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DEVELOPING LINGUISTIC AND CULTURAL AWARENESS THROUGH MACHINE TRANSLATION POST-EDITING IN JAPANESE–INDONESIAN TRANSLATION LEARNING

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ABSTRACT
The rapid development of Neural Machine Translation (NMT) has changed the way translation is taught and learned. Although machine translation systems are now widely used in translation classrooms, many students still tend to accept machine-generated translations without carefully examining their linguistic and cultural appropriateness. This study investigates how Machine Translation Post-Editing (MTPE) helps develop students' linguistic and cultural awareness in Japanese–Indonesian translation learning. A convergent mixed-methods design was employed involving undergraduate students who participated in ten instructional meetings using three Japanese folktales as translation materials. Data were collected from students' MTPE products, reflection sheets, and perception questionnaires. The findings show that students went beyond correcting errors in machine-generated translations by actively evaluating and revising linguistic and cultural meanings. During the post-editing process, they reconsidered word choices, revised semantic and pragmatic meanings, and adjusted culturally embedded expressions. Many students were also able to explain the reasons behind their revisions and reflect on the linguistic and cultural issues they encountered, although some revisions still resulted in overly free interpretations that altered the original meaning. These preliminary findings indicate that MTPE provides students with opportunities to examine machine-generated translations more critically while gradually developing greater awareness of linguistic and cultural aspects of translation. This study offers preliminary insights into how MTPE can support the development of linguistic and cultural awareness in Japanese–Indonesian translation learning.

Keywords: *machine translation post-editing; translation pedagogy; linguistic awareness; cultural awareness; translation learning*

1. INTRODUCTION
The rapid development of artificial intelligence has significantly changed translation practices and translation education. Among these developments, Neural Machine Translation (NMT) has become widely used because of its ability to produce increasingly fluent and grammatically well-formed translations (Castilho et al., 2017; Läubli et al., 2018). Its accessibility has also made machine translation a common resource in academic and professional contexts, allowing users to translate multilingual texts quickly and efficiently (Doherty, 2016; Bowker & Buitrago., 2019)As a result, translation education is no longer concerned solely with human translation but increasingly involves preparing students to work

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critically with machine-generated texts (Pym, 2013; O'Brien, 2022).

Despite these advances, fluent machine-generated output does not necessarily represent the meaning of the source text adequately. This is particularly important when translation involves lexical choices, contextual meaning, language functions, and culturally embedded expressions. (Harto, S et al., 2022) for example, found that students engaged in post-editing needed to pay attention to language structure, language function, and textual characteristics when working with machine-translated texts. Similarly, (Cholewska, 2021) showed that translation trainees regarded machine-generated output as a text requiring critical evaluation rather than as a final translation. These findings suggest that the apparent fluency of machine translation should not eliminate the need for human evaluation and revision.

The problem becomes more complex when culturally embedded meaning is involved. (Aboelnagah, 2025) demonstrated that effective post-editing of culturally embedded expressions requires not only linguistic competence but also extralinguistic and cultural knowledge, particularly when meaning cannot be adequately represented through literal lexical correspondence. In a student translation context, (Roza et al., 2024) likewise showed that translating culture-specific expressions requires careful interpretation of cultural meaning and appropriate translation choices to maintain relevant aspects of the source culture while making the text accessible to target readers. Such issues are particularly relevant to Japanese–Indonesian translation, where linguistic differences are accompanied by differences in pragmatic conventions and culturally specific ways of expressing meaning.

Within this context, Machine Translation Post-Editing (MTPE) provides a useful way of engaging students with machine-generated translations. Post-editing involves the evaluation and revision of machine-generated output to achieve an appropriate target-text quality (Nitzke, J., & Hansen-Schirra, 2021; O'Brien, 2022). More recently, however, MTPE has also been incorporated into translator education. Rather than accepting machine-generated translations as finished products, students are required to compare them with source texts, identify translation problems, consider alternative expressions, and determine appropriate revisions (Koponen et al., 2021).

From a learning perspective, this process may have implications beyond improving translation quality. When students evaluate machine-generated translations, they are required to consider why a particular lexical choice is inappropriate, whether the intended meaning has been conveyed, whether an expression sounds natural in the target language, and how culturally embedded meanings should be represented. Post-editing therefore places students in a position where they must make and justify translation decisions rather than simply reproduce machine output. Previous classroom-based research has shown that MTPE can encourage students to engage more critically with machine-generated translations and become more attentive to language use and translation choices (Cholewska, 2021; Harto et al., 2022; Gu et al., 2025)

Such engagement is particularly relevant to the development of linguistic awareness. During post-editing, students need to evaluate lexical accuracy, semantic interpretation, grammatical structure, naturalness, pragmatic appropriateness, and communicative function. Repeated comparison between the source text and machine-generated output can therefore draw students' attention to how meaning is constructed differently across languages. Rather than relying only on dictionary equivalents or grammatical correctness, students are

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Volume 2 , July 2026

encouraged to consider whether a translation is contextually and communicatively appropriate.

