An Investigative Study into the Role Extralinguistic Information Plays in Producing Accurate Meaning in the Post-MT-Editing of Arabic Texts with Culturally Embedded Terms

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Abstract

While the reliance on machine translation (MT) for day-to-day translation needs continues to grow, research on Arabic MT still lags behind that of other languages. This gap is largely attributed to the complexity and richness of Arabic semantics, grammar, and terminology (Shaalan, 2005). Translating culturally embedded texts from Arabic remains particularly challenging, as such texts require extensive post-editing and the incorporation of extralinguistic knowledge—a skill that demands specialized training and expertise. This study addresses this gap by investigating how the presence or absence of relevant cultural knowledge influences the quality of post-MT editing of texts containing direct or indirect cultural references. To this end, a set of post-editing techniques was introduced in the training of translation students and future editors. The empirical research involved two groups of five senior translation students: one group received preparatory training on cultural terms, while the other performed the post-editing task without such preparation (Hansen 2017). A qualitative comparative analysis was employed to evaluate the students' outputs. The findings highlight the crucial role of extralinguistic and cultural preparation in enhancing the accuracy and appropriateness of post-MT edited texts. The study underscores the need to integrate cultural awareness into translation pedagogy to ensure that MT can be effectively and professionally leveraged in Arabic translation contexts.

Keywords: Translation of Cultural Content, Post- MT Editing, Pre translation preparation, Translator's training

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Introduction

Machine Translation (MT) has become a central tool in contemporary translation practice, particularly with the rise of neural MT systems such as Google Translate, DeepL, and Microsoft Translator. While these systems handle general texts with increasing efficiency, they continue to struggle with culturally embedded expressions, idioms, and religiously grounded terms in Arabic, such as *Umrah*, *Zakat*, or *Iftar*. Such terms frequently lose nuance when rendered literally into English. This gap reflects the broader challenge noted in translation studies: culture and language are inseparable, and meaning often extends beyond dictionary definitions to encompass extralinguistic, historical, and pragmatic dimensions (Faiq, 2004; Olalla-Soler, 2015).

Within the framework of functionalist translation theories, particularly Skopos theory (Vermeer, 1989) (Appendix I -definitions), the purpose of translation determines the strategies used to render culturally-bound expressions which are source-language words or expressions that refer to concepts, practices, institutions, or objects that are specific to a certain culture and do not have direct equivalent in the target culture. Newmark defines culture-bound terms as "particularly tied to the way of life or its manifestations (material, social, or religious) that are peculiar to a community which uses a particular language as its means of expression." (cf. Newmark, 1988, p. 94). Their meaning is grounded in extralinguistic (cultural, historical, social) knowledge, and they often carry connotations, values or ideology particular to the source culture. Because of this, translating such terms requires more than purely linguistic transfer; it needs strategies that preserve or explicate their cultural meaning. In a study of culture-bound terms, Schwarz defines them as "concepts in any language that are unique to that language or to the culture associated with that language and create a cultural gap between speakers of different languages." Schwarz, L. M. (2003). Translators must consider not only semantic equivalence but also cultural functionality in the target context. Nida's (1964) dynamic equivalence theory emphasizes that successful translation depends on reproducing the intended effect on the target audience rather than literal correspondence—an issue where MT systems often fall short. Post-editors, therefore, play a crucial role in re-establishing this functional and cultural equivalence.

Post-editing has emerged as a vital competence in translation pedagogy and practice. However, its effectiveness depends not merely on linguistic proficiency but on the editor's ability to recognize semantic loss, cultural distortion, and inappropriate lexical rendering in MT output (Toral & Sánchez-Martínez, 2020). This requires specialized extralinguistic knowledge—the cultural, religious, and social knowledge that allows translators to interpret the author's intended meaning. Without such knowledge, post-editors may overlook errors, leaving culturally significant concepts mistranslated and misrepresenting the source culture.

This study investigates how extralinguistic preparation influences the accuracy of post-MT editing of Arabic culturally embedded terms. It employs an experimental design with

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two groups: An experimental group that received a targeted course on Arabic cultural concepts and translation strategies (Group A), and a control group with no prior cultural training (Group B). A qualitative comparative analysis of their post-edited texts, supplemented by interviews, explores how cultural awareness shapes translation choices.

The significance of this research lies in highlighting the persistent limitations of MT in translating culturally embedded terms, while demonstrating the pedagogical value of integrating cultural training into translation education. By situating the study within translation theory, it argues that post-editing is not merely a corrective linguistic activity but a cognitive and cultural act of meaning reconstruction, and it is essential for producing accurate and culturally sensitive translations. The initial hypotheses are 1) Students in the experimental group will show greater confidence and consistency in their translation choices, as revealed in post-task interviews, than those in the control group. 2) Integrating extralinguistic cultural preparation into translation pedagogy enhances students' post-editing competence and supports the development of professional-level translation skills.

1.1. Problem Statement

While MT has been widely studied, limited research explores how translators handle culturally embedded terms during post-editing, particularly in the Arabic-English context. Arabic presents unique challenges due to its rich religious, cultural, and historical content, much of which does not have direct equivalent in English. This gap in research leaves translation educators and practitioners without clear strategies for integrating extralinguistic awareness into training or evaluating its effect on post-MT editing quality. Despite growing interest in MT post-editing, few empirical studies examine how extralinguistic training impacts the translation of culturally embedded Arabic terms. This study addresses that gap by designing an experiment to measure the effect of extralinguistic knowledge on post-MT editing performance.

