

# Identifying MT Errors for Higher-Quality Target Language Writing

Kayo Tsuji, Osaka Metropolitan University, Japan\*

## ABSTRACT

Second language education has arrived at a phase of proposing effective uses of neural machine translation (NMT). Previous research has explored various aspects of post-editing and suggested that it is crucial to manually edit NMT output to produce better target language (TL) texts. The purpose of this study was to identify NMT errors in output text, so that Japanese TL (English) learners can recognize what to be aware of. The study targeted the NMT output from Japanese-written academic reports, pre-edited by 73 Japanese students with intermediate TL proficiency. The data was analysed and primarily lexical and grammatical issues were detected and systematically classified. Results showed that the use of inappropriate TL vocabulary was the most frequent error, followed by misuse or lack of determiners. Some could be avoided in a pre-editing phase by carefully choosing precise source-language (SL) vocabulary or reducing SL ambiguity, while others required a deeper understanding of TL syntactic rules or the nuance of TL vocabulary. TL Learners need to raise their awareness of these NMT errors for effective post-editing.

## KEYWORDS

Japanese, MT Errors, Neural Machine Translation, Post-Editing, Target Language Writing

Developing neural machine translation (NMT) has had a significant impact on second language education and research (e.g., Chung, 2020; Klimova et al., 2023; Lee, 2023), and its effective use has been the focus of much attention. Previous studies have reported on the value of pre-editing (Farhana et al., 2023; Kokanova et al., 2022; Liang & Han, 2022; Marzouk & Schirra, 2019), the effectiveness of pre-editing rules (Hiraoka & Yamada, 2019; Tsuji & Okamoto, 2022; Zheng et al., 2022), the necessity of post-editing (Lee, 2020; Niño, 2009; Udina, 2019), and the efficacy of post-editing strategies (Shih, 2021; Shin & Chon, 2023).

The most effective way to use MT includes both pre- and post-editing (Cheng et al., 2021; Zheng et al., 2022). Although pre-editing contributes to improving the quality of target-texts (TTs), it is indispensable to manually edit MT output to further enhance TT quality (Kuraya, 2019; Yamada, 2021). Considering that post-editing is a challenging task for learners with intermediate or lower target-language (TL) ability (Chung, 2020; Klimova et al., 2022; Lee, 2022), typical MT errors in the Japanese-English MT output should be identified for effective post-editing. To that end, the present study discusses what errors MTs tend to make and which elements TL learners should be aware of.

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\*Corresponding Author

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## PREVIOUS RESEARCH

Post-editing<sup>1</sup> has received attention from a variety of perspectives. Researchers have identified the merits of post-editing (Alsalem, 2019; Escartín et al., 2017; Fredholm, 2019), explored the post-editing process (Chung, 2020; Jia et al., 2019; Shin & Chon, 2023), along with user experiences of post-editing (Harto et al., 2022). They have also analysed how TL proficiency affects the post-editing process (Chung, 2020; Shin & Chon, 2023) and how the process of post-editing is different between native and non-native TL speakers (Báez, 2018; Sánchez-Gijón & Torres-Hostench, 2014). In relation to education, research has explored whether MT can be used as a pedagogical support tool (Lee & Briggs, 2020; Tsuji & Okamoto, 2022), how post-edit training influences TT quality (Báez, 2018; Zhang & Torres-Hostench, 2022), as well as what MT errors are output in order to develop post-editing strategies (Shih, 2021; Shin & Chon, 2023).

### Influential Elements on Post-editing Quality

The quality of post-editing can be influenced by learner's level of TL proficiency and the degree of the users' genre/topic familiarity. Previous studies have investigated the relationship between learners' TL proficiency and the post-editing quality. A certain TL proficiency is required for post-editing MT output (Escartín et al., 2017; Ishikawa, 2020; Kuraya, 2019). Some research, involving advanced-level TL students (e.g., Lee, 2022; Niño, 2009), reported that post-editing improved the quality of TTs, while other research, with learners of lower TL proficiency (e.g., Chung, 2020; Klimova et al., 2022), identified learner difficulties in detecting and correcting MT errors. For instance, Chung (2020) investigated how TL ability affects the post-editing process and concluded that students with intermediate or lower TL proficiency tended to focus only on the word-level correction, while advanced learners reinterpreted the content of TTs and then edited parts inconsistent with source texts (STs). Also, Shin and Chon's 2023 study revealed that TL proficiency affects learners' success with post-editing strategies: Learners with higher L2 proficiency employed a greater variety of post-editing strategies. Both skilled and less skilled learners tended to employ word- and phrase-level deletion/paraphrase, however skilled learners used these strategies more frequently. Such post-editing requires a greater cognitive load on the part of students with relatively lower TL ability, with the result being that the content of TTs cannot be reconsidered with a wider perspective.<sup>2</sup> Similarly, Lee and Briggs (2020) also reported that learners' TL proficiency affects the number and type of error corrections made by students. Learners with advanced TL proficiency can post-edit TTs which are generally close in quality to those of native TL speakers (Sánchez-Gijón & Torres-Hostench, 2014). Not only the learner's TL ability but also the genre of STs factors into the effectiveness of post-editing. When TL learners do not have sufficient knowledge on the specific genre/topic, understanding the ST content is difficult (Harto et al., 2022). Choosing accurate TL vocabulary along with the particular context of an unfamiliar genre/topic is not easy. However, based upon the results of Harto's 2022 study, there are some advantages of MT use: Post-editing practices contribute to enhancing learners' TL vocabulary in the unfamiliar genre.

### MT Use in Educational Settings

MT use can facilitate TL learners to produce higher-quality TL writing. In Lee's 2020 study, Korean learners with intermediate TL (English) proficiency (70-95 on the TOEFL iBT) were asked to compare their own translations with MT outputs in order to revise the former. Through the activity, the participants learned new TL vocabulary and expressions relevant to the ST context. Statistical analysis showed a decrease in lexical and grammatical errors in their revisions, thus MT use facilitated learning of new perspectives on the TL. In a similar vein, Lee and Briggs' 2020 study, involving 58 Korean university students, investigated whether MT can be an indicator for error analysis when translating Korean (STs) into English (TTs). The learners corrected errors in their own translations by comparing them with the TL vocabulary and expressions used in the MT output. Results showed that

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