MTPE may similarly create opportunities for developing cultural awareness. In Japanese–Indonesian translation, students frequently encounter expressions whose meanings are closely associated with Japanese cultural practices and concepts. Translating such expressions requires decisions about whether cultural meaning should be preserved, adapted, reformulated, or explained for Indonesian readers. Research on culturally embedded expressions has shown that successful translation requires attention to cultural and extralinguistic knowledge rather than lexical correspondence alone (Aboelnagah, 2025). Studies of student translation practices have also demonstrated that learners employ different strategies when negotiating cultural meaning according to the source expression and the needs of target readers (Roza et al., 2024). Thus, working with machine-generated translations may provide a space in which students become more conscious of the relationship between language, culture, and translation decisions.

Although previous studies have examined the use of machine translation and post-editing in translator education, much of the existing research has concentrated on translation quality, post-editing performance, technology use, and post-editing competence Koponen et al., 2021; O'Brien, 2022; Gu et al., 2025). Comparatively less attention has been given to how linguistic and cultural awareness develops while students evaluate, revise, and reflect on machine-generated translations. Moreover, studies that examine this process through multiple forms of evidence students' actual post-editing products, their reflections on translation decisions, and their perceptions of MTPE remain limited. This gap is particularly relevant to Japanese–Indonesian translation, where linguistic and cultural differences require students to negotiate both linguistic form and culturally embedded meaning.

Therefore, the present study investigates MTPE not only in terms of the revisions students produce but also as a process through which linguistic and cultural awareness may develop. Using a convergent mixed-methods design, the study integrates students' post-editing products, learning reflection sheets, and perception questionnaires to examine what students revise, how they explain their translation decisions, and how they perceive the role of MTPE in their learning. Accordingly, this study addresses the following research question: How does Machine Translation Post-Editing (MTPE) develop students' linguistic and cultural awareness in Japanese–Indonesian translation learning?

2. METHOD

2.1 Research Desain

This study employed a convergent mixed-methods design to examine the role of MTPE in developing students' linguistic and cultural awareness in Japanese–Indonesian translation learning. A mixed-methods approach was considered appropriate because it brings together qualitative and quantitative evidence, allowing the research problem to be examined from complementary perspectives (Creswell & Clark, 2018). The convergent design was selected because the study examined not only students' post-editing practices but also the reasoning underlying their translation decisions and their perceptions of learning through MTPE.

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In a convergent mixed-methods design, qualitative and quantitative data are collected during the same stage of the study, analysed separately, and integrated during interpretation (Creswell & Clark, 2018). In this study, qualitative data were obtained from students' MTPE products and learning reflection sheets, while supplementary quantitative data were collected through a student perception questionnaire. Although 23 students participated in the MTPE learning activities, eight students completed the perception questionnaire. The questionnaire data were therefore used descriptively as supplementary evidence rather than as a representation of the perceptions of the entire class. Each data source provided a different perspective on the learning process: the MTPE products showed how students revised machine-generated translations, the reflection sheets provided insight into the reasoning behind their revisions, and the questionnaire offered supporting evidence of respondents' perceptions of learning through MTPE. The integration of these data provided a more comprehensive account of how students identified translation problems, evaluated machine-generated output, justified their translation decisions, and developed greater linguistic and cultural awareness.

Conceptually, this study views MTPE not merely as a technique for improving machine-generated translations but as a learning process that engages students in evaluating, revising, and reflecting on translation output. Through post-editing, students are encouraged to critically examine translation quality, justify their choices, and pay closer attention to language use and culturally embedded meaning. From this perspective, meaning negotiation during MTPE involves attention to lexical choice, semantic interpretation, grammatical structure, pragmatic appropriateness, and culture-specific meaning. Through continuous evaluation, revision, and reflection, students are expected to develop greater linguistic and cultural awareness and produce translations that are more appropriate for Indonesian target readers. The relationships among these components are illustrated in the conceptual framework below.

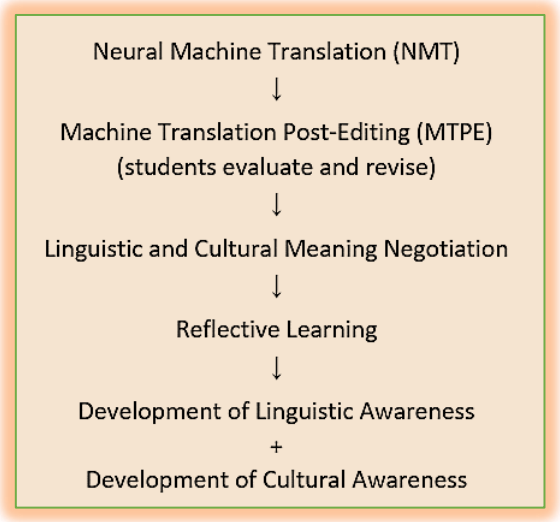


Figure 1. Conceptual Framework

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2.2 Participan and Learning Contexts

The study was conducted in a Japanese–Indonesian translation course involving 23 students of Japanese Lecturer Program. The course consisted of 14 meetings over one semester; however, the research focused on ten instructional meetings in which MTPE-related learning activities were implemented. The first meeting introduced fundamental concepts of translation, including definitions, translation techniques, and translation methods. The second meeting introduced Machine Translation Post-Editing (MTPE), followed by guided examples of how machine-generated translations could be evaluated and revised. From the subsequent meetings until the tenth meeting, students engaged in post-editing activities using three Japanese folktales as translation materials.