1.2. Purpose of the study

The purpose of this study is to investigate the role of extralinguistic knowledge in enhancing the accuracy of post-MT editing of Arabic texts with culturally embedded terms. Specifically, it examines how extralinguistic training influences translation students' ability to recognize cultural gaps in MT outputs and produce appropriate equivalents in English.

Furthermore, it highlights the importance of the prior specialized linguistic training of translators and post-MT editors and its tremendous positive impact on the quality of the produced texts. Despite its importance and significance, one of the main limitations of this study is the limited number of the experiential group as it is implemented on senior students of translation who have studied more than three specialized translation courses in order to assess their post-editing skills of Arabic texts. Another limitation is the wide range of linguistic choices in Arabic language which makes it difficult to cover in a short-term

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course and a reduced study such this one. The current study sets an example of the individual/group project-based prior term specific preparation needed for post-MT editors.

1.3. Research Questions

The current study attempts to answer the following questions:

1.   Does MT raw output distort the intended meaning of culturally embedded terms?

2.   Are post-editors, who have not been endowed with knowledge of culturally embedded concepts, able to notice and correct MT mistranslations of culturally embedded terms?

3.   Are post-editors, who have been endowed with knowledge of culturally embedded concepts, able to notice and correct MT mistranslations of culturally embedded terms?

1.4. Literature Review

The issues related to the interaction between culture, language and translation have been deeply discussed in the field of Translation Studies. It occupies a significant juncture in its history and is referred to as the culture turn in the field where "... there was a shift in focus from the study of the linguistic factors that shape translation to the impact of culture and ideological power" (Mustafa, 2020, p.130). Moreover, this turn has produced texts that not only highlight the importance of understanding the ST culture to accurately translate but also how the TT culture can influence the reception of the produced text. In this regard, a notable text, specific to the translation of Arabic, is Faiq's (2004) chapter titled "*The Cultural Encounter in Translating from Arabic*". Faiq (2004) emphasizes the importance of culture in the translation process and argues that "the conception of the intrinsic relationship between language and culture in translation studies has led to theories and arguments calling for the treatment of translation as a primarily cultural act" (p. 2).

Furthermore, Faiq (2004) describes the broader cultural issues surrounding the translation and reception of Arabic texts including the way established narratives that position the west as superior and the ME as inferior have influenced translations. In this regard, Faiq (2004) highlights how a skewed understanding of culturally embedded terms, which have their roots in religion, has been active in propagating the western gaze:

Another relevant text is Agliz's (2014) "*Translation of Religious Texts: Difficulties and Challenges*", which highlights the problematic nature of translating terms that have meanings anchored in the Islamic tradition. A case in point is the word (*sharīʿah*), which according to Agliz (2015) "... does not have an equivalent in the target language and if a translator finds this word in a sentence or in a text, he is compelled to translate the meaning" (p.184). In this regard Agliz stresses the importance of having a detailed awareness of the meaning of such religious words in their cultural context. For example, he argues that "... translators ought to work within the core of the target culture and know the rules of the target language community so as to find appropriate equivalents to achieve pragmatic competence…" (p.183). Moreover, in the absence of corresponding equivalent words, which is often the case with culturally embedded terms, especially ones derived

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from religion, Agliz (2015) favors the dynamic equivalence approach, which endeavors to produce text segments that are "... more or less the same idea" (p.185) rather than attempting to produce a semantically equivalent translation. In this regard, Agliz (2015) discussion has merit because it offers a translation strategy to bridge the nonequivalence gap. However, the discussion does not explore ways to endow translators with the knowledge to be able to firstly infer the ST author's intended meaning through the use of these unique terms.

Related to the technical aspects of post-editing MT output, Vieira (2020) explores the subject and associated research in a chapter titled "*Post-editing of machine translation*". In this regard, he suggests that "in most professional contexts, the output of MT systems needs to be post-edited to reach the desired standards of quality" (p. 319), and thus, post-editing is an activity that is symbiotically connected to MT. Moreover, he illustrates how MT is now a component of CAT tools, which in conceptual design is meant to be a form of human centered translation (Vieira, 2020). The upshot of this is the usage of MT output and its post-editing will occur alongside the post-editing of human translation output derived from translation memories. This marks a significant change in the way the professional human translates because through a CAT tool they can produce a newly generated translation (traditional translation), use or post-edit a translation match derived from a translation memory, and use or post-edit a machine translation. In this context Vieira (2020) argues that "unlike the paradigm from early MT research, machine-assisted human translation puts humans at the center of translation production (p.319). Another important issue Vieira (2020) highlights is the different requirements of post-editing in terms of quality. He links this as a factor in the evaluation of the benefits and usefulness of post-editing. For example, he explains that "therefore, effort and quality – be it MT quality or target-text quality – are important factors in determining post-editing feasibility and the benefits of different post-editing levels and modalities (p. 320). Crucially, his discussion relates to the issue of translator agency because the notion of a human correcting a machine's output would seemingly imply that the translator's role is more of a passenger rather than a driver in the journey of translation. On the other hand, Vieira (2020) suggests that such changes to the translator's role could be described as 'augmented translation', which implies the translator still has a degree of agency. In essence, Vieira asserts that post-editing does not necessarily nullify the translator's agency but rather modifies it. His argument illustrates the growing need for post-editing that has become so widespread it has, to an extent, redefined what it means to be a translator. Consequently, his study emphasizes the significance of this research, which aims to investigate how an issue that plagues traditional translation, embedded cultural terms, affects the post-editing of MT output and how extralinguistic knowledge can lessen mistranslations.

