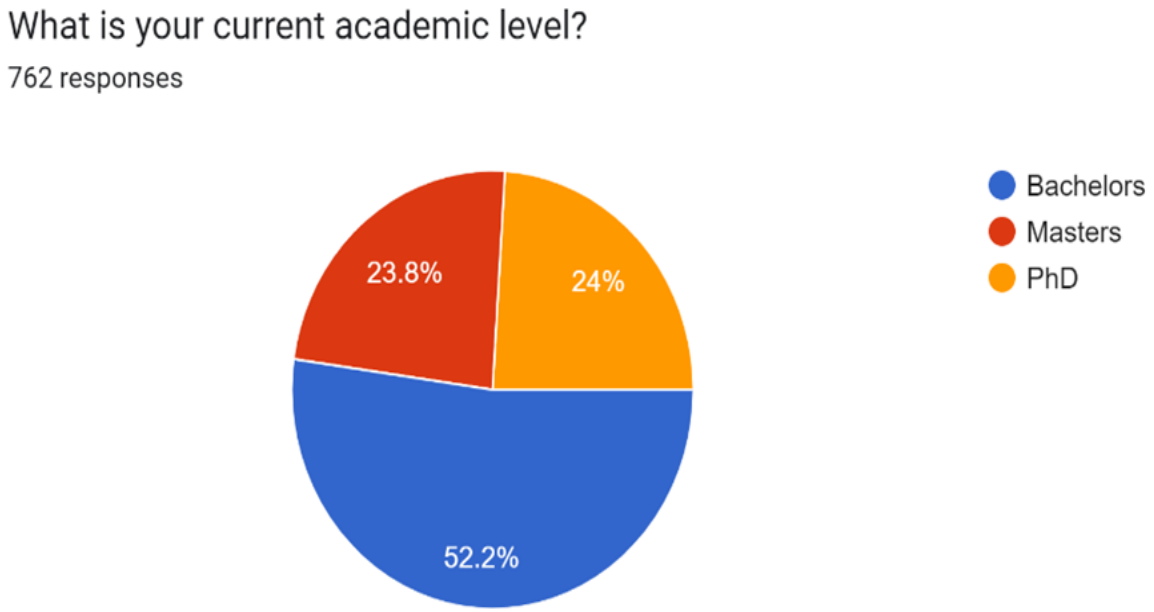

Figure 3

LITERATURE REVIEW

Overview of AI-powered language translation tools

In recent years, there has been substantial progress in the development of language translation tools powered by artificial intelligence (AI). These tools aim to improve communication by overcoming linguistic and cultural differences. These technologies have advanced from simple translation systems to complex programmes that utilise artificial intelligence, specifically machine learning and neural networks, to enhance accuracy and usability. Originally focused on languages with a small number of speakers (Amtrup, 1999), AI translation systems have become essential for worldwide communication. The field of natural language

processing has seen significant advancements, as demonstrated by the development of applications such the Japanese-English online teaching systems (Tokuda, 2001) and English-French text conversion chatbots (Mohan, 2023). Nevertheless, the efficacy and ethical ramifications of these practices continue to be topics of contention (Mohamed, 2024). In her study, Pokrivčáková (2019) delves more into the advantages and difficulties of integrating AI into language instruction. She acknowledges the enhancements in personalised learning and teaching efficacy, while also emphasising the necessity of teacher training and addressing the potential for misuse. In his study, Lee (2020) explores the use of machine translation (MT) as a teaching tool in English as a Foreign Language (EFL) classes. He highlights the beneficial effects of MT on student writing and emphasises the importance of teacher assistance in addressing its limits. In his study, Wang (2023) explores the wider educational consequences of AI for international students. He highlights the advantages of personalised learning and adaptive testing, while also acknowledging the obstacles posed by privacy issues, cultural differences, and ethical considerations.

Development and technological advancements

Language translation tools have undergone substantial technological breakthroughs over their existence. The journey began with rule-based systems, advanced to statistical machine translation (SMT), and more recently, transitioned to neural machine translation (NMT). The translation process has been revolutionised by these innovations, which have challenged conventional beliefs regarding quality and output (Parsa, 2021). Computer-aided translation has become the prevailing commercially feasible norm due to its increasing prominence (Parsa, 2021). Advancements in technology have made it possible to translate languages with a small number of speakers, thereby overcoming the limited availability of resources by using automatic translation capabilities (Amtrup, 1999). In his study, Mudawe (2019) investigates the capabilities of technology-driven translation technologies, including Machine Translation (MT), Computer-Aided Translation (CAT), and Translation Management Systems (TMS). The study examines the efficacy of Google Translate in comparison to human translators, highlighting the intricacy of guaranteeing translation accuracy and the need for additional research to fulfil international benchmarks. Moreover, the swift advancement of these tools has broadened their reach by including a more extensive array of languages, hence improving worldwide communication and inclusivity.