During the MTPE activities, students worked with outputs generated by several machine translation systems, including DeepL, Google Translate, Yandex, and Papago. Rather than treating these outputs as final translations, students examined them and revised linguistic and cultural problems identified in the machine-generated texts. Their post-edited translations were subsequently presented in class and discussed collectively. Particular attention was given to lexical choices, linguistic problems, and culturally embedded meanings that were inadequately represented in the machine-generated translations. These classroom discussions provided opportunities for students to compare translation alternatives and explain the considerations underlying their post-editing decisions.

2.3 Data Collecting Techniques

Data were collected from three complementary sources: students' post-editing products, learning reflection sheets, and a perception questionnaire. The post-editing products were collected during the MTPE instructional activities and were used to examine the linguistic and cultural revisions made by students when working with machine-generated translations. These products provided observable evidence of how students revised lexical choices, semantic meaning, grammatical structures, pragmatic expressions, and culture-specific elements in the source texts.

At the end of the instructional period, two research instruments were administered: a perception questionnaire and a learning reflection sheet. Of the 23 students who participated in the MTPE learning activities, eight completed the perception questionnaire. The questionnaire was therefore used to provide supplementary quantitative data on respondents' perceptions of MTPE, particularly its role in helping them identify linguistic problems, recognize cultural aspects of translation, critically evaluate machine-generated output, and make translation decisions. The reflection sheet provided qualitative data on how students evaluated machine-generated translations, selected lexical equivalents, addressed culture-specific expressions, and explained the reasoning behind their post-editing decisions.

The three data sources were used complementarily. The post-editing products provided evidence of what students revised, the reflection sheets revealed the reasoning underlying their translation decisions, and the questionnaire provided supplementary evidence of respondents' perceptions of their experience with MTPE. Together, these data offered multiple perspectives on the development of linguistic and cultural awareness during the learning process.

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2.4 Data Analysis Technique

Data were analysed using a convergent mixed-methods design, in which qualitative and quantitative data were collected during the same phase of the study, analysed independently, and subsequently integrated during interpretation (Creswell & Clark, 2018). This integration enabled the researcher to examine the research problem from multiple perspectives and to develop a more comprehensive understanding of how Machine Translation Post-Editing (MTPE) contributes to the development of students' linguistic and cultural awareness in Japanese–Indonesian translation learning. The integration of findings followed the principle of triangulation by convergence, whereby evidence from different data sources was compared to identify areas of consistency and complementarity (Creswell & Clark, 2018).

The analysis began with an examination of students' MTPE products, which served as direct evidence of the revisions made during the translation process. The post-edited translations were evaluated in terms of lexical accuracy, semantic accuracy, grammatical accuracy, naturalness, pragmatic appropriateness, register appropriateness, cultural adaptation, cultural preservation, and interpersonal meaning. These aspects were analysed to identify how students refined lexical choices, interpreted meaning, reorganised sentence structure, addressed pragmatic issues, and represented cultural elements while revising machine-generated translations. The analysis also provided an overview of students' developing translation awareness as reflected in their revision decisions (House, 2015), (Koponen et al., 2021).

The second stage focused on students' reflection sheets to explore the reasoning behind their revision decisions. The reflections were analysed to understand how students selected lexical equivalents, considered cultural adaptation, responded to translation difficulties, and perceived the role of MTPE throughout the learning process. Particular attention was given to the ways students explained their translation choices and negotiated meaning while revising machine-generated translations. Reflection data therefore provided important evidence of the development of linguistic and cultural awareness beyond what could be observed from the revised translations alone (Koponen et al., 2021).

The third stage involved analysing the student perception questionnaire regarding the implementation of MTPE in translation learning. The questionnaire data were analysed descriptively to illustrate students' perceptions of how MTPE supported their ability to identify linguistic problems, understand cultural meaning, evaluate machine-generated translations critically, and improve their overall translation learning experience. These findings served as supporting evidence that complemented the analyses of both the MTPE products and the reflection sheets.

Finally, findings from the three sources of data were brought together through an integrated interpretation. Rather than comparing the datasets independently, the researcher examined how the MTPE products, reflection sheets, and questionnaire responses complemented one another in explaining the same learning process. The post-editing products demonstrated what students revised, the reflection sheets explained why those revisions were made, and the questionnaire showed how students perceived the contribution of MTPE to their learning. Integrating these three sources of evidence made it possible to provide a more comprehensive explanation of how Machine Translation Post-Editing

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Volume 2 , July 2026

(MTPE) fostered students' linguistic and cultural awareness in Japanese–Indonesian translation learning (Creswell & Clark, 2018).

