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Machine Translation in EFL Learning: Chinese Undergraduates' Use, Perceptions, and Machine Translation Literacy



Abstract: - Machine translation (MT) has been recently experiencing an upsurge in popularity within the realm of second language (L2) and foreign language (FL) education. This paper aims to present the findings of a questionnaire survey that investigated the use and perception of MT, as well as MT literacy, in English as a foreign language (EFL) learning among undergraduate students in China. A total of 936 online questionnaires were collected from one university in China, with corresponding statistical data analyzed thereafter. The results indicate that MT is prevalently and frequently used in EFL learning by both low- and high-proficiency respondents from diverse disciplines, highlighting an urgent need to improve their MT literacy. This study holds significant pedagogical implications, shedding light on best practices for the efficient use of MT in realm of language education, particularly in EFL education.

Keywords: EFL; FL; MT; MT literacy; Language education.

I. INTRODUCTION

Machine Translation (MT), specifically free online programs, are revolutionizing students' approach to foreign language (FL) and second language (L2) learning [1-4]. Over the last decade or so, increasingly sophisticated yet compact devices, along with omnipresent cellular and Wi-Fi networks, have made free online MT websites and applications readily accessible to learners [5-6]. Additionally, the emergence of neural machine translation (NMT) has greatly improved the quality of MT output. MT use has recently been gaining popularity in language education and everyday use due to its convenience, multilingualism, free availability, and immediacy [7-8].

However, it is crucial to note that MT tools are not designed solely for the purpose of language learning, as pointed out by [9]. Without proper assessments of MT outputs and productive and analytic language skills, learners' dependence on and indiscriminate use of these tools may only increase [10]. Therefore, language instructors should focus on helping students learn how to use MT tools effectively [11]. To achieve this, language instructors need to better understand their use of MT, their students' beliefs about these tools, and their status of MT literacy. Possessing this insight will be helpful in shaping the tactics deployed for incorporating these tools in language education.

In relation to language education and MT, a substantial body of literature delves into the topic and explores the use of MT. However, there has been a noticeable dearth of research examining Chinese undergraduate students' MT use and their perception of it in their English as a foreign language (EFL) learning, as well as their MT literacy. Therefore, this study aims to fill this research gap and investigate the issues mentioned above by focusing on Chinese undergraduate students' use and perception of MT in their EFL learning, as well as their MT literacy, to offer guidance for the educational practice of the optimal use of MT in EFL education [12]. To achieve this goal, we conducted a questionnaire survey that yielded 936 valid responses from Chinese undergraduate students at a university in China [13]. The research aims to answer the three primary questions on their use of MT in EFL learning in the Chinese context: 1) To what extent do Chinese undergraduate students in EFL learning use MT, and how do they incorporate this technology into their language learning process? 2) How do they perceive the quality of MT outputs, the impact of MT on their EFL learning, and their MT reliance? 3) What is the current status of their MT literacy.

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II. LITERATURE REVIEW

“MT is the automated process of translating written or spoken texts from one natural language to another, using computer software and applications” [14]. For more than 30 years, researchers have been investigating the potential implications of MT on language education and acquisition [15]. Early studies on MT found that there was often a high frequency of errors in the output at various levels, requiring significant human effort in post-editing [16-17]. As a result, in the earlier years, MT was generally not considered a useful pedagogical tool for FL learning [18]. However, more recent studies have suggested that the error incidence in the output of recent MT systems is substantially lower when compared to earlier versions of MT, thanks to advancements in NMT. This has led to a growing recognition of the potential advantage of MT as a pedagogical tool in FL learning.

In recent years, the volume of research concerning MT and its impact on FL education, particularly in writing, has seen a noticeable increase. Many researchers have reported positive impacts of MT on learners, including enhanced fluency, decreased errors, and increased focus on content in the target language [19]. MT has also been shown to enhance the overall quality of writing by decreasing lexical, grammatical, syntactical and spelling errors [20]. Furthermore, using MT for revisions has had a beneficial impact on student writing strategies [21]. In addition to improving writing skills, allowing MT use has endowed learners with a feeling of relief and stability, subsequently leading to a boost in their motivation and confidence [22]. However, while the potential benefits of using MT are significant, researchers have revealed that the effect resulting from MT assistance is not likely permanent and they have also cautioned against over-reliance on it, as this may impede second language acquisition and the improvement of writing skills [23].

There are also researchers contributing to MT use in translation programs. For example, [24] formulated a well-rounded model for the adoption of MT, grounded in the Technology Acceptance Model, [25] investigated the impact of employing MT engines on the proficiency of translation students, while [26] examined the correlation between proficiency level and post-editing skills of language learners for machine-translated text. Similarly, [27] explored potential approaches for integrating a fundamental MT module into a university-level translation program. Overall, these researchers nearly unanimously agree that there is an increasing demand for a novel form of digital literacy referred to as MT literacy [28], and the guidance of instructors on the effective use of MT in language education.