Benefits and challenges of AI-powered translation

AI-driven translation systems have transformed global communication by dismantling linguistic obstacles, enabling instantaneous translation, and enhancing the accessibility and efficiency of cross-cultural engagement (Mohan, 2023). These tools provide substantial advantages in educational environments, especially for international students who depend on them for academic and social reasons. Li (2021) examines the capabilities of AI translation systems in improving English learning methods, showcasing their potential in customised and adaptable learning environments. Despite the benefits of AI-powered translation systems, they still face challenges in ensuring accuracy and quality in translations on websites and apps (Gunarto, 2019). The intricacy of managing colloquial idioms, specialised jargon, and translations that are specific to a particular situation poses continuous challenges. Important factors to examine include ethical difficulties, such as privacy issues, cultural sensitivity, and the possibility of reinforcing biases (Mohamed, 2024). It is essential to strike a balance between the capabilities of AI and these concerns in order to optimise their usefulness and guarantee their ethical use.

RESULTS

Survey results

Participants reported using the translation tools in different situations. 87.4% (744 people) utilised them for reading academic texts and articles, 86.6% (737 people) for writing assignments and essays, 48.4% (412 people) for taking down notes in class, and 85.5% (728 people) for taking part in discussions and seminars.

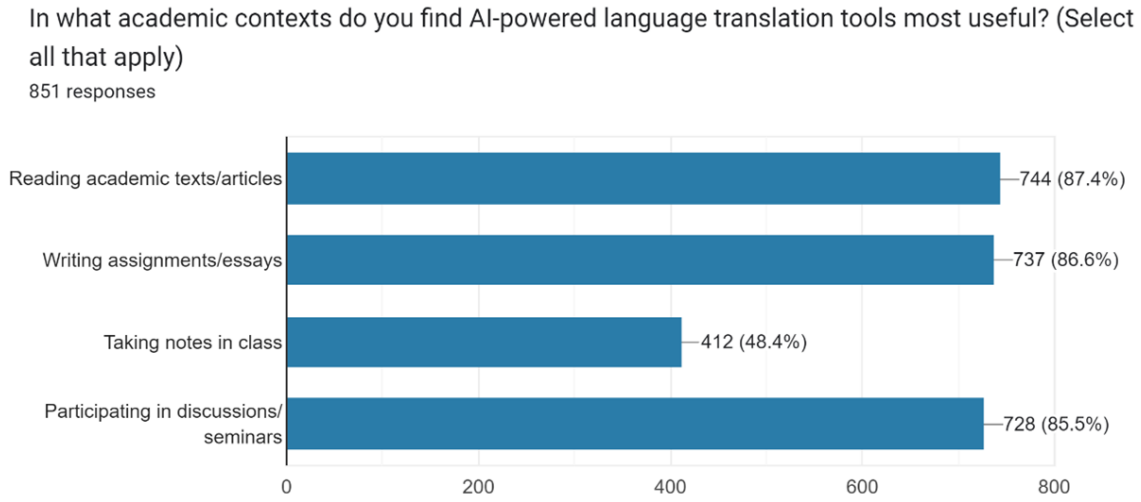

Figure 4

Regarding device preference, the majority of respondents, specifically 99.6% (848 individuals), predominantly utilised smartphones. Additionally, 65.3% (556 individuals) used desktops, while 23% (196 individuals) used tablets.