3. RESULTS AND DISCUSSION

This section presents the findings of the study by integrating evidence from three sources of data: students' MTPE products, learning reflection sheets, and perception questionnaires. In line with the convergent mixed-methods design, each dataset was first analysed separately and then interpreted collectively to provide a comprehensive understanding of how MTPE contributes to the development of students' linguistic and cultural awareness in Japanese–Indonesian translation learning. The discussion focuses not only on the revisions students made during post-editing but also on the reasoning behind those revisions and students' perceptions of the learning process.

The findings are organised into three interrelated themes. The first theme examines how students negotiated linguistic and cultural meaning while revising machine-generated translations. The second theme explores how reflective learning supported students in evaluating, questioning, and justifying their translation decisions throughout the post-editing process. The final theme discusses the development of students' linguistic and cultural awareness as demonstrated through their post-editing products, reflective writing, and perception data. Together, these findings illustrate how MTPE functions not only as a translation revision activity but also as a learning process that encourages students to construct meaning through evaluation, revision, and reflection.

3.1 Linguistic and Cultural Meaning Negotiation

The reflection data indicate that students' perspectives on machine-generated translations changed throughout the MTPE learning process. Rather than accepting machine-generated output as final, many students reported evaluating the translations critically before deciding whether they should be retained, revised, or reformulated. Machine-generated translations were no longer regarded as final products but as preliminary drafts requiring further evaluation and refinement. This shift suggests that meaning negotiation emerged as the initial stage through which students began to develop greater linguistic and cultural awareness during Japanese–Indonesian translation learning.

This change became evident in the students' post-editing practices. During MTPE, students systematically compared machine-generated translations with the source texts, examined contextual meaning, verified lexical choices using dictionaries and other references when necessary, and justified their revisions by considering structural differences between Japanese and Indonesian. Rather than relying solely on literal lexical correspondence, they increasingly evaluated register, naturalness, and the communicative flow of the target text. These revisions demonstrate that students were beginning to negotiate meaning by balancing linguistic accuracy with contextual appropriateness instead of reproducing machine-generated output uncritically.

The reflection sheets further explain why students made these revisions. Many participants reported that the evaluation process emerged from their growing awareness of the limitations of machine translation. They observed that machine-generated translations

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frequently conveyed literal meanings while failing to represent implicit meanings, pragmatic intentions, or culturally embedded expressions naturally in Indonesian. Consequently, students recognized that effective post-editing required interpretation rather than simple lexical replacement. This finding indicates that students were no longer functioning as passive recipients of machine-generated translations but were beginning to assume the role of critical evaluators who actively negotiated meaning before producing the final target text.

The questionnaire responses provided supplementary support for these observations. Among the eight questionnaire respondents, most reported that MTPE helped them identify lexical inaccuracies, recognize semantic differences between Japanese and Indonesian, detect unnatural expressions, and select more appropriate lexical equivalents. Although based on a limited number of respondents, these questionnaire findings are consistent with the patterns identified in the students' post-editing products and reflection sheets, providing supplementary support for the qualitative findings.

These findings are consistent with previous studies highlighting the pedagogical value of MTPE in translation education. Harto et al. (2022) reported that post-editing activities encouraged undergraduate translation students to examine language structure, lexical choices, and contextual meaning more critically before accepting machine-generated translations. Similarly, Cholewska (2021) found that MTPE shifted translation trainees from passively accepting machine translation output to actively evaluating alternative translations and justifying their revision decisions. The present findings extend these studies by demonstrating that this evaluative process also represents the initial stage in the development of students' linguistic and cultural awareness during Japanese–Indonesian translation learning.

Taken together, these findings suggest that meaning negotiation extends beyond the correction of translation errors. Instead, it develops through students' continuous evaluation of machine-generated translations, reflection on translation alternatives, and justification of revision decisions. In this sense, MTPE functions not merely as a translation revision technique but as a pedagogical process that initiates the development of linguistic and cultural awareness. By encouraging students to evaluate lexical choices, contextual appropriateness, and cultural interpretation simultaneously, MTPE provides opportunities for learners to construct meaning actively throughout the translation process. Therefore, meaning negotiation represents the initial stage in the development of students' linguistic and cultural awareness in Japanese–Indonesian translation learning.