To gain insight into how instructors perceive MT use in language education, numerous research studies have been undertaken to investigate individuals' perceptions, attitudes, and beliefs towards it [29]. The findings reveal varying levels of understanding regarding MT capabilities and acceptance of its use among students [30]. Some instructors had a very positive opinion of the significance of MT in language education [31], and some encouraged and approved of the academic suitability of students using this technology [32]. In contrast to the positive opinion, some instructors perceived MT as a potentially detrimental tool in the foreign language classroom due to ethical concerns or students' excessive reliance on it [33], and some were skeptical about MT accuracy and the pedagogical value of MT on FL learning [34]. Meanwhile, certain instructors hold the opinion that student use of MT is inevitable and that teaching about the optimal use of MT tools would benefit both learners and instructors.

Accordingly, perceptions, attitudes, and beliefs about MT and MT use in language education have also been explored from learners' perspective in many studies [35]. These studies were conducted in various national contexts, utilizing either questionnaires, interviews, or both to investigate learners' perspectives, such as those conducted by [36], or to examine the perceptions of both learners and instructors, as seen in [37]. Overall, studies on learners' use and perception indicate that students have varied opinions regarding the appropriateness, reliability, and ethical considerations of MT tools. However, the findings suggest that learners generally have positive views towards machine translation.

While there have been numerous studies conducted on learners' perceptions of MT in language education, research contributing to Chinese undergraduates' use and perception of MT in EFL learning is severely limited. Among the few studies conducted, in the study by [38], the researchers investigated how translation students utilized and evaluated online resources for Chinese-English translation. They accomplished this by administering a questionnaire to a randomly selected sample of 100 students majoring in translation from a university in China. Another study conducted by [39], the researcher explored the impact of Google Translate on extemporaneous

English-language first drafts. The study involved 124 Chinese sophomore, junior, and senior students majoring in English as a Foreign Language (EFL). These students were assigned three different tasks to assess the influence of Google Translate on their writing performance. Similarly, [40] 21 undergraduate and 39 postgraduate students majoring in translation at Hong Kong universities were recruited as participants in the survey.

According to the findings of the research, it was observed that the impact of MT on the acquisition of translation competence is influenced by both the properties of MT itself and learners' English proficiency. Notably, the three studies were conducted among languages-related students: either majoring in translation or English. However, it should be noted that EFL is a mandatory course for all undergraduates in Chinese universities, regardless of their majors or disciplines, which indicates the few existing studies have a limitation of a very limited range group for not covering students of other majors except languages-related majors. Additionally, the studies suffer from a small sample size, further adding to their limitations.

After reviewing relevant literature, it appears that the current studies have not adequately addressed the use and perceptions of MT among Chinese undergraduate EFL learners, let alone MT literacy. Therefore, our study aims to bridge this gap and provide insights into these areas.

III. METHODOLOGY

A. *Participants and sampling method*

The study included undergraduate students of diverse majors from Hunan Institute of Technology in China. For this study, a convenience sampling method was utilized to select participants. To encourage honest responses, participants were assured that their identities would remain anonymous and their answers confidential. The university had a total of 19,985 undergraduates, out of which 936 individuals participated and submitted valid questionnaires, resulting in a 100% valid return rate.

B. *Data collection methods and tools*

We used an online questionnaire, a recognized cost-effective and convenient research tool, to gather quantitative data on MT use and perceptions in EFL learning among Chinese undergraduates. The questionnaire comprised 22 questions divided into four sections: basic information of respondents (Q1-Q4), use of MT (Q5-Q12), perception of MT (Q13-Q17), and MT literacy (Q18-Q22). It consisted of 19 single-choice and three multiple-choice questions, including two semi-open questions. The survey was conducted from January 6, 2023, to February 6, 2023.

As an online questionnaire was the primary survey method, we utilized the WJX online survey platform (www.wjx.cn) and social media to gather data. WJX is a cost-effective, efficient, and secure platform with visual data presentation capabilities. The questionnaire was designed and distributed on the WJX platform using QR codes and links on social media platforms such as QQ and WeChat. Additionally, we employed SPSS (29.0) and Excel for data analysis and figure generation to facilitate our research process.

C. *Pilot survey and sample size calculating*

After obtaining ethical approval, we developed a questionnaire survey through a series of iterative pilot surveys. Our objective was to improve the structure and language of the questions included in the questionnaire. Before implementing the survey, we conducted trial fillings of the questionnaire and conducted repeated checks to ensure its accuracy. Subsequently, we invited 50 university students from various majors to fill out and provide feedback on the questionnaire. Using their feedback, we refined the questionnaire to make it more effective and user-friendly, accurately representing our research aims through a collaborative process.

To test the credibility of our sample size for our target population, we used an online sample size calculator available on the internet (<https://www.surveysystem.com/sscalc.htm>). This tool helped in estimating the required number of participants for obtaining statistically significant results. The parameters commonly used in statistics to evaluate the credibility of a sample size are confidence interval (CI) and confidence level (CL). Our analysis of 936 participants, taken from a population of 19985 undergraduates, showed a 3.1% CI and 95% CL, indicating 95% certainty that the sample reflects the population accurately within $\pm 3.1\%$. Thus, if 40% of respondents chose a

specific answer, we could infer that 36.9% to 43.1% of the relevant population made the same choice. These calculations show that our sample size is highly credible.