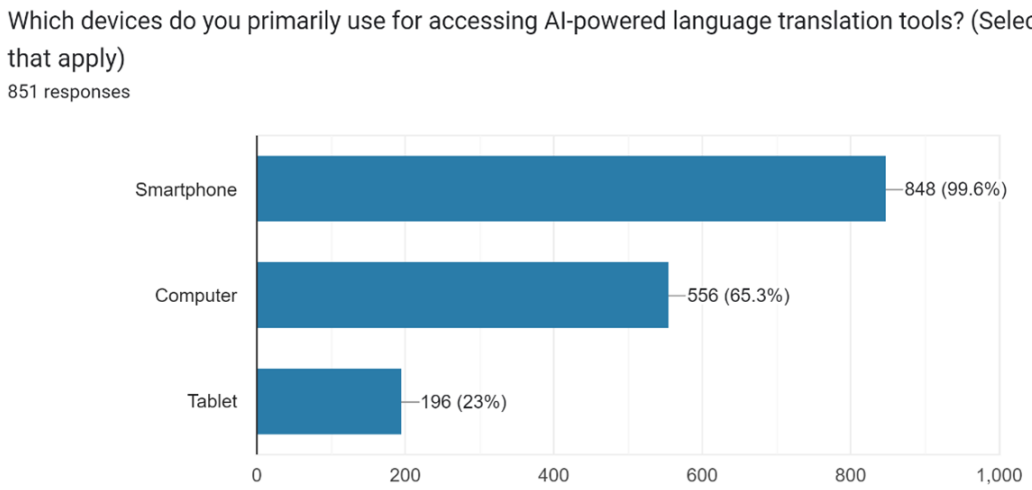

Figure 5

The access methods were mobile applications (99.5%, 847), websites (45.1%, 384), and integration into other applications (17.6%, 150).

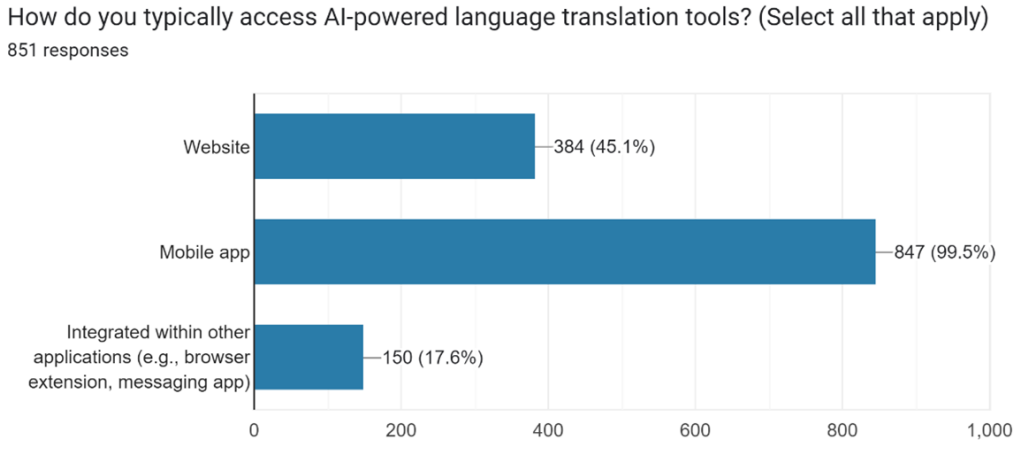

Figure 6

All responders (100%, 851) thought text translation to be a valuable function. The additional functionalities included speech translation (86%, 732), instant camera translation (46.4%, 395), and offline translation (49%, 417).