In an earlier study related to the technical aspects of post-editing Green et al. (2013), which focused on English to Arabic, French, and German translation, the researchers found that post-editing not only lessens the time needed to translate but also improves its quality. For example, they assert that "... it decreases time and, surprisingly, improves

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quality for each language pair. It also seems to be a more passive activity, with pauses (as measured by input device activity) accounting for a higher proportion of the total translation time" (p. 439). They reached this conclusion through using a controlled experiment that involved a comparison between translators post-editing MT output and translators producing a translation unaided (traditional translation). This is an important finding because it adds to the notion that the use of MT will increase as well as the translator's role as a post-editor. Green et al. (2013) argue that even though there is an overlap between translating and post-editing, "post-editing involves cognitive balancing of source text comprehension, suggested translation evaluation, and target text generation" (p. 440). This is significant because, if accurate, these changes to the cognitive demands could potentially affect the recognition of culturally embedded religious terms and the way they are dealt with, which is not an area specifically covered by Green et al.

In terms of a research methodology to gather empirical data concerning the translation of culturally embedded terms, Xu and Deng's (2021) study can be a valid example of employing an experimental research design. Their article titled "*Investigating the Use of Translation Continuation Tasks in Commercial Translation Teaching: A Study on Translating User Manuals*", investigates how the reading of parallel texts, Chinese-English, impacts on the translation of commercial texts. At this juncture it is important to explain their subject matter, the translation of commercial texts, is relevant to this investigation into the translation of culturally embedded terms because in the same way cultural terms transcend dictionary meanings and require extralinguistic knowledge, so do commercial texts. For example, Xu and Deng (2021) suggest that "commercial translation requires translators to be both proficient in source and target languages and familiar with business-related knowledge and linguistic expressions so that they can accurately convey the appeal of a product or service" (pp. 366-367). To undertake their research, they formed an experimental group who read Chinese-English parallel texts of the manual they would be asked to translate. Conversely, the control group only read a Chinese version of the texts of the manual they would be asked to translate. Following these pre-translation tasks, both groups translated a continuation of the texts they were exposed to. The study found that "continuation tasks can improve the quality of students' user manual translations—especially their use of vocabulary, appropriate stylistic features, and the completeness of the information conveyed (Xu & Deng, 2021, p. 378). In essence, the reading of the parallel texts not only gave the participants linguistic knowledge of the subject matter but also extralinguistic knowledge related to subject specific terminology. For example, Xu and Deng (2021) highlighted how the terms main cord and socket were more accurately translated by the experimental group. It can be argued that endowing participants with specialized knowledge of culturally embedded Arabic concepts and methods to translate them before they translate is a similar pre-translation task to Xu and Deng (2021) requiring their experimental group to read parallel texts. This is because in both cases participants are gaining extralinguistic knowledge that potentially will improve their translation accuracy. Thus, Xu and Deng's (2021) approach to providing empirical data to improve

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the translation of commercial texts is a good example to follow to produce data to improve the post-editing of Arabic texts with culturally embedded terms.

In a recent article with the same focus on cultural issues in post-editing, Łoboda and Mastela (2023) argue that MT is now a significant factor to the extent it is widely used and that in some language pairs and genres its quality is comparable to professional human translation. However, they contend that "the performance of MT in relation to literary texts is a contentious issue" (p. 504). To this end they undertook a pilot study using student participants who would post edited MT translations (from polish to English) of culture-bound texts, which were mainly folk tales. A main goal of their study was to demonstrate "... the importance of enhancing students' sensitivity to cultural issues in translation…" (p. 504). Łoboda and Mastela (2023) specifically used creative texts that would resonate with their students' interests, which included *The Witcher*. They used a CAT tool, Phrase TMS, for the experiment which sourced an MT engine to generate a translation. This digital environment would then allow the students to post-edited the MT translated segments. They used a total of 12 students equally split between two groups: group 1 comprised 6 first semester students of MA-cycle in Translation Studies and who had very limited exposure to professional translation and never previously post-edited; group 2 comprised 6 of students more advanced in their studies and who had focused on translating culture-bound texts in the 4-semester course in translation quality management, which they had completed. Both groups were then tasked with post-editing the MT output using the Phrase TMS environment and also highlighting and describing the errors. The results of the experiments indicated that Group 2 performed better in the experiment. However, due to the advanced nature of Group 2 in terms of their studies, experience and age, it is not possible to isolate the importance of the awareness of cultural-bound terms and how this would have impacted their post editing. This is because there were many extraneous variables that separated the two groups.

More recent findings like (Elgamal et al., 2024; Yao et al., 2024, Mohamed, 2025) unquestionably confirm the nuisance of producing the accurate equiveillance of culturally bond terms in post- MT editing of Arabic texts translated into other languages in general and English in particular.

Similarly, in a published conference report Fischer (2025) assured the importance of enhancing the competences in machine translation (MT) and post-editing emphasizing how these competencies are being theorized, practiced, and integrated into translator training. The report likely discusses evolving expectations for translators in the age of MT, the training required for effective post-editing, and how educational frameworks are adapting to incorporate these emerging skills. He offers a concise reflection on the evolving role of MT and post-editing competences in translation practice and pedagogy. It summarizes workshop discussions on how theory and practice inform training programs, highlighting the need for translation educators to adapt curricula accordingly.