D. Data analysis method

The quantitative data gathered from the questionnaire underwent a thorough analysis, utilizing various statistical methods. Descriptive statistics, including frequency distributions and percentages, were employed to provide an overview of their collective feedback and insights. Additionally, inferential statistics, such as correlations and regression analyses, were utilized to investigate potential relationships between variables. To identify any latent factors that may be influencing the responses, factor analysis was also implemented as part of the analysis process.

IV. RESULTS

A. The use of MT

In our study, a sample of 936 undergraduate students of diverse disciplines at a university in China was surveyed. The findings indicated that a significant majority of the respondents, totaling 852 individuals (91.03%), acknowledged employing MT tools to facilitate their EFL learning in some way, while a mere 84 respondents (8.97%) stated that they had never used such resources. To provide a clearer understanding of MT use in EFL education, we examined and evaluated it from four dimensions: users of MT, preferred MT systems, frequency of MT use, different types of MT use, and typical usage patterns.

To get an in-depth insight into the primary users of MT among Chinese undergraduates in EFL learning, we analyzed our collected data based on two perspectives: English proficiency and discipline.

In terms of the level of English proficiency, the respondents were roughly classified: respondents with high English proficiency and respondents with low English proficiency. In the higher education system of China, undergraduate students are encouraged to demonstrate their English proficiency by passing standardized exams such as the College English Test (CET) for non-English majors and the Test for English Majors (TEM). The CET consists of two major levels, CET 4 and CET 6, while the TEM also has two levels, TEM 4 and TEM 8. For our study, we categorized respondents who passed any of these proficiency tests as having high English proficiency, while those who had not passed any of the tests were labeled as having low English proficiency.

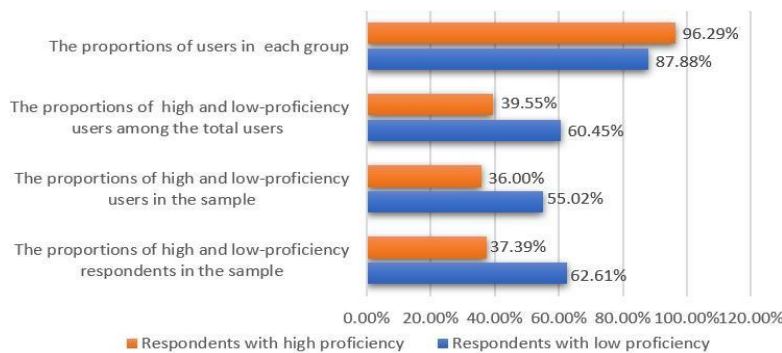


Fig. 1 Descriptive statistics of users in terms of the level of English proficiency

As Figure 1 shows, our study sample consisted of 350 respondents with high proficiency and 586 respondents with low proficiency, accounting for 37.39% and 62.61% of the sample, respectively. Among the respondents (91.03%) reported utilizing MT tools in the sample, respondents with high proficiency accounted for 36.00% while their low-proficiency counterparts accounted for 55.02%. This means that among the users surveyed, 39.55% were respondents with high proficiency and 60.45% were those with low proficiency. It could be attributable to the fact that there were fewer high-proficiency respondents than low-proficiency respondents, with the former group representing 37.39% and the latter group comprising 62.21% of the sample. However, the study found that as high as 96.29% of high-proficiency respondents acknowledged using MT while only 87.88% of low-proficiency

respondents reported using MT. This may indicate that individuals with higher proficiency are more inclined to use MT than those with lower proficiency.

In terms of disciplines, the university offers a diverse range of disciplines, including English language, economics, management, science, and engineering. The research found that the majority of respondents (40.91%) majored in engineering, followed by English language (38.57%), management (9.51%), science (5.56%), and economics (5.45%), as indicated in Figure 2. However, there were only slight differences in the use of MT across disciplines, with over 80% of users in each discipline. About 95.82% and 94.12% of respondents in language and economics fields respectively reported using MT, while the ratios were 88.76%, 80.77%, and 87.53% respectively for management, science, and engineering.

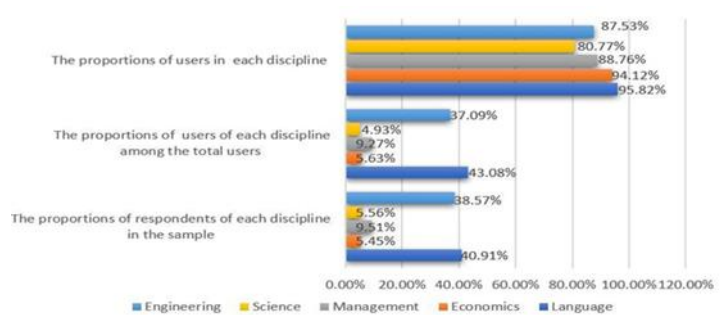


Fig. 2 Descriptive statistics of users in terms of disciplines

B. Preferred MT systems

The question regarding the preferred MT system was a multiple-choice question. This allowed for the possibility that some students might use more than one MT system. The study found that among the various MT systems available, the majority of respondents preferred Baidu Translate (67.41%), followed by Youdao Translate (62.71%) and Google Translate (25.21%), as shown in Figure 3. Other less popular MT systems included Sougou Translate (14.96%), DeepL (12.18%), and Tencent TranSmart (11.22%). These findings align with earlier studies conducted by Duan (2021) and Ning (2020), indicating that the top two popular MT systems among Chinese users are Baidu Translate and Youdao Translate.