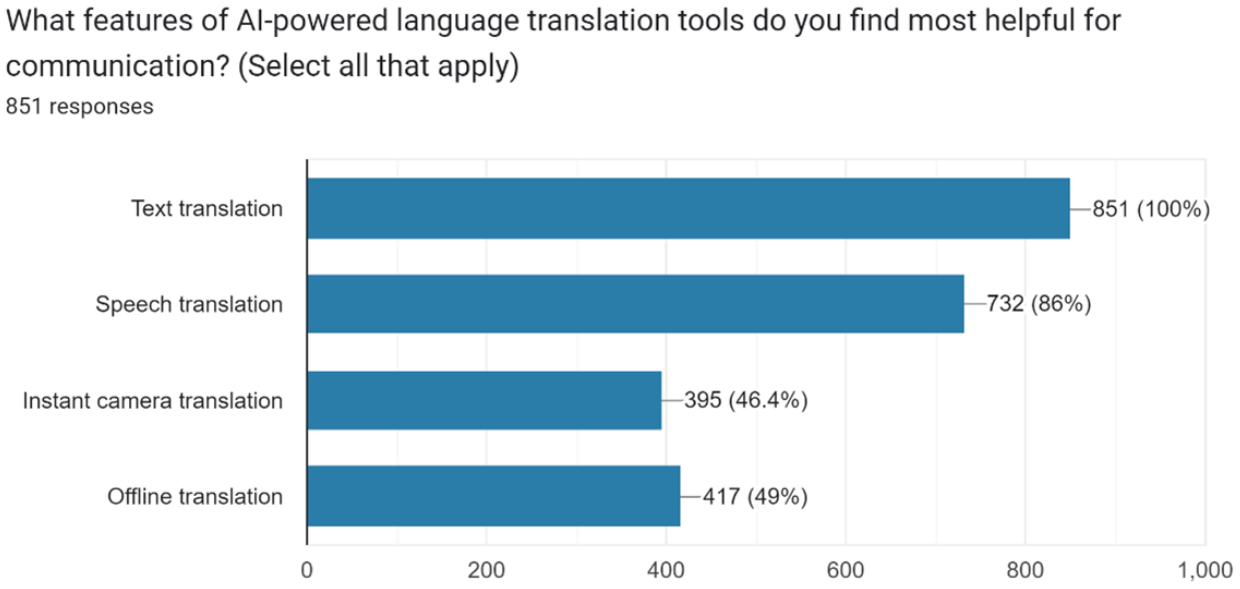

Figure 7

Several challenges were mentioned by participants in relation to AI-powered translation tools. The overwhelming majority of respondents, 99.6% (848), expressed significant concerns over the accuracy of translations. 65.3% (556) of the participants encountered difficulties with complex or specialised terminology, 46.4% (395) had trouble with contextual understanding, and 91.7% (780) faced challenges due to limited language support.

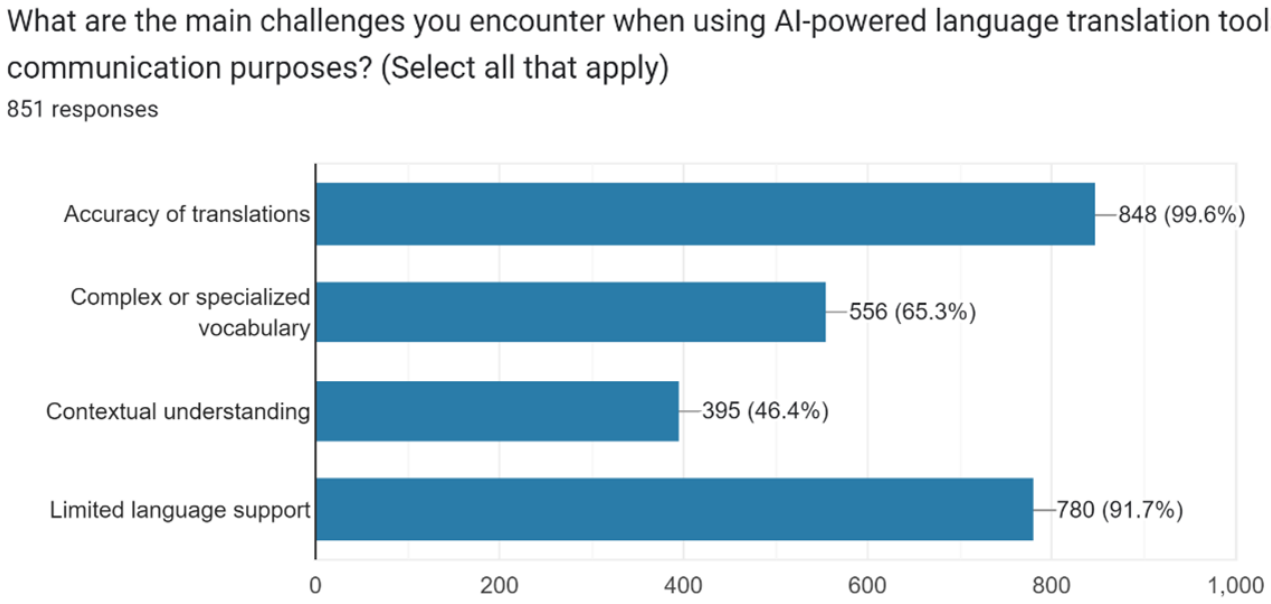

Figure 8

Regression results and analysis

The descriptive statistics table below summarises the variables used in the study, including the number of observations (N), mean, standard deviation (sd), minimum (min), and maximum values for each variable. The average academic level is 1.960, indicating that people have varying degrees of education. The individuals'

proficiency in language levels vary, with a mean of 1.626. The utilisation of AI translation tools has a mean of 1.051, indicating that most participants have prior familiarity with these tools. Scales are used to measure translation accuracy, useful features, frequency of academic and personal usage, formal training, overall happiness, recommendation likelihood, and continued use, with mean values ranging from 1.945 to 2.901. Standard deviations represent variability in responses. The standard deviations demonstrate response variability, with helpful characteristics having the highest standard deviation (1.730), indicating that people have different perspectives of the utility of AI translation tool features.