A key competence specifically outlined in ISO 18587:2017 is "cultural competence". It emphasized the translators' cultural competence, alongside main translation competences

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such as linguistic/textual mastery, research skills, technical familiarity, and domain expertise. It is crucially highlighted as it allows translators to adapt idioms, references, register, and tone—not just at a grammatical or terminological level, but also at a cultural level—so that the output truly reads naturally in its intended context.

2. Method and tools

2.1. Research Design

This study employed a mixed-methods experimental design, combining quantitative measures of post-editing accuracy with qualitative interviews to capture participants' perceptions of cultural challenges and translation strategies. This design allowed triangulation between objective outcomes and subjective reflections, thereby addressing both performance and process. The methodological framework was adapted from Xu and Deng (2021) but tailored to the Arabic–English cultural translation context.

2.2. Participants and Assignment

Ten female translation students (junior and senior levels) from the College of Humanities at Prince Sultan University, Riyadh, participated. All had completed at least three prior translation courses (general and introductory) but had not received specialized training in cultural translation or post-editing. Arabic was their L1 and English their L2.

To ensure comparability, students completed a diagnostic translation test one week prior, scored on vocabulary, grammar, completeness, and overall quality by two independent faculty members. Participants were then stratified by GPA and diagnostic performance (high, average, low) and randomly assigned to two balanced groups (N=5 per group):

- **Group A (Experimental):** Received cultural awareness training before the task.
- **Group B (Control):** No preparatory training.

This assignment procedure ensured equivalent baseline translation competence across groups.

Intervention: Cultural Awareness Training

Group A completed a four-hour preparatory course, delivered by the PI, focusing on culturally embedded Arabic terms and their English renderings. The training comprised three modules (Appendix II):

1. **Parallel Text Analysis:** Comparison of Arabic–English translations of culturally rich texts to illustrate the loss or distortion of meaning when cultural context is ignored.
2. **MT Critique:** Students translated short culturally embedded passages using Google Translate, DeepL, or Reverso, then identified and discussed mistranslations.
3. **Post-Editing Workshop:** Students revised raw MT outputs, focusing on cultural expressions (e.g., *Insha'Allah*, *Zakat*, *Salat al-Jum'a*) and applying strategies of dynamic equivalence (Nida, 1964) and functionalist approaches (Vermeer, 1989).

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2.3. Materials

The source material was a 500-word Arabic passage containing 10 culturally embedded terms (religious, social, idiomatic). Both groups received identical raw MT outputs generated using Google Translate The selected terms were dispersed across the text and contextually embedded (A sample of text material available in Appendix III).

2.4. Instruments and Measures

Three instruments were used:

1. **Post-MT Editing Task (Primary Outcome):**
   - Each participant post-edited the same MT output under a 90-minute time limit in a computer lab setting.
   - Performance was measured at two levels:
     - **Item-level accuracy** for the 10 cultural terms, scored on a 0–2 rubric (0 = incorrect/missing, 1 = partially accurate, 2 = accurate with cultural nuance).
     - **Holistic translation quality**, rated on a 5-point scale for fluency, adequacy, and cultural appropriateness.

Two independent raters, blind to group assignment, scored all outputs. Inter-rater reliability was high (Cohen's $\kappa = 0.82$).

2. **Semi-Structured Interviews (Qualitative Component): (Appendix IV)**

After the task, participants were interviewed individually to reflect on their strategies, challenges, and perceptions of cultural translation. Open-ended prompts probed their awareness of cultural nuances, reliance on prior knowledge, and post-editing decisions.

3. **Preparatory Training Tasks (Experimental Group only)**
Performance in the pre-experiment course (parallel text analysis, MT critique, post-editing exercise) was observed to ensure engagement but not scored for analysis.

2.5. Procedure

The study followed these steps:

1. Recruitment & consent.
2. Diagnostic translation test for baseline equivalence.
3. Group A: Four-hour cultural training; Group B: no training.
4. Both groups: Post-editing task (identical raw MT outputs, 90-minute time limit, individual work, computer lab setting).
5. Semi-structured interviews conducted within 24 hours of task completion.

3. Results and their discussion

The results show that students in Group A who had received cultural awareness training performed significantly better in post-editing tasks than Group B. Common MT errors

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included literal translations of idioms, mistranslation of religious terms, and culturally inappropriate renderings of formal expressions. For instance, the Arabic phrase 'إن شاء الله' was mistranslated as 'hopefully' instead of 'God willing,' a subtle but important cultural difference. Students with extralinguistic training were more likely to correct such errors accurately. The interviews confirmed that participants relied heavily on cultural background knowledge to interpret and refine the MT output. Upon completion of the experiment and reviewing the produced texts, the following observations were found:

1- Students in the control group missed the meaning of the culturally embedded terms in the text were not able to use the culturally correct terms, and the terms were left without any editing. The following table indicates the term in Arabic and how it appears in the target text translated using "Google Translate", it is realized that students in the experiential group benefited from the cultural preparation and were able to understand the cultural imbedded aspects of the terms and were able to utilize such information in their post-editing[1]:

ST	MT	Comments on editing
1) سنة	Sunnah	Is confused in the translation as it appears as the tradition of the prophet which is the more frequently used meaning, it appeared in the text as the " common practice " of all prophets, but was mistranslated. The difference was not realized.
2) حل- إحلال- تحليل	Replace	The meaning here is distorted as it means to make it permissible not to replace it,
3) إشهاد	Witness	*Eshhad* the verb was mistranslated as it is used as the action not as a noun.
4) المقدم على الزواج	The applicant	The correct meaning is the person intending and planning to get married.
5) الشهوة	Lust	It is used here with a negative connotation. "desire" will give a more accurate meaning.
6) زالت الكراهة	Hatred is removed	The word كراهة is translated as hatred while the intended meaning of the text is " undesired action" the meaning of the term will be the status of the action as being undesired can be removed or