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3.2 Reflective Learning during MTPE

The reflection sheets reveal that MTPE functioned not only as a translation revision activity but also as a reflective learning process through which students gradually examined, questioned, and justified their translation decisions. Rather than merely recording their learning experiences, students used the reflection sheets to explain why they accepted, rejected, or reformulated machine-generated translations. This process encouraged them to move beyond correcting translation errors toward critically evaluating the linguistic and cultural appropriateness of the translated text. The findings suggest that reflective learning became an essential mechanism through which students developed greater awareness of translation as a process of meaning negotiation.

eISSN 3124-9396
Volume 2 , July 2026

Students' reflections indicate that this learning process developed through continuous evaluation of machine-generated translations. Many participants explained that they compared the source text with the machine-generated output before making revisions, paying particular attention to lexical choice, sentence structure, semantic meaning, and contextual appropriateness. Rather than selecting the first lexical equivalent suggested by the machine translation system, students increasingly considered whether the translation accurately conveyed the intended meaning of the source text and sounded natural in Indonesian. Several participants also reported consulting dictionaries when they encountered unfamiliar vocabulary or when machine-generated translations appeared ambiguous or contextually inappropriate. These reflections demonstrate that students gradually became more analytical and deliberate in evaluating translation quality.

The reflection data further show that students increasingly recognized translation as a process of informed decision-making rather than the search for a single correct equivalent. Many participants explained that the same Japanese expression could be translated in different ways depending on the context, communicative purpose, and target readers. Consequently, they reported comparing several translation alternatives before selecting the most appropriate expression. Rather than relying solely on grammatical correctness or lexical equivalence, students began to justify their translation decisions by considering readability, coherence, and contextual meaning. This shift indicates that reflection encouraged students to become active decision-makers who evaluated translation alternatives critically instead of accepting machine-generated output without further consideration.

Another important finding concerns the relationship between language and culture during the reflective learning process. Students reported that evaluating machine-generated translations made them more aware that successful translation requires not only linguistic accuracy but also an understanding of cultural context. Several participants explained that Japanese cultural expressions, pragmatic meanings, and implicit messages often required additional interpretation before they could be expressed naturally in Indonesian. Through repeated post-editing activities, students increasingly recognized that translation involves negotiating both linguistic and cultural meaning. These reflections suggest that reflective learning encouraged students to connect language choices with broader cultural and communicative considerations, providing an important foundation for the development of cultural awareness discussed in the following section.

The questionnaire responses provided supplementary support for these findings. Among the eight questionnaire respondents, most reported that MTPE encouraged them to think more critically about machine-generated translations, evaluate alternative translations before making revision decisions, and reflect on the reasons underlying their translation choices. Although these responses were obtained from a limited number of respondents, they are consistent with the patterns identified in the students' reflection sheets and post-editing products, providing additional support for the qualitative findings.

These findings are consistent with previous studies emphasizing the pedagogical value of reflection in MTPE. (O'Brien, 2022) argues that post-editing extends beyond correcting machine-generated output by encouraging translators to evaluate translation quality critically and justify their revision decisions. Likewise, (Koponen et al., 2021)

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highlight that revision and post-editing involve reflective evaluation in which translators continuously reconsider translation alternatives before determining the most appropriate target-text solution. More recently, (Gu et al., 2025) demonstrated that classroom-based MTPE activities promote reflective learning by encouraging students to explain the rationale behind their revisions while engaging critically with machine-generated translations. The present study extends these findings by demonstrating that reflective learning not only improves revision practices but also serves as the pedagogical mechanism through which students gradually develop linguistic and cultural awareness in Japanese–Indonesian translation learning.

Overall, the findings indicate that reflective learning transformed MTPE from a technical revision activity into a pedagogical process through which students continuously evaluated translation problems, justified revision decisions, and actively constructed meaning. Rather than functioning as passive users of machine translation, students increasingly became reflective translators who examined linguistic accuracy, contextual appropriateness, and cultural meaning before producing the final translation. These findings suggest that reflective learning represents the educational mechanism linking meaning negotiation with the development of linguistic and cultural awareness during Japanese–Indonesian translation learning.

3.3 Development of Linguistic and Cultural Awareness

3.3.1 Development of Linguistic Awareness

1) Awareness of Natural and Contextual Translation

The analysis of students' post-editing products indicates that MTPE contributed to the development of students' linguistic awareness, particularly in producing translations that were more natural and contextually appropriate in Indonesian. Rather than preserving machine-generated translations literally, students increasingly revised lexical choices, sentence structures, and expressions to better reflect the intended meaning and communicative context of the source text. This finding suggests that students gradually shifted their attention from lexical equivalence toward contextual appropriateness and natural language use throughout the translation process.

For example, the Japanese opening expression "*Mukashi mukashi no ohanashi desu*" was translated by Google Translate as "*Ini adalah kisah dari masa lampau*." Although grammatically correct, students revised it to "*Pada zaman dahulu*," which is a more natural and conventional opening formula in Indonesian folktales. This revision demonstrates that students no longer evaluated translation quality solely based on lexical equivalence but also considered genre conventions and natural language use in the target culture.