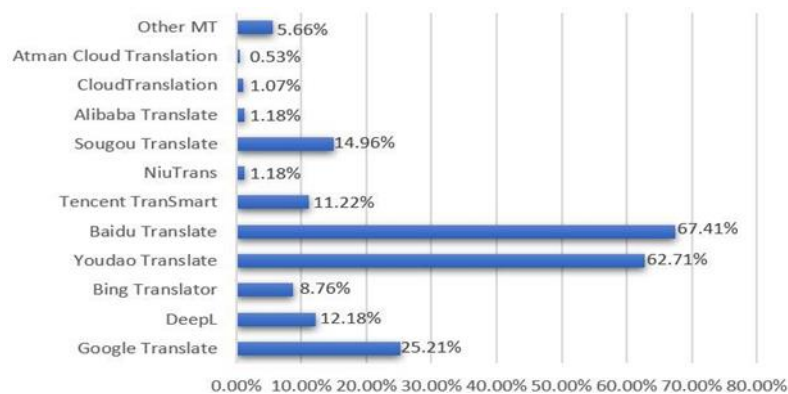


Fig. 3 Descriptive statistics of preferred MT systems

C. Frequency of MT use

Regarding the frequency of MT use, findings revealed that the majority of respondents (91.03%) reported using MT tools in their EFL learning, with over half (9.83%+46.26%) admitting to frequently using MT (Figure 4). Among them, 9.83% reported using MT tools regularly, 46.26% reported using MT tools often, and 32.48% admitted using tools occasionally, while only 2.46% rarely used the tools. This finding of the prevalent and frequent use of MT in language learning is consistent with previous relevant studies conducted in other national contexts.

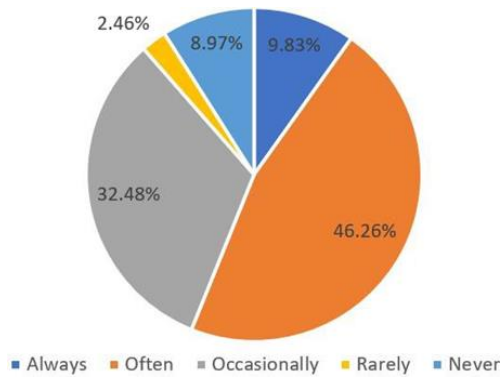


Fig. 4 Descriptive statistics of the frequency of MT use

D. *Types of MT use*

Investigating the types of MT use in EFL learning was another important aspect of our survey. Different types of use were reported by the participants, including vocabulary comprehension, translation, reading comprehension, and writing compositions or papers. Figure 5 illustrates the slight disparities observed amongst these four types of use. Vocabulary comprehension was found to be the most prevalent MT use in EFL learning among participants, with approximately 70% (20.19%+50.75%) of respondents utilizing MT regularly or often as an electrical dictionary and only 1.07% rarely using MT. This discovery aligns with the earlier research conducted by [25] among undergraduate students at Duke University. Our survey showed translation as another typical application of MT, with 8.87% of respondents always using MT for translation, and 36.43% usually using it for this purpose. For reading comprehension, 7.69% always used MT, 28.31% often used it, and 42.2% occasionally used it. The corresponding proportions for writing were 7.37%, 28.21%, and 41.56%, respectively.

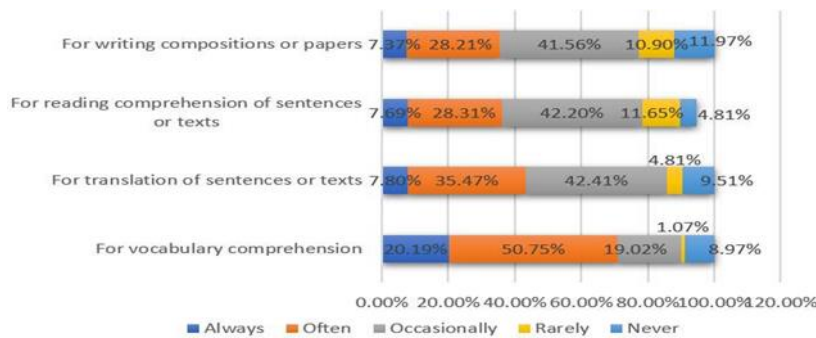


Fig. 5 Descriptive statistics of the types of MT use

E. *Typical use patterns*

Additionally, the typical use patterns of MT in EFL learning among undergraduates in China was investigated in our study. The results indicated that there were four common use patterns for MT. Of the respondents, 45.62% claimed to use MT outputs after carefully checking and revising them, 27.78% reported using the outputs after only a little revision, 8.01% admitted selecting the best MT outputs after comparing multiple MT systems, while 9.62% used raw MT outputs directly (Figure 6). Overall, the findings suggest that most respondents (45.62%+27.78%+9.62%) used MT outputs discriminately by evaluating the output quality to some extent, but a minority of students (9.62%) used MT outputs indiscriminately. However, it remains unclear about the participants' ability to accurately identify and rectify errors in MT outputs, and whether they were able to accurately assess the overall output quality. Thus, there is a concern over the misuse of MT. Furthermore, our study reveals that there exists a phenomenon of indiscriminate use of MT.