Table 1: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
age	851	2.737	0.956	1	6
gender	851	1.476	0.500	1	2
acad_level	851	1.960	1.051	1	4
lang_proficiency	851	1.626	1.144	1	4
used_ai_translate	851	1.051	0.219	1	2
translate_accuracy	851	2.193	1.473	1	5
helpful_features	851	2.901	1.730	1	6
freq_acad_use	851	2.082	1.360	1	5
freq_personal_use	851	2.039	1.339	1	5
formal_training	851	1.945	0.229	1	2
overall_satisfaction	851	2.644	1.286	1	5
recommendation_likelihood	851	2.088	1.320	1	5
continue_use	851	2.603	1.391	1	5

The regression analysis in the table investigates the relationships between several independent variables, including age, gender, academic level, language proficiency, use of AI translation tools, translation accuracy, frequency of academic and personal use, overall satisfaction, and recommendation likelihood. Model (1) focuses on 'Translation Accuracy' as the dependent variable, with independent variables like age, gender, academic level, language proficiency, and the use of AI translation tools, aiming to understand how these factors affect translation accuracy. Model (2) examines 'Frequency of Academic Use,' adding translation accuracy to the set of independent variables from Model (1), to determine how demographics, tool choice, and perceived accuracy influence academic use.

Model (3) uses 'Frequency of Personal Use' as the dependent variable, investigating similar factors as the previous models to see what impacts personal communication usage. Model (4) looks at overall 'Satisfaction,' expanding the independent variables to include the frequency of academic and personal use to reveal how these combined factors contribute to overall satisfaction with AI-powered translation tools. Model (5) explores 'Recommendation Likelihood' as the dependent variable, identifying what makes students more likely to recommend AI translation tools to others. Finally, Model (6) examines the 'Likelihood of Continuing to Use AI Translation Tools.' Each model aims to uncover various influences and relationships that affect the use and perception of AI translation tools among users.

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Table 2: Regression Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Translation Accuracy	Freq_Acad_Use	Freq_Personal_Use	Satisfaction	Recommend_ likelihood	Continue_use
age	-0.216***	-0.009	-0.023	-0.204***	0.347***	-0.116**
	(-3.94)	(-0.18)	(-0.42)	(-4.16)	(7.38)	(-2.30)
gender	0.027	0.075	0.069	-0.090	0.126	0.038
	(0.30)	(0.99)	(0.90)	(-1.05)	(1.59)	(0.42)
acad_level	0.401***	0.144***	0.313***	-0.071	0.119**	-0.100*
	(7.23)	(2.74)	(5.56)	(-1.50)	(2.18)	(-1.84)
lang_proficiency	0.552***	0.091**	0.379***	-0.220***	-0.005	-0.253***
	(14.96)	(2.06)	(8.43)	(-5.14)	(-0.11)	(-4.85)
used_ai_translate	-1.064***	3.364***	-0.738***	-0.236	0.229	0.571*
	(-11.48)	(52.94)	(-8.98)	(-1.26)	(1.12)	(1.92)
translate_accuracy		0.246***	0.222***	-0.079**	0.073*	-0.076*
		(6.61)	(6.02)	(-2.06)	(1.76)	(-1.83)
freq_acad_use				0.148***	0.238***	-0.076
				(3.17)	(4.63)	(-1.46)
freq_personal_use				-0.007	0.115**	0.140***
				(-0.16)	(2.34)	(2.83)
overall_satisfaction					0.139***	0.183***
					(3.90)	(4.47)
recommendation_ likelihood						0.250***
						(6.08)
Constant	2.178***	-2.507***	1.057***	3.959***	-0.770***	1.904***
	(9.27)	(-13.14)	(5.28)	(14.80)	(-2.63)	(4.78)
Observations	851	851	851	851	851	851
R-squared	0.271	0.357	0.323	0.085	0.257	0.155

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In Model (1) analysing 'Translation Accuracy,' there is a negative and significant relationship with age (coefficient = -0.216, $p < 0.01$), indicating that older students perceive lower translation accuracy. The variable 'Academic Level' exhibits a positive and significant correlation (coefficient = 0.401, $p < 0.01$), suggesting that students at higher academic levels perceive better translation accuracy. 'Language Proficiency' also shows a positive and significant relationship (coefficient = 0.552, $p < 0.01$), indicating that higher language proficiency correlates with higher perceived accuracy. Conversely, the variable 'Use of AI Translation Tools' has a negative and significant relationship with translation accuracy (coefficient = -1.064, $p < 0.01$), suggesting that those who use AI translation tools perceive lower accuracy.