Another example can be seen in the translation of the dialogue involving the cat at the end of the story. Google Translate rendered the sentence "ねこはびっくり。『ねずみにだまされたにゃあ』(*Neko wa bikkuri, Nezumi ni damasareta Nya*)" as "*Kucing itu terkejut. 'Tikus itu menipuku, meong*!'" Students revised it to "*Kucing terkejut. Dan berkata, 'Aku ditipu tikus, meong*!'" Although the revision appears relatively simple, it reflects students' awareness of contextual coherence by making

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Volume 2 , July 2026

the relationship between the narration and the direct speech more explicit. They also reformulated the utterance from "*Tikus itu menipuku" to "Aku ditipu tikus,*" producing a more natural expression in Indonesian while preserving the intended meaning of the original dialogue.

The reflection sheets provide further insight into the reasoning behind these revisions. Many students reported that they had begun to evaluate translations at the sentence and discourse levels rather than focusing on individual lexical items in isolation. Several participants explained that they consulted dictionaries whenever the lexical equivalents suggested by machine translation did not adequately represent the intended meaning of the source text. Others reformulated expressions because the machine-generated output sounded unnatural, awkward, or inconsistent with the narrative context. These reflections indicate that students gradually developed greater sensitivity to contextual meaning, natural language use, and the communicative function of translation rather than relying solely on literal lexical correspondence.

The questionnaire responses provided supplementary support for these findings. Among the eight questionnaire respondents, most reported that MTPE helped them recognize inappropriate lexical choices, interpret contextual meaning more accurately, and produce more natural Indonesian translations. Although these responses were obtained from a limited number of respondents, they are consistent with the patterns identified in the students' post-editing products and reflection sheets, providing additional support for the qualitative findings.

These findings are consistent with previous studies highlighting the contribution of MTPE to the development of linguistic competence in translation learning. (Harto, 2022) reported that post-editing activities encouraged undergraduate translation students to examine lexical choices, language structure, and contextual meaning more critically before accepting machine-generated translations. Similarly, (Cholewska, 2021) found that MTPE shifted translation trainees from relying on machine-generated output toward actively revising translations based on linguistic appropriateness and communicative effectiveness. The present findings extend these studies by demonstrating that repeated post-editing activities also foster students' awareness of naturalness and contextual appropriateness in Japanese–Indonesian translation learning.

Taken together, these examples illustrate that students' revisions were not limited to correcting lexical or grammatical errors. Instead, they increasingly evaluated how meaning should be expressed naturally and coherently within the target language. Their post-editing decisions demonstrate growing awareness that successful translation requires sensitivity to context, discourse, and the communicative conventions of Indonesian rather than reliance on literal lexical correspondence.

2) Awareness of Translation Decision-Making

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The analysis of students' post-editing products indicates that MTPE encouraged students to become more aware of the decision-making processes involved in translation. Rather than accepting machine-generated translations as the most appropriate solutions, students increasingly evaluated alternative lexical choices, compared different translation possibilities, and selected expressions that better represented the intended meaning of the source text. This finding suggests that students gradually shifted from relying on machine-generated output toward making informed translation decisions based on linguistic, contextual, and communicative considerations.

This development is evident in several post-editing products. Rather than limiting their revisions to correcting grammatical or lexical errors, many students reformulated phrases and sentence structures to improve coherence, readability, and contextual appropriateness. In several cases, students replaced machine-generated expressions that were linguistically acceptable but pragmatically inappropriate with alternatives that better reflected the communicative intention of the source text. These revisions demonstrate that students increasingly viewed translation as a process of evaluating multiple alternatives rather than identifying a single correct equivalent.

The reflection sheets further explain how these decisions were made. Many students reported comparing machine-generated translations with the source text before determining whether a translation should be retained, modified, or reformulated. Several participants explained that they consulted dictionaries when multiple lexical equivalents were available, while others emphasized the importance of considering context before selecting the most appropriate expression. Rather than relying solely on grammatical correctness, students increasingly justified their translation choices by considering semantic accuracy, naturalness, readability, and communicative purpose. These reflections indicate that translation decisions became progressively more analytical and context-sensitive throughout the MTPE process.

The reflection data also suggest that students gradually recognized translation as an interpretative activity rather than a mechanical transfer of words between languages. Several participants explained that a translation could be linguistically correct while still failing to convey the intended meaning in Indonesian. Consequently, they reconsidered alternative translations, evaluated their suitability within the narrative context, and selected expressions that more effectively represented the communicative function of the source text. This finding demonstrates that students were beginning to understand translation as a process of informed judgement rather than literal linguistic substitution.

The questionnaire responses provided supplementary support for these observations. Among the eight questionnaire respondents, most reported that MTPE encouraged them to evaluate machine-generated translations more critically, compare alternative translations before making revision decisions, and justify the reasons underlying their translation choices. Although these responses were obtained from a limited number of respondents, they are consistent with the patterns identified in the students' post-editing products and reflection sheets, providing additional support for the qualitative findings.