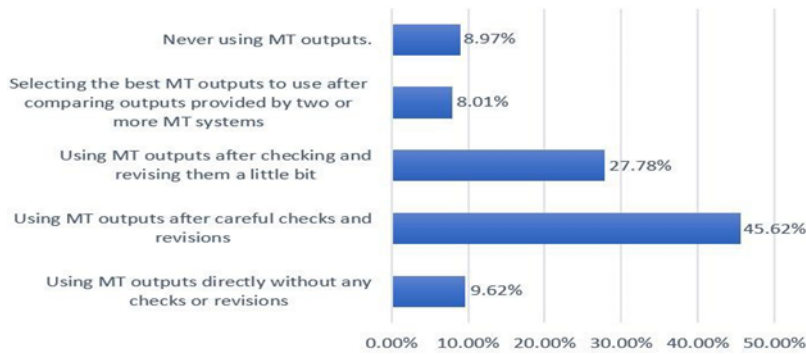


Fig. 6 Descriptive statistics of typical MT use pattern

F. *The perceptions of MT*

We surveyed to gather respondents’ perceptions of MT in EFL learning. Specifically, we compared the responses of two groups of respondents: those with low English proficiency and those with high proficiency.

Figure 7 depicts the results of a question that asked respondents with different levels of English proficiency about their perception of the quality of MT outputs. The comparison of the perceptions of the quality of MT outputs between respondents with high proficiency and those with low proficiency revealed a slightly significant difference: Respondents with high proficiency were more critical of the quality of MT output than those with low proficiency, with only 3.43% of the respondents with high proficiency claiming that no revisions were needed and 10.86% believing that major revisions were necessary, compared to 7.85% and 4.44% of those with low proficiency, respectively. In other words, individuals with lower language proficiency tend to have a more positive perception of the quality of MT outputs compared to those with higher proficiency levels.

This disparity implies that some students with low proficiency are more likely to accept MT outputs without being fully aware of whether the outputs are correct or not. However, both groups had a significant percentage of respondents who believed that not all MT outputs were acceptable and revisions are needed, which indicates they were more likely to view MT as an effective tool for EFL learning instead of a substitute for learning. Overall, our study has demonstrated that most students possess a healthy awareness of the constraints of MT.

To further probe into the research object’s perception of the quality of MT outputs, the respondents were asked whether MT can be a substitute for professional translators. Figure 8 presents the responses of the respondents with high proficiency and those with low proficiency. It was found that as less as 8.58% of the respondents with high proficiency gave a positive answer and as much as 78.29% negative, compared to 12.29% and 61.09% of those with low proficiency, respectively. The findings indirectly further confirm that respondents of high proficiency were generally more critical of MT and those of low proficiency tended to have a more positive perception of MT.

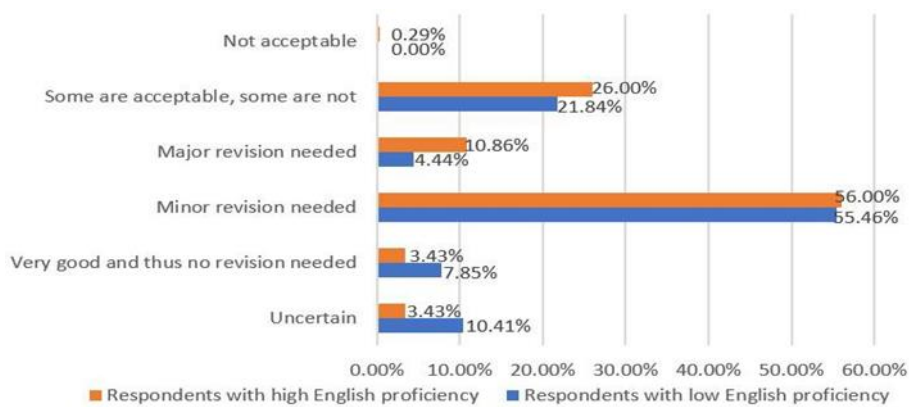


Fig. 7 Descriptive statistics of participants’ perceptions of the quality of MT outputs

