

# Mejora de competencia traductora mediante banco de adverbios epistémicos basado en corpus<sup>1</sup>

## Enhancing translation competence through a corpus-based bank of epistemic adverbs

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### Abstract

Epistemic adverbs pose significant challenges in scientific translation due to their nuanced expression of certainty and cultural-linguistic variations. This study examines their treatment in the Translation II subject at Universidad Central "Marta Abreu" de Las Villas, where students struggle with these markers. By analyzing the English-Spanish parallel corpus ParaCorp2020, the research develops a pedagogical bank of 26 epistemic adverbs and their translations, accompanied by 12 classroom exercises. The methodology combines corpus analysis with mixed-method research to diagnose student difficulties and validate the resource. Results highlight the tool's efficacy in enhancing translation competence while promoting active learning. The bank's structured approach, categorizing adverbs by translation strategies, bridges theoretical and practical gaps in the Translation II curriculum. Specialists confirmed its accuracy, applicability, and potential to reduce reliance on instructor intuition. This work contributes to translation pedagogy