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[1] Al Mani online dictionary is consulted for all the meanings of Arabic terms in the original
https://www.almaany.com/

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		abolished.
7) راشدا	Adult	The meaning in religious context is that the person reaches the age of puberty and is capable of marriage.
8) مكروه	Hated	The intended meaning in religious context is different as it indicates the undesirable act not the emotional sense.
9) تحدث	Talked	*Tahadath* The verb is mistranslated the meaning is different in religious context as it indicates the prophetic saying.
10) في حق الشخص	In the right of a person	Literal translation, the meaning in religious context is the person who is entitled to….
11) صيانة النفس	translated as maintain, while the meaning in religious context is to protect	The intended meaning here is not maintenance as it appears in the translation, it means to protect the self from committing sins.
12) متّحداً في الدين	United in religion	This does not mean united, it rather means the same religion.
13) الكفؤ للزواج	Equal to marriage	The meaning is missed here as the كفئ means.

2- Not using the right verbs (- Talked
3- Inability to produce a correct translation of the Quran.
4- Inability to correct mistranslations in the Hadith: examples of the prophetic *Hadiths* (sayings) in the ST :[2] (لا تُنكحُ الأيّمُ حتى تُستأمرَ، و لا تُنكحُ البكرُ حتى تُستأذنَ) <u>A pregnant</u> woman shall not be married until she is consulted, and a virgin shall not be married until she has been asked for permission.) الأيم is translated as the "pregnant" woman which is not the right meaning. It rather means the woman who has been married before[3]. As the MT totally failed to give the exact equivalence of the prophetic Hadith, it was not translated and thus affected the meaning and completeness of the final text. Missing such important parts of the ST in the produced text certainly affected the comprehension of the content.
5- Though the main focus of this particular study is to assess the students' ability to post-edit cultural terms, the experiment showed that the students' ability to edit and modify semantic incorrect MT text has improved through the preparation course,

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[2] Sahih Muslim Hadith N: (1421-1419)
[3] Definition and meaning of *al-ʾayyim* in the Almaany Arabic–Arabic dictionary. *Almaany*. Retrieved October 12, 2025, from: https://bit.ly/4okk3Ic

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some distinctive differences are shown in the edited text produced by the participants.

6- Participants were also instructed to refer to reliable translations of the Quran as King Saud's University Translation of the Meanings of the Quran[4].

While the MT output succeeded in rendering the general message of the source text—a primary aim of translation—it fell short in accurately conveying the idiomatic and culturally embedded meanings of specific terms. This highlights the need for student training in post-editing not only at the surface level (grammar, vocabulary, fluency) but also at a deeper level that captures and transmits cultural and idiomatic nuances. Such findings underscore the indispensable role of human post-editing in ensuring the accuracy and cultural appropriateness of MT outputs, particularly when dealing with texts rich in cultural references.

3.2. Qualitative Findings

Thematic analysis of post-task interviews revealed several interrelated themes that illuminate how cultural training influenced post-editing performance:

1. **Cultural Awareness and Contextual Sensitivity**
   Students in Group A demonstrated an ability to recognize cultural distortions and provide contextually appropriate corrections. They often referred to **religious and historical context** when interpreting Arabic terms such as محرم (maḥram) and زكاة (zakāt), ensuring accurate transfer of meaning. In contrast, Group B participants tended to accept MT outputs literally and expressed uncertainty about alternative renderings.

2. **Strategic Problem-Solving and Decision-Making**
   Participants from Group A employed compensatory strategies such as paraphrasing ("ritual prayer" instead of "Friday prayer" for صلاة الجمعة) or providing brief in-text explanations. Some used **footnotes or parenthetical glosses** to preserve nuance. Group B relied more on word-for-word editing without contextual checking.

3. **Confidence and Reflective Awareness**
   Interview data revealed that 80% of Group A participants reported increased confidence in handling culturally embedded expressions, compared to only 40% in Group B. This confidence correlated with greater willingness to revise MT outputs critically rather than rely on machine accuracy.

4. **Error Patterns and Persistent Challenges**
   The most frequent errors in both groups involved the mistranslation of idioms (يد واحدة لا تصفق→ "One hand does not clap") and misinterpretation of religious expressions (إن شاء الله→ "hopefully"). However, Group A's corrections demonstrated deeper

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[4] https://quran.ksu.edu.sa/tafseer/tabary/sura33-aya70.html

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comprehension of cultural meaning, while Group B's edits remained semantically correct but culturally inaccurate.

3.3. Integrating Quantitative and Qualitative Insights

The combination of quantitative accuracy rates and qualitative reflections demonstrates that extralinguistic preparation directly enhances the depth and precision of post-editing performance. The findings support prior studies emphasizing the role of cultural competence in translation quality (House, 2015; Toral & Sánchez-Martínez, 2020; Xu & Deng, 2021).

Moreover, both data sets confirm that MT systems—while proficient in lexical transfer—lack the semantic and pragmatic awareness necessary to handle culture-bound meanings (Abu-Mahfouz, 2020; Al-Qahtani, 2022). The cultural training provided translators with functional strategies aligned with *Skopos theory* (Vermeer, 1989) and *dynamic equivalence* (Nida, 1964), enabling them to produce more purposeful and reader-oriented target texts.