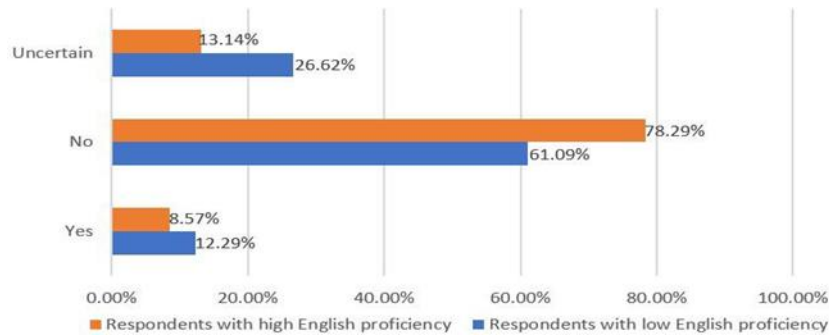


Fig. 8 Descriptive statistics of respondents’ perceptions on whether MT can replace professional translators

Figure 9 displays the findings from the survey segment that aimed to explore students’ perceptions regarding the impact of MT use on EFL learning. The comparison was made between respondents with high English proficiency and those with low English proficiency. The findings indicate that a significant proportion of EFL learners considered MT to be a valuable resource for language acquisition, with more than 50% of respondents in both groups reporting its usefulness and approximately 30% acknowledging its high value. Conversely, only a negligible percentage of individuals in either category expressed a negative opinion of MT’s effectiveness. Furthermore, the findings indicate a slight but significant contrast between participants possessing high English proficiency and those with low English proficiency. Specifically, a greater proportion (35.71%) of respondents with high proficiency perceived MT as highly beneficial, while a smaller percentage (9.43%) considered it to be only somewhat helpful. In contrast, the corresponding percentages for the group of respondents with low proficiency were 28.33% and 14.68%, respectively. This indicates that respondents with high proficiency perceive MT as more beneficial than those with low proficiency, which coincides with the finding of a literature review conducted by [21]. In the review, he concluded that studies published after 2018 claimed that advanced learners could benefit more from MT.

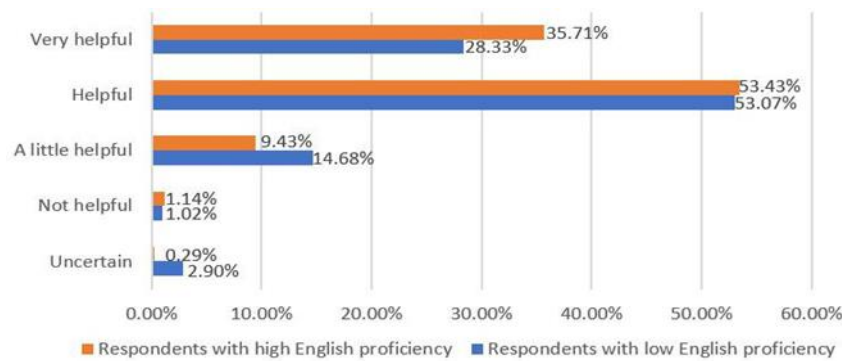


Fig. 9 Descriptive statistics of respondents’ perceptions of the impacts of MT use

Figure 10 illustrates the descriptive statistics outlining the respondents’ perceptions of their reliance on MT. Similar to the preceding analyses, the respondents were categorized based on their language proficiency levels, namely high and low. It is surprising to find that there was a general trend of MT reliance, with over 75% of respondents in both categories reporting reliance on MT and the proportion in the group with high proficiency being as high as 92%. Another surprising finding reveals a substantial variance between the two groups regarding their reliance on MT, with the high-proficiency group reporting a much higher MT reliance than the low-proficiency group. Specifically, 92.00% of the high-proficiency group admitted reliance on MT and only 6.57% asserted no MT reliance. In contrast, the low-proficiency group had a proportion of 76.45% who reported MT reliance, and 15.19% who admitted no reliance on MT. There appears to be a distinct association between linguistic competence and the extent of reliance on MT. Students with lower language proficiency may have been less aware of the availability and usefulness of MT, while those with higher proficiency may use it more as a tool to supplement their language skills.

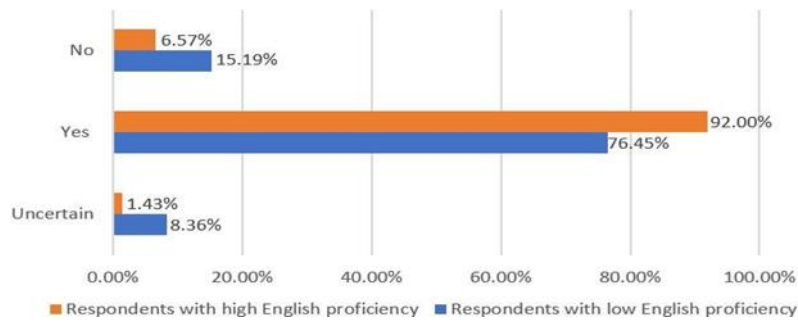


Fig.10 Descriptive statistics of respondents' perceptions of their MT reliance

V. MT LITERACY

MT literacy is defined as “users’ capacity to understand how MT systems work and can be used, to evaluate the MT-friendliness of a text, and to modify MT output” [27]. It involves understanding the strengths and limitations of MT, as well as knowing how to evaluate and improve MT output. The last part of the questionnaire on our present study focused on the following aspects concerning MT literacy: students’ knowledge of pre-editing and post-editing skills, their exposure to MT knowledge, and their perception of their need for MT literacy. Table 1 depicts the findings of the survey regarding it.