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These findings are consistent with previous studies highlighting the contribution of MTPE to the development of translation decision-making. (Harto, 2022) reported that post-editing activities encouraged undergraduate translation students to analyse lexical choices, contextual meaning, and language structure critically before accepting machine-generated translations. Similarly, (Cholewska, 2021) found that MTPE shifted translation trainees from passively relying on machine translation output to actively evaluating translation alternatives and justifying their revision decisions. The present findings extend these studies by demonstrating that repeated post-editing activities not only improve students' revision practices but also foster greater awareness of translation as a process of informed decision-making within Japanese–Indonesian translation learning.

Taken together, these findings suggest that translation decision-making developed through students' continuous evaluation, comparison, and justification of translation alternatives during MTPE. Rather than functioning as passive users of machine translation, students increasingly assumed the role of active translators who critically evaluated linguistic choices before determining the final translation. MTPE therefore contributed not only to improving translation quality but also to developing students' linguistic awareness by encouraging them to make context-sensitive, communicatively appropriate, and well-justified translation decisions.

3.3.2 Development of Cultural Awareness

1) Awareness of Culture-Specific Meaning

The analysis of students' post-editing products demonstrates that MTPE contributed to the development of students' awareness of culture-specific meaning during Japanese–Indonesian translation. Rather than treating Japanese cultural expressions as ordinary lexical items, students increasingly recognized that many cultural concepts could not be translated appropriately through literal equivalence alone. This awareness became evident when students revised machine-generated translations by considering the cultural meaning embedded in the source text before determining the most appropriate translation strategy.

This tendency can be observed in several post-editing examples. Students revised a number of Japanese culture-specific expressions, including 十二支, おもてなし, うちでのこづち, and various onomatopoeic expressions that had been translated literally by the machine translation system. Instead of retaining the literal output, many students selected expressions that better represented the intended cultural meaning in Indonesian. In several cases, students also preserved the original cultural concept while modifying its presentation to improve readers' understanding without losing its cultural identity. These revisions indicate that students were beginning to distinguish between lexical meaning and culturally embedded meaning during translation.

The reflection sheets further explain the reasoning behind these revisions. Many students stated that translating Japanese cultural expressions required more than dictionary knowledge because the intended meaning was closely related to

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Japanese customs, social values, and cultural practices. Several participants explained that literal translation often produced expressions that were difficult for Indonesian readers to understand. Consequently, they reconsidered whether a cultural expression should be maintained, adapted, or explained according to the context of the story and the needs of the target readers.

Students also reported that MTPE increased their awareness of the relationship between language and culture. They realized that successful translation depended not only on selecting equivalent vocabulary but also on understanding the cultural background represented by the source language. This awareness encouraged them to examine the cultural function of an expression before making translation decisions. As a result, post-editing became a process of interpreting cultural meaning rather than simply replacing Japanese words with Indonesian equivalents.

The questionnaire responses provided supplementary support for these findings. Among the eight questionnaire respondents, most reported that MTPE helped them identify culture-specific expressions, recognize cultural differences between Japanese and Indonesian, and understand the importance of cultural context in translation. Although these responses were obtained from a limited number of respondents, they are consistent with the patterns identified in the students' post-editing products and reflection sheets.

Overall, the findings indicate that students' awareness of culture-specific meaning developed through continuous engagement with machine-generated translations during the post-editing process. Rather than relying on literal lexical correspondence, students increasingly interpreted cultural concepts by considering their communicative function, cultural significance, and comprehensibility for Indonesian readers. This development demonstrates that MTPE supported students in recognizing that successful translation involves negotiating cultural meaning as well as linguistic meaning.

These findings are consistent with the study conducted Aboelnagah (2025), which demonstrated that successful post-editing of culturally embedded expressions depends not only on linguistic competence but also on translators' extralinguistic and cultural knowledge. The study found that participants who considered the cultural background underlying source-language expressions produced more accurate and culturally appropriate translations than those who relied primarily on literal lexical equivalence. Likewise, Roza et al. (2024) reported that student translators became increasingly aware that culture-specific expressions require careful interpretation because their meanings are closely connected to cultural values and social practices rather than individual lexical items.

The present study supports these findings by showing that Japanese–Indonesian translation students gradually shifted from translating isolated words to interpreting culturally embedded meanings before making translation decisions. More importantly, the present findings demonstrate that MTPE provides opportunities for students to negotiate cultural meaning actively rather than relying on literal lexical correspondence. Through repeated post-editing activities, students increasingly recognized that successful translation requires understanding both the cultural significance and communicative function of source-language expressions.

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Volume 2 , July 2026

2) Awareness of Cultural Adaptation

The students' post-editing products indicate that the development of cultural awareness was not limited to recognizing culture-specific expressions but also extended to making appropriate adaptation decisions during translation. As students encountered Japanese cultural concepts that could not be transferred directly into Indonesian, they began to consider various ways of representing these expressions while maintaining both comprehensibility and the original cultural meaning. Their revisions suggest that cultural adaptation became an important part of the post-editing process rather than a simple replacement of unfamiliar words.