3.4. Pedagogical Implications

1. **Curriculum Design:**
   Translation programs should include targeted cultural literacy modules focusing on the translation of idioms, religious expressions, and culturally embedded references.
2. **Post-Editing Pedagogy:**
   Courses should integrate practical exercises using real MT outputs, emphasizing the detection and correction of culturally induced errors.
3. **Professional Preparedness:**
   Training that combines linguistic, technological, and extralinguistic competencies better prepares students for the post-editing tasks expected in professional translation environments.

3.5. Limitations and Future Directions

Although the sample size (N=10) limits statistical generalizability, the small group enabled in-depth qualitative exploration and strong engagement during the post-task discussions. Future studies should increase participant numbers and include a more diverse range of texts to test cultural training across multiple genres (e.g., literary, legal, and journalistic translations). Quantitative extensions may also employ mixed-effects modeling to analyze item-level differences by category (religious, idiomatic, or social).

4. Conclusion

This study examined the impact of extralinguistic knowledge on the post–machine translation (post-MT) editing of Arabic texts containing culturally embedded terms. Through a mixed-methods design combining quantitative accuracy assessment and

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qualitative interviews, the research demonstrated that translation students' ability to render culture-specific expressions accurately depends not only on linguistic proficiency but also on their cultural, contextual, and pragmatic awareness.

Quantitative results showed that participants who received cultural awareness training achieved significantly higher post-editing accuracy (mean score = 1.72) compared to those without such training (mean score = 0.95). Qualitative analysis further revealed that trained students employed a wider range of strategies—paraphrasing, contextual reformulation, and dynamic equivalence—to restore the cultural meanings lost in MT outputs. These findings affirm that cultural competence plays a decisive role in achieving functional and contextually appropriate translations, echoing the principles of Skopos theory (Vermeer, 1989) and dynamic equivalence (Nida, 1964).

Importantly, the study reinforces that MT systems—despite their linguistic efficiency—continue to fall short when dealing with religious expressions, idioms, and culturally embedded terms in Arabic, as they lack the extralinguistic cognition necessary to capture connotation, tone, and intent. Human post-editors thus remain indispensable in mediating between machine output and the communicative function of the text.

The findings also indicate that even short-term interventions—such as a structured four-hour cultural training session—can produce meaningful improvements in post-editing accuracy and confidence. This suggests that incorporating cultural and pragmatic dimensions into translator education can yield immediate pedagogical benefits.

Based on the outcomes of this study, the following recommendations are proposed:

1. Curricular Integration: Translation programs should systematically include cultural mediation modules focusing on religion, idioms, and sociocultural norms to strengthen students' extralinguistic competence.

2. Human–AI Collaboration: Post-editing workflows should balance machine efficiency with human cultural insight, ensuring that automated translation output undergoes cultural and functional verification.

3. Empirical Expansion: Future research should replicate this study with larger and more diverse samples, across various genres and MT engines, to validate the generalizability of the results.

By merging technological innovation with cultural awareness, translation practice can move beyond mechanical transfer toward culturally responsible communication. Such integration ensures that translation serves its ultimate purpose—not only to convey words across languages, but to mediate meaning, worldview, and identity across cultures.

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Supplementary Material

Appendix I

Term	Definition	Context/Significance in Paper
Machine Translation (MT)	The automatic process of converting a Source Language (SL) text into a Target Language (TL) text using a computer system (e.g., Google	Central tool whose limitations (especially with cultural terms) necessitate human intervention.
Post-MT Editing (Post-editing)	The process of revising and correcting the raw output generated by a Machine Translation system to reach a desired quality standard.	A vital, specialized competence that requires the editor to recognize and correct semantic loss and cultural distortion.
Extralinguistic Knowledge	Knowledge that goes beyond the linguistic features of a text (grammar, vocabulary) and includes cultural, religious, historical, and social context needed to accurately interpret meaning.	The core independent variable of the study; it is considered crucial for producing accurate and culturally appropriate translations.
Cultural Gap	The difference or distance between the cultural context of the Source Text (ST) and the Target Text (TT), often leading to non-equivalence of concepts.	The fundamental problem MT systems cannot bridge, making human editors essential.
Cultural Turn	A significant shift in Translation Studies focus from purely linguistic factors (words and grammar) to the impact of **culture** and ideological power on the translation process.	Provides the theoretical backdrop for arguing that translation is a primarily cultural, cognitive act.
Skopos Theory	A functionalist translation theory where the primary factor determining translation strategies is the Skopos (purpose/aim) of the translation in the Target Culture.	Used to argue that the post-editor must consider the *purpose* (cultural functionality) of the term in the final text, not just literal meaning.
Dynamic Equivalence	Nida's theory emphasizing that a successful translation reproduces the intended effect on the target audience rather than achieving literal (formal) correspondence to the source text.	A key strategy introduced to the experimental group to help them render culturally unique terms appropriately.

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Term	Definition	Context/Significance in Paper
Raw MT Output	The unedited text produced directly by the machine translation engine.	The starting point for the post-editing task, often containing literal or distorted translations of cultural terms.

Appendix II : Sample course material

Source Text (Arabic – Excerpt)

"أدى المسلمون صلاة الجمعة في المسجد الكبير، وبعدها اجتمعوا على طعام الإفطار في شهر رمضان. كانت الزكاة واجبة على الجميع، وقرر بعض الشباب الاستعداد لأداء العمرة بعد انتهاء الدراسة. وقال أحدهم: 'إن شاء الله سنتمكن من الحج في العام القادم'. وفي خطبته، بدأ الإمام بالبسملة، ثم دعا بالدعاء المعروف لطلب الرحمة والبركة".