Table 1. Descriptive statistics of respondents’ MT literacy

Questions	Yes	No
Do you have some knowledge of pre-editing or post-editing?	32.05%	67.95%
Is any MT-related course offered to you in your department?	10.09%	89.1%
Have you been instructed on the effective use of MT by your EFL teachers?	10.58%	89.42%
Do you think there is a need for you to learn basic knowledge about MT and post-editing?	78.42%	21.58%

The findings indicate a significant gap between the widespread use of MT and the level of MT literacy. When asked about their knowledge of pre-editing or post-editing, 67.95% of respondents answered negatively, while only 32.05% responded positively. Furthermore, a staggering 89.1% of participants reported no exposure to MT knowledge, with only 10.09% claiming some level of exposure. Similarly, a mere 10.58% of respondents acknowledged receiving instruction on the effective use of MT, while 89.42% did not. In terms of their perceived need for MT literacy, a notable majority of respondents, specifically 78.42%, indicated their eagerness and interest in receiving training on effective use of MT. The results of the survey reveal that there was a significant lack of knowledge and exposure to pre-editing, post-editing, and other MT-related literacy among the respondents as the majority of teachers fail to equip their students with guidance or tactics on utilizing MT to enhance their learning, and they also neglected to address its appropriate academic use. However, there was strong interest in receiving training in the effective use of MT, suggesting a necessity for improvement in this area.

VI. DISCUSSION

A. Prevalent and frequent use of MT: users, preferred MT systems, typical types of use, and typical use pattern

Our study uncovered a high prevalence of MT use (91.02%) in EFL learning among both low and high-proficiency undergraduates from diverse academic backgrounds in China, with slight variations observed among students of different disciplines and proficiency levels. The prevalence of MT use can be attributed to the fact that MT has become more readily accessible due to the widespread availability of free online MT in various languages. In addition, since FL learning is widely regarded as a major challenge for learners, the appeal of MT tools seems to be growing among them. Proficient individuals are more inclined to use MT. A plausible explanation for this trend

could be that those with higher language proficiency may find MT tools helpful for quick translations or as a resource for improving their own translation abilities. However, further research would be needed to validate this correlation and explore the underlying motivations behind the use of MT by individuals with varying language proficiency levels. While English majors show a higher proportion of MT use, which might be explained by the abundance of EFL courses that encourage innovative language tools to improve academic and professional performance.

Our study also found a high occurrence of MT use (over 50%) among Chinese undergraduates in EFL learning, likely due to the mandatory nature of EFL courses and the pressure to improve English skills for improved job prospects. Additionally, with the ubiquity of smartphones and the internet, students can access MT anytime, anywhere, and many students find it challenging to resist the appeal of effortless technology-mediated strategies. Note that some students may excessively depend on MT in EFL learning, resulting in negative outcomes like decreased motivation, accuracy in written English, and over-reliance on MT.

The result on the preferred MT systems showed the respondents' preference for Baidu Translate and Youdao Translate. One possible explanation is that the two MT systems have been specifically designed and tailored to cater to the Chinese-English language pair, which implies that they are likely to deliver superior performance for translations between these two languages. However, it is important to inform students that trying different MT systems can be beneficial. This is because these systems are constantly learning, and their results may improve over time.

Concerning the types of MT use, it was found that vocabulary comprehension and translation stand out as the most frequent types of MT use in EFL learning. Comprehending vocabulary is a crucial aspect of language acquisition. MT can facilitate students in swiftly and effortlessly searching for the meaning of unfamiliar words, thereby taking the place of traditional dictionaries. For EFL students, translation is a frequent assignment. MT can provide students with instant access to translations, saving them time and yielding prompt outcomes. However, it is imperative to educate students that MT must not be employed as a replacement for classroom instruction or as a tool for academic dishonesty.

B. Perception of MT: quality of MT output, the impact of MT, and MT reliance

The findings of our study revealed most of the respondents saw limitations and imperfections in the outputs of MT, with the respondents with high proficiency being more critical. This could be due to high proficiency respondents' better understanding of language nuances and complexity, making them more likely to detect errors. Additionally, high-proficiency respondents may have higher expectations for the quality of translation output, leading to a more critical evaluation. Conversely, those with lower proficiency may have a restricted comprehension of the language, making it difficult to identify MT output errors. Anyway, it is important to guide students to use MT outputs with a critical lens as MT outputs are not always error-free, and "students may be challenged or misled by the quality improvement in MT output". One of the challenges associated MT use is the requirement for users to acknowledge that the outputs generated by MT systems are seldom flawless and necessitate thorough inspection and revision. Although most respondents recognized MT imperfections, there might be a discrepancy between students' perception and their capability to recognize and rectify errors in MT. According to [28], the current neural-based MT produces similar errors to those made by human translators, which can be challenging for students to recognize. This may lead students to rely too heavily on the machine's output and overlook its limitations [29]. Teacher interventions are necessary, particularly for low-proficiency students because they are often confused by MT outputs or may blindly accept them without critical analysis.