In Model (2), the variable 'Academic Level' shows a positive and significant relationship (coefficient = 0.144, $p < 0.01$), indicating that students at higher academic levels use translation tools more frequently for academic

purposes. The variable 'Use of AI Translation' also demonstrates a positive and significant relationship (coefficient = 3.364, $p < 0.01$), suggesting that frequent users of AI translation tools are more likely to use them for academic purposes. Additionally, 'Translation Accuracy' has a positive and significant correlation (coefficient = 0.246, $p < 0.01$), implying that higher perceived accuracy of these tools leads to more frequent use in academic settings.

In Model (3), the variable 'Academic Level' shows a positive and significant relationship (coefficient = 0.313, $p < 0.01$), suggesting that students at higher academic levels use translation tools more frequently for personal purposes. 'Language Proficiency' is also positively and significantly correlated (coefficient = 0.379, $p < 0.01$), indicating that higher language proficiency is associated with more frequent personal use of translation tools. Interestingly, the variable 'Use of AI Translation' is negative and significant (coefficient = -0.738, $p < 0.01$), suggesting that those who frequently use AI translation tools might actually use them less often for personal purposes. Lastly, 'Translation Accuracy' exhibits a positive and significant relationship (coefficient = 0.222, $p < 0.01$), implying that higher perceived accuracy of these tools leads to more frequent use for personal activities.

In Model (4), the variable 'Age' is negative and significant (coefficient = -0.204, $p < 0.01$), indicating that older students are less satisfied with AI translation tools. Similarly, 'Language Proficiency' is negative and significant (coefficient = -0.220, $p < 0.01$), suggesting that higher language proficiency correlates with lower satisfaction. Conversely, 'Translation Accuracy' is positive and significant (coefficient = 0.078, $p < 0.01$), showing that higher perceived accuracy increases satisfaction.

In Model (5), 'Academic Level' is positive and significant (coefficient = 0.119, $p < 0.05$), implying that students at higher academic levels are more likely to recommend AI translation tools. Additionally, 'Frequency of Academic Use' is positive and significant (coefficient = 0.238, $p < 0.01$), indicating that frequent academic users are more likely to recommend these tools. 'Overall Satisfaction' is also positive and significant (coefficient = 0.193, $p < 0.01$), suggesting that higher satisfaction increases the likelihood of recommending the tools.

In Model (6), 'Academic Level' is negative and significant (coefficient = -0.104, $p < 0.05$), indicating that students at higher academic levels might be less likely to continue using the tools. Similarly, 'Language Proficiency' is negative and significant (coefficient = -0.253, $p < 0.01$), suggesting that higher proficiency correlates with a lower likelihood of continued use. However, 'Use of AI Translation' is positive and significant (coefficient = 0.571, $p < 0.01$), showing that current users are more likely to continue using these tools. Furthermore, 'Recommendation Likelihood' is positive and significant (coefficient = 0.250, $p < 0.01$), suggesting that those likely to recommend the tools are also likely to continue using

Interpretation of key findings

The regression analysis provides valuable insights into how various factors influence the use, perception, and satisfaction with AI-powered language translation tools among international students. Key factors such as academic level, language proficiency, and perceived translation accuracy significantly affect the dependent variables. These insights can aid in designing and improving AI translation tools to better meet the needs of international students. There is a significant negative correlation between age and the frequency of using AI translation tools for academic purposes and overall use. This indicates that younger students tend to use AI translation tools more frequently than older students for both academic and general purposes. No significant correlation was found between age and other factors, nor was there any significant correlation between gender and the factors measured in the study.

A significant positive correlation exists between academic level and the frequency of using AI translation tools for academic purposes, overall use, and the likelihood of recommending them. This suggests that students at higher academic levels are more likely to use AI translation tools for academic purposes and are also more

likely to recommend them to others. Language proficiency shows a significant positive correlation with the frequency of using AI translation tools for academic purposes but has a negative correlation with overall use and recommendation likelihood. This implies that students with higher language proficiency use AI translation tools more for academic purposes but less for general use and are less likely to recommend them. Conversely, students with lower language proficiency may find translation tools more helpful for general communication.

There is a significant positive correlation between having used AI translation tools in the past and all factors measured, except for translation accuracy. This indicates that students who have used AI translation tools before are more likely to use them again in the future for both academic and personal purposes, recommend them to others, and continue using them. Translation accuracy shows a significant positive correlation with the frequency of using AI translation tools for both academic and personal purposes. This means that students who perceive higher translation accuracy in AI translation tools are more likely to use them for both academic and personal purposes. There is also a significant positive correlation between the frequency of using AI translation tools for academic purposes and the frequency of using them for personal purposes and overall use. This suggests that students who use translation tools frequently for academic purposes also tend to use them more for personal purposes, and vice versa. Lastly, there is a significant positive correlation between overall satisfaction with AI translation tools and the likelihood of recommending them and continued use. This means that students who are more satisfied with the translation tools are more likely to recommend them to others and continue using them themselves.