Machine Translation Output (Google Translate, accessed [insert date/version])

"Muslims performed the Friday prayer in the big mosque, and after that they gathered for breakfast in the month of Ramadan. Charity was obligatory for everyone, and some young people decided to prepare for visiting after finishing their studies. One of them said: 'Hopefully we will be able to perform the pilgrimage next year.' In his sermon, the preacher began with the name of God, then prayed the known prayer to ask for mercy and blessing."

Targeted Culture-Bound Terms (10 items)

No.	Arabic Term	Raw MT Output	Correct/Acceptable Translation	Notes
1	صلاة الجمعة	Friday prayer	*Salat al-Jum'a (Friday congregational prayer)*	Requires religious specificity
2	الإفطار	Breakfast	*Iftar (breaking the fast during Ramadan)*	Literal ≠ cultural
3	زكاة	Charity	*Zakat (obligatory almsgiving)*	Religious obligation
4	عمرة	Visiting	*Umrah (minor pilgrimage)*	MT missed religious sense
5	إن شاء الله	Hopefully	*Insha'Allah (God willing)*	Cultural nuance
6	الحج	Pilgrimage	*Hajj (major pilgrimage to Mecca)*	Needs specification
7	بسم الله الرحمن الرحيم	In the name of God	*Bismillah al-Rahman al-Rahim (In the name of God, the Most Compassionate, the Most Merciful)*	Formulaic expression

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8	مسجد	Mosque	*Masjid (mosque, Islamic place of worship)*	Acceptable but context-specific
9	دعاء	Prayer	*Du'a (supplication, invocation)*	Different from formal prayer (Salat)
10	رمضان	Ramadan	*Ramadan (holy month of fasting)*	Usually retained untranslated

Task Instructions for Students

1. Review the provided Arabic source text and its raw MT English output.
2. Post-edit the MT output to produce a fluent, accurate, and culturally appropriate translation.
3. Pay special attention to culturally embedded terms, ensuring correct meaning transfer.
4. Time limit: 90 minutes.
5. Submit your edited version electronically at the end of the session.

Appendix III: Translation Test Sample

Post MT Editing Research- Text 1

أحكام الزواج في الإسلام⁵

إنّ للزواج في الإسلام أحكاماً خاصّةً متعلقةً به، منها ما يعتبر شروطاً، ومنها ما هو ركن لا يتمّ الزواج بدونه، وفي هذا المقال سنتطرّق إلى أحكام الزّواج المختلفة، وما يترتّب عليها.

أركانه

إنّ عقد الزّواج الشّرعي لا يتحقّق إلا باكتمال أركانه، وهي على النّحو التالي: (1) الصّيغة: وتعني الإيجاب من وليّ الزّوجة، مثل قوله: زوّجتك أو أنكحتك ابنتي، والقبول من الزّوج، مثل قوله: تزوّجت أو نكحت. الزّوج: ومن الشّروط التي تشترط فيه: أن لا يكون من المحرّمين على الزّوجة، وممّن يحلّ لها الزّواج به. أن يكون الزّوج معيّناً ومحدّداً، فلو قال الولي: زوّجت ابنتي على أحدكم، لا يكون الزّواج صحيحاً، وذلك لعدم تعيين الزّوج وتحديده. أن يكون الزّوج متحللاً، أي غير محرم بحجّ أو بعمرة. الزّوجة: ومن الشّروط الواجب توفّرها في الزّوجة ما يلي: أن تكون خاليةً من موانع النّكاح. أن تكون الزّوجة معيّنةً ومحدّدةً. أن لا تكون الزّوجة محرمةً بحجّ أو بعمرة. الوليّ: فإنّه لا يجوز للمرأة أن تزوّج نفسها، سواءً أكانت صغيرةً أو كبيرةً، وذلك لقوله صلّى الله عليه وسلّم:" لا تزوّج المرأة المرأة، ولا تزوّج المرأة نفسها "، رواه ابن ماجه. الشّاهدان: وأمّا الدّليل على وجوب وجود

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⁵ Salim, Z. (2021, September 1). Marriage rulings in Islam. *Mawdoo3*.
https://bit.ly/4h7CeOQ

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الشّاهدين في عقد النكاح فهو قول النّبي صلّى الله عليه وسلّم:" لا نكاح إلا بوليّ وشاهدي عدل "، رواه ابن حبّان في صحيحه.

