

GAMETRAPP project in progress: Designing a virtual escape room to enhance skills in research abstract post-editing

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Abstract

The “App for post-editing neural machine translation using gamification” (GAMETRAPP) project (TED2021-129789B-I00), funded by the Spanish Ministry of Science and Innovation (2022–2025) and led by the University of Málaga, has been in progress for two and a half years. The project is developing a web application that incorporates a gamified environment, specifically a virtual escape room, to bring post-editing practice closer to scholars. This paper outlines the methodological process followed and provides a brief description of the virtual escape room.

1 Introduction

The breakthrough of artificial intelligence (AI) has significantly impacted the development and advancement of language technologies, including neural machine translation (NMT). This advancement has also led to a greater reliance on post-editing (PE), which has garnered increasing attention from scholars. Previous research has explored the implementation of PE, particularly in academic contexts, focusing on first language (L1) to second or foreign language (L2) translation (Parra Escartín and Goulet, 2020).

Against the backdrop of scientific dissemination in English as L2, the GAMETRAPP project (Toledo-Báez & Noriega-Santiañez, 2024) is developing a web application that incorporates a gamified environment, specifically a virtual escape room, to enhance the PE of research abstracts translated from Iberian Spanish to American English (L1 to L2). While other applications, such as Kaninjo (Moorkens et al., 2016), have been developed to train users in PE, GAMETRAPP

stands out by introducing gamification as an innovative strategy to engage users in the PE learning process.

2 Analyzing NMT and PE to design the gamified environment

The methodological process of the GAMETRAPP project was carried out in four phases, which are outlined as follows: 244 Spanish-language abstracts were selected from Spanish journals ranked in Quartiles 1 and 2 (representing the top 50% of journals) in the *Scientific Journal & Country Ranking 2022*. Of these, only 126 abstracts met the following three criteria: a) published in 2023; b) following the IAMRaC¹ structure; c) authored by scholars affiliated with Spanish universities and/or research centers. Google Translate was selected as the NMT engine because, according to a previous questionnaire conducted to assess the Spanish scholars’ needs, it was the most widely used NMT engine.

The 126 abstracts were, on the one hand, translated into English by a professional translator, and, on the other hand, machine-translated with Google Translate and then post-edited into English by a professional post-editor (both of whom had English as their L1). Then, the translated and post-edited abstracts were analyzed, identifying NMT and PE errors and kudos using two metrics. On the one hand, the Multidimensional Quality Metrics was used to detect and classify NMT errors across the following categories: Terminology, Accuracy, Terminology, Accuracy, Linguistic conventions, Style, Locale conventions, Audience appropriateness, and Design and markup. On the other hand, the Post-edit Me! metric (Lefer et al., 2023) was used to detect and classify edits into four categories: value adding/successful edits,

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¹ This acronym stands for Introduction, Aims, Methodology, Results, and Conclusion. It is a variant of the IAMRaC structure (i.e., Introduction, Methodology, Results, and Discussion).

unnecessary edits, incomplete edits, or unsuccessful/error introducing/missing edits.

This dual analysis not only helped identify some of the most frequent NMT errors in machine-translated research abstracts but also revealed specific ES→EN PE patterns. The analysis results provided the foundation for the design of the gamified exercises, as the linguistic material was adapted to create the activities. These activities were organised into three parts: Part 1 focused on detecting NMT errors, Part 2 centered on PE, and Part 3 aimed at identifying successful and unsuccessful edits of PE.

An example of each type of activity is provided below:

Part 1: Identify the error in the following NMT output:

- No hay datos recientes que recojan su adaptación durante la pandemia por la COVID-19.
- There **is** no recent data that reflect their adaptation during the COVID-19 pandemic.

Part 2: Correct the error in the NMT output:

- La lucha contra la radicalización gana protagonismo.
- The fight against radicalization gains prominence.
- The fight against radicalization _____ prominence.

Correct answer: The fight against radicalization **is gaining** prominence.

Part 3: Indicate whether this post-editing is correct or not:

- Los medios digitales **suelen** entenderse como una herramienta que contribuye a materializar el ideal social.
- Digital media **are** usually understood as a tool that contributes to materializing the social ideal.
- Digital media **is** usually understood as a tool that contributes to materializing the social ideal.

Option 1: Correct

Option 2: **Incorrect**

3 Brief explanation on the gamified environment

The gamified environment, developed using the Articulate tool, is divided into two main sections: a theoretical section and a practical section. The theoretical section introduces the game and covers basic concepts related to NMT, scientific abstracts, and PE. The practical section is divided into 5 worlds: Humanities, Arts, Natural Sciences,

Applied Sciences, and Social Sciences. The game is designed as an escape room where users earn a key and a puzzle piece at the end of each world. Throughout the game, players must navigate the five worlds by completing PE activities. Players are ranked based on the time it takes to complete the game. At the end of the game, they complete a brief game experience questionnaire based partially on IJsselsteijn et al. (2013). The first iteration of the GAMETRAPP app and escape room is scheduled for testing with scholars from the University of Málaga between April and May 2025. A second round of usability testing will follow in June/July 2025, after adjustments are made to the app and escape room. The final versions of the GAMETRAPP app and escape room are set to launch in August/September 2025.

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