CONCLUSION

This offers vital insights into the perceptions and usage patterns of AI translation tools by international students. These tools are instrumental in helping students overcome language barriers, thereby improving their academic performance and social integration. Key findings highlight a positive correlation between previous use of AI translation tools and their continued usage, indicating that familiarity breeds continued reliance. Additionally, higher perceived translation accuracy leads to increased use for both academic and personal purposes. Furthermore, the study reveals that academic level and language proficiency significantly influence the use of these tools. Students at higher academic levels tend to use AI translation tools more frequently and are more likely to recommend them. On the other hand, students with higher language proficiency use these tools mainly for academic purposes but less for general communication and are less likely to recommend them. These insights highlight the importance for academic institutions to support international students by providing resources and training on the effective use of AI translation tools, thus enhancing their overall educational experience. In conclusion, the study provides valuable data that can inform the development and implementation of AI-powered language translation tools tailored to meet the diverse needs of international students. It emphasizes the crucial role of these tools in facilitating communication, reducing language barriers, and enriching the overall academic and social experience of international students.

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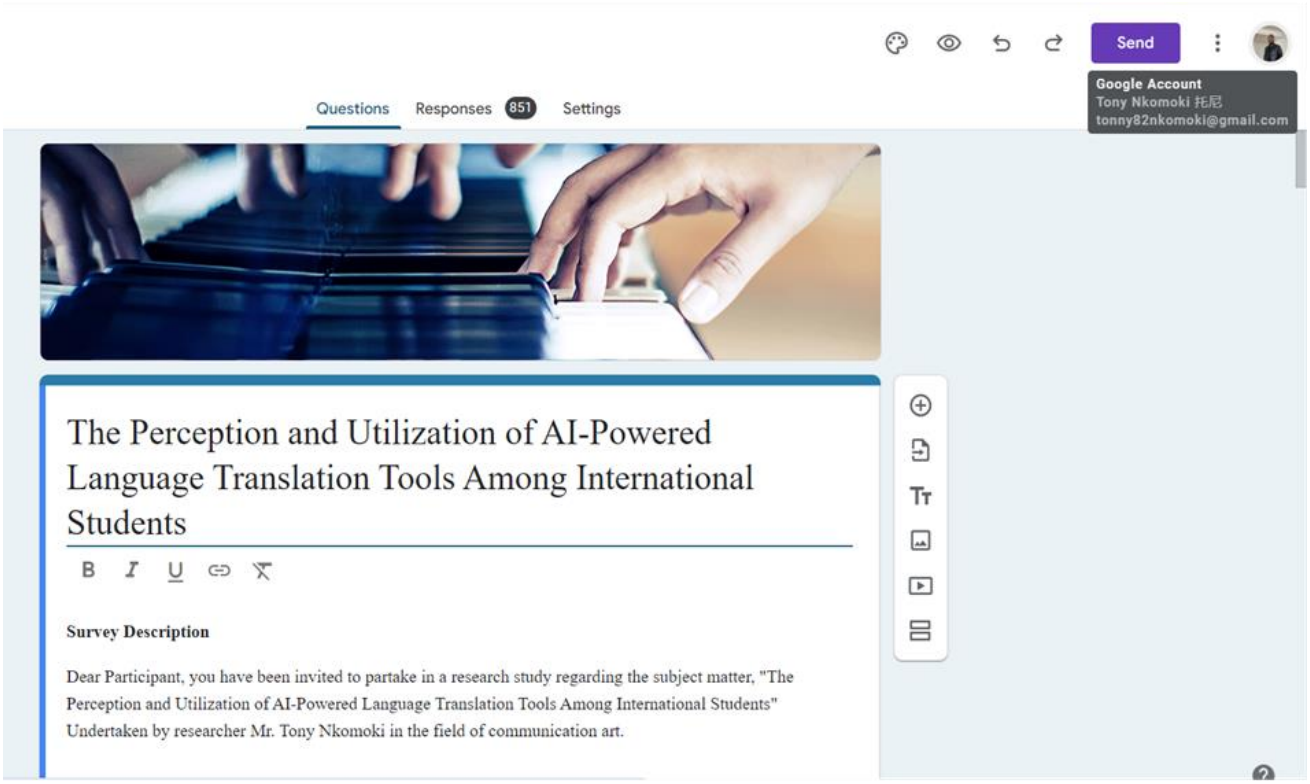
APPENDIX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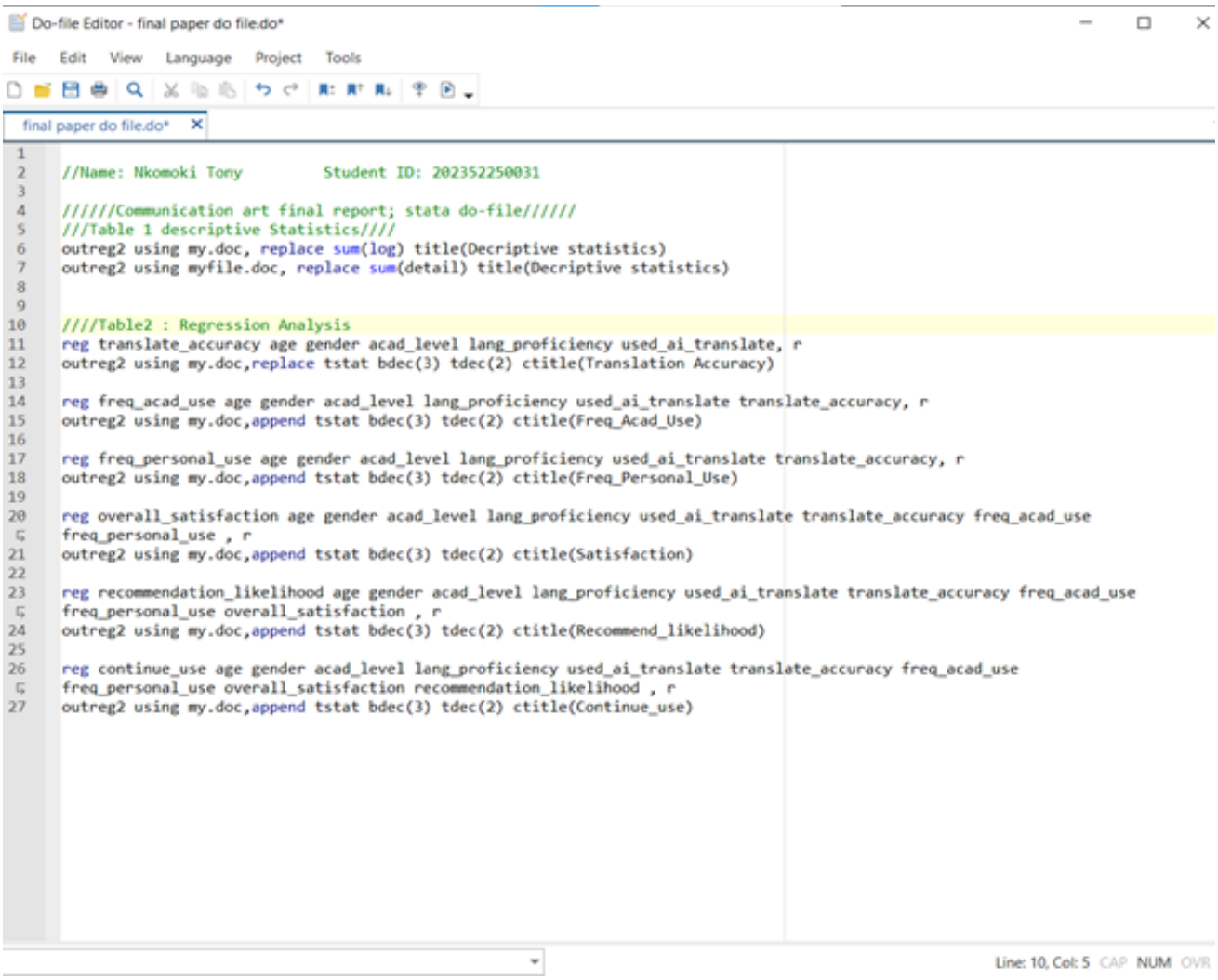
The Perception and Utilization of AI-Powered Language Translation Tools Among International Students
Survey Description
Dear Participant, you have been invited to partake in a research study regarding the subject matter, "The Perception and Utilization of AI-Powered Language Translation Tools Among International Students" Undertaken by researcher Mr. Tony Nkomoki in the field of communication art.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//Name: Nkomoki Tony Student ID: 202352250031
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