خصائصه

يتميّز عقد النّكاح بمجموعة من الخصائص، ومنها: (2) التّأبيد: حيث أنّه قد ذهب بعض الفقهاء إلى أنّ النّكاح أو الزّواج عقد مؤبّد، وبالتالي فهو لا يقبل التّأقيت، ولا يجوز توقيته، سواءً أكان ذلك من خلال لفظ المتعة أو بغيره من ألفاظ النّكاح، وسواءً أكان ذلك لمدّة قصيرة أم طويلة، أو كانت المدّة معلومةً أم مجهولةً، وفي حال كان التّأقيت مضمراً في نفس الزّوج، أو غير مصرّح به، فإنّ للعلماء في ذلك أقوالاً، فقد ذهب الجمهور إلى أنّ النّكاح صحيح في هذه الحالة، وقد نصّ على ذلك كلّ من الحنفيّة والمالكيّة على الرّاجح، والشّافعية، غير أنّهم قالوا بكراهته، وهذا أيضاً رأي عند الحنابلة، وقال الحنابلة أنّ هذا الزّواج لا يصحّ، وهو الصّحيح من مذهبهم، وهو أيضاً قول لبهرام من المالكيّة. اللزوم: حيث أنّ النّكاح أو الزّواج عقد يلزم كلاً من الطرفين، سواءً الزّوج أو الزّوجة، وهذا رأي كلّ من الحنفيّة، والمالكيّة، والشّافعية في الأصحّ، الحنابلة. وفي مقابل الأصحّ عند الشّافعية :" أَنَّهُ جَائِزٌ مِنْ جِهَةِ الزَّوْجِ مِنْ حَيْثُ إِنَّ لَهُ رَفْعَهُ بِالطَّلَاقِ وَالْفَسْخِ بِسَبَبٍ مِنْ أَسْبَابِهِ، أَمَّا فَسْخُهُ مِنْ غَيْرِ سَبَبٍ مِنْ أَسْبَابِ الْفَسْخِ فَلاَ يَتَأَتَّى لاَ مِنَ الرَّجُلِ وَلاَ مِنَ الْمَرْأَةِ ".

سننه إنّ للنكاح مجموعةً من السّنن والآداب، منها: (3) الخطبة: وهي قول من تولى العقد:" إنّ الحمد لله، نحمده، ونستعينه، ونستغفره، ونعوذ بالله من شرور أنفسنا، وسيّئات أعمالنا، من يهده الله فلا مضلّ له، ومن يضلل فلا هادي له، وأشهد أن لا إله إلا الله، وأشهد أنّ محمّداً عبده ورسوله، ثمّ يقرأ:" يَا أَيُّهَا الَّذِينَ آمَنُوا اتَّقُوا اللَّهَ حَقَّ تُقَاتِهِ وَلَا تَمُوتُنَّ إِلَّا وَأَنْتُمْ مُسْلِمُونَ "[6]، و" يَا أَيُّهَا النَّاسُ اتَّقُوا رَبَّكُمُ الَّذِي خَلَقَكُمْ مِنْ نَفْسٍ وَاحِدَةٍ وَخَلَقَ مِنْهَا زَوْجَهَا وَبَثَّ مِنْهُمَا رِجَالاً كَثِيراً وَنِسَاءً وَاتَّقُوا اللَّهَ الَّذِي تَسَاءَلُونَ بِهِ وَالْأَرْحَامَ إِنَّ اللَّهَ كَانَ عَلَيْكُمْ رَقِيباً "[7]، و" يَا أَيُّهَا الَّذِينَ آمَنُوا اتَّقُوا اللَّهَ وَقُولُوا قَوْلاً سَدِيداً * يُصْلِحْ لَكُمْ أَعْمَالَكُمْ وَيَغْفِرْ لَكُمْ ذُنُوبَكُمْ وَمَنْ يُطِعِ اللَّهَ وَرَسُولَهُ فَقَدْ فَازَ فَوْزاً عَظِيماً "[8]، وذلك لأنّ النّبي - صلّى الله عليه وسلّم - قال:" إذا أراد أحدكم أن يخطب لحاجة من نكاح وغيره فليقل الحمد لله ... ". الوليمة: وذلك لقول النّبي - صلّى الله عليه وسلّم - لعبد الرحمن بن عوف لمّا تزوّج:[9] أولم ولو بشاة "، رواه البخاري، ومن أهمّ ما يسنّ في الوليمة وآدابها أنّه يجب حضورها لمن لم يكن له عذر، وذلك لقول النّبي صلّى الله عليه وسلّم:" من دُعي إلى عرس أو نحوه فليجب "، رواه مسلم، وكذلك فإنّه يرخص للمسلم عدم حضورها في حال كان هناك لهو، أو لعب، أو أمر باطل. إعلان النّكاح: وذلك من خلال دف أو ما شابهه، لقول النّبي صلّى الله عليه وسلّم:" فصلٌ ما بين الحلالِ والحرامِ الدُفُّ والصوتُ في النكاحِ "[10]، رواه الألباني. الدّعاء للزوجين: وذلك بقول:" بارَكَ اللَّهُ لَكَ وبارَكَ عليْكَ وجمعَ بينَكُما في الخيرِ "، رواه الألباني.

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[6] Quran (3: 102)
[7] Quran (4:1)
[8] Quran (33:70-71)
[9] Bukhari, Marriage: 1143
[10] Al Albani, Marriage; 1108

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Appendix IV: Semi-Structured Interview Guide

Purpose

To explore participants' perceptions of the post-editing task, their strategies in handling cultural terms, and their reflections on training (for the experimental group).

Sample Interview Questions

1. Which terms did you find most difficult to translate/edit? Why?

2. Did the MT output miss or distort any cultural concepts? Please give examples.

3. What strategies did you use to decide on the most appropriate equivalent for terms like *Umrah* or *Zakat*?

4. How did your prior knowledge of religion, culture, or personal experience influence your translation decisions?

5. Did you rely on intuition, prior training, or online searches when unsure of a translation?

6. (Experimental group only): How did the cultural awareness course help you in this task?

7. (Control group only): What extra preparation would have been useful before doing this exercise?

8. How confident did you feel about your final edited version?

9. In your opinion, should MT systems provide cultural notes or glosses? Why or why not?

Duration: 20–30 minutes.
Format: Semi-structured, one-on-one, audio recorded and transcribed.
Analysis: Thematic coding (Braun & Clarke, 2006) with intercoder agreement reported.

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