This pattern is evident in several post-editing products. Students did not apply a single strategy when revising culture-specific expressions. In some cases, they retained the original cultural concept because they considered it essential to the identity of the source text. In other cases, they selected Indonesian expressions that conveyed a similar cultural function or added explanatory information to help readers understand unfamiliar concepts. Such variation indicates that students no longer viewed cultural translation as a literal transfer of vocabulary but as a process of selecting the most appropriate representation for Indonesian readers.

The reflection sheets provide further evidence of this decision-making process. Many students explained that they first considered whether a Japanese cultural expression had an equivalent concept in Indonesian before deciding how it should be translated. When no direct equivalent was available, several participants preferred to retain the original expression while ensuring that its meaning could still be understood through the surrounding context. Others chose to adapt the expression when they believed that a literal translation would confuse Indonesian readers or reduce the readability of the story. These reflections demonstrate that students' adaptation decisions were guided by considerations of both cultural authenticity and reader comprehension.

Students also recognized that different cultural expressions required different translation strategies. Rather than relying on a single approach throughout the translation process, they evaluated each expression individually according to its cultural significance, narrative function, and potential impact on the target audience. This awareness suggests that students were beginning to understand cultural adaptation as a flexible decision-making process rather than a fixed translation procedure. Their revisions therefore reflect increasing sensitivity to the relationship between language, culture, and communication. Such variation reflects the dynamic and functional nature of translation techniques, in which translation choices are shaped by context, purpose, and the relationship between the source and target texts rather than by fixed linguistic correspondence (Molina, L., & Albir, 2002).

The questionnaire responses provided supplementary support for these findings. Among the eight questionnaire respondents, most reported that MTPE improved their ability to determine when cultural expressions should be preserved, adapted, or reformulated in Indonesian. Although these responses were obtained from

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a limited number of respondents, they are consistent with both the reflection data and the students' post-editing products.

Overall, the findings suggest that MTPE contributed to the development of students' awareness of cultural adaptation by encouraging them to justify their translation choices according to the cultural meaning of the source text and the communicative needs of Indonesian readers. Rather than relying on literal translation or following machine-generated output uncritically, students gradually learned to adapt cultural expressions through informed translation decisions. This development reflects an important stage in the emergence of cultural awareness, where translation is understood as an act of intercultural mediation rather than linguistic substitution alone.

The present findings also corroborate those reported by (Roza et al., 2024), who observed that student translators did not rely on a single translation strategy when dealing with culturally bound expressions but instead selected different approaches, including preservation, adaptation, and explicitation, according to the communicative purpose of the target text. Their findings suggest that cultural adaptation is a flexible decision-making process requiring translators to balance cultural authenticity with target-reader comprehension. A similar conclusion was reached by (Aboelnagah, 2025), who emphasized that effective post-editing of culturally embedded terms requires translators to justify their translation choices based on contextual and cultural knowledge rather than literal lexical correspondence. The findings of the present study extend these previous studies by demonstrating that Japanese–Indonesian translation students developed greater confidence in selecting culturally appropriate The questionnaire responses support these findings. Most participants agreedstrategy consistently, students evaluated each cultural expression according to its narrative function, cultural significance, and readability for Indonesian readers. These findings reinforce the view that MTPE can facilitate the development of intercultural decision-making by encouraging students to adapt cultural expressions through informed and context-sensitive translation choices.

CONCLUSION

This study explored how Machine Translation Post-Editing (MTPE) contributes to the development of students' linguistic and cultural awareness in Japanese–Indonesian translation learning. The findings indicate that MTPE supported this development by engaging students in continuous meaning negotiation and reflective learning throughout the post-editing process. Rather than accepting machine-generated translations uncritically, students gradually learned to evaluate lexical choices, interpret contextual meaning, justify revision decisions, and consider the communicative purpose of their translations before producing the final target text. These findings suggest that meaning negotiation and reflection functioned as complementary learning processes through which linguistic and cultural awareness gradually developed.

The analysis of students' post-editing products, reflection sheets, and supplementary questionnaire responses further demonstrates that learning through MTPE extended beyond correcting translation errors. Through repeated post-editing activities,

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students became increasingly aware of natural language use, contextual meaning, and the relationship between language and culture. They also demonstrated greater sensitivity to culture-specific expressions and developed a stronger ability to determine when cultural meanings should be preserved, adapted, or reformulated for Indonesian readers. These findings indicate that MTPE encouraged students to view translation not merely as lexical substitution but as a process of informed linguistic and cultural decision-making.

Overall, this study highlights the pedagogical value of MTPE in Japanese–Indonesian translation education. Beyond improving machine-generated translations, MTPE encouraged students to become more critical, reflective, and responsible translators by actively evaluating translation alternatives and justifying their revision decisions. The findings suggest that integrating MTPE into translation classrooms can provide meaningful opportunities to foster students' linguistic and cultural awareness while strengthening their ability to evaluate, revise, and refine machine-generated translations. Future studies may involve larger participant groups, a broader range of translation genres, and longitudinal designs to examine how linguistic and cultural awareness develops over time in AI-assisted translation learning.

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