Regarding the impact of MT on EFL learning, survey results indicate that most EFL undergraduates in China, especially those with high proficiency, view MT as a valuable resource for language acquisition. However, it needs to point out that "MT can serve as a useful tool for a task at hand, but the long-term pedagogical effect remains uncertain" and there could be a discrepancy between how students perceive the effectiveness of MT and its actual impact on their learning. Studies by [16] and [17] supported the idea that the effect resulting from MT assistance is not likely permanent. Therefore, additional research is required to investigate the long-term impact of MT on EFL learning among undergraduates in China.

The most surprising finding about this survey is that over 75% of respondents in the low-proficiency group and approximately 92% in the high-proficiency group reported reliance on MT. MT reliance can negatively impact language learning by leading to a lack of comprehension of language structure and grammar rules and inaccurate translations, resulting in communication errors and misunderstandings. The students' MT overreliance is symptomatic of a deeper problem in the teaching pedagogy and methodology. While MT reliance may impede academic language development, it can still be a valuable tool for language learning and accessing academic content, enabling students to showcase their knowledge and learning in their field of study, irrespective of their English proficiency, if used appropriately[21]. For proper use of MT, teachers should motivate students to use MT tools as a supplementary resource in their language learning journey, rather than a replacement for it. Teachers can also provide guidance on how to use these tools effectively.

C. *MT literacy and pedagogical implications*

Our study on the use and perceptions of MT in EFL learning among Chinese undergraduates highlights the need for MT literacy education. However, our findings also reveal a significant deficiency in students' MT literacy knowledge and exposure, despite their willingness to learn. Notably, the relationship between MT and academic dishonesty has always been the primary concern among FL and L2 instructors, and numerous instructors have expressed their disapproval regarding MT use by their students. This might explain students' lack of exposure to MT literacy. However, whether we like it or not, MT is an omnipresent existence and an unavoidable part of our daily lives. Moreover, numerous studies have reported the positive and effective MT use in foreign language education. Hence, dismissing the potential benefits of MT use and banning it solely based on the belief that it may lead to disengagement from cognitive language learning is unwarranted.

Therefore, developing students' MT literacy is crucial to using MT effectively. This raises a question about the awareness of EFL instructors regarding the pedagogical implications of MT use, its incorporation into the educational program, and the demonstration of exemplary approaches for language learning. [23]suggested MT training might be more effective than prevention. Failing to incorporate MT tools in language instruction is counterproductive, as it leaves students to independently discern the capabilities and limitations of the technology. Several previous studies support integrating MT into the language curriculum with defined appropriate and inappropriate uses and purposeful training. [24] recommended explicit instruction on MT strengths and limitations to promote advanced language proficiency.

All in all, instructors should educate their students about the risks associated with using MT and equip them with the necessary MT literacy for effective language learning. Basically, students must be introduced to fundamental concepts related to MT literacy. Firstly, it is essential to acknowledge that not all MT systems possess equal capabilities, and different systems may produce outputs of varying quality. Therefore, before using any MT system, it is crucial to assess the quality of its output. And it is advisable to try multiple MT systems as different systems may excel in different areas or text types. Secondly, MT output often contains errors, mistranslations, or awkward phrasing. Hence, pre-editing and post-editing are crucial steps in using MT to ensure the quality and accuracy of the translated content. Thirdly, it is important to emphasize that MT should not be seen as a replacement for professional translators. It should be used as a supplementary tool to enhance translation work. By following these guidelines, students may use MT effectively and responsibly, while avoiding the pitfalls associated with its misuse.

VII. CONCLUSION AND LIMITATION

The present study explored the use and perceptions of MT as well as MT literacy among Chinese undergraduate EFL learners. The results revealed that both low- and high-proficiency respondents from diverse disciplines used MT frequently as a resource for language learning. The respondents perceived MT as helpful, acknowledged its limitations, and relied on it heavily.

However, there was a noticeable disparity in the perception of MT between the two groups. High-proficiency respondents were more critical of MT but still viewed it as beneficial. Additionally, the study highlighted a clear lack of knowledge and exposure to MT literacy among the students. In conclusion, this study provides valuable insights into the use and perception of MT as well as MT literacy among undergraduate EFL learners in China. While MT has its benefits, the study emphasizes the importance of specific training to improve students' MT

literacy. By incorporating MT literacy into their instructional approaches, instructors can assist students in becoming more proficient and knowledgeable users of this technology, ultimately contributing to their language proficiency and communicative competence.

Despite its contribution to the field, there are some limitations to this study. Firstly, the sample size may not be representative of all Chinese undergraduates who are studying EFL. With a larger sample size and with participants from more universities in China, the study results could be more convincing. Secondly, the study only investigated the use and perceptions of MT as well as MT literacy in EFL learning from the perspective of students. The discrepancy between students' perspectives and instructors' perspectives might have been overlooked. Future directions for research could include investigating how MT is used and perceived both by students and instructors and exploring its impact on language learning in global contexts. Additionally, further research is warranted to uncover more on how to optimally use MT in EFL learning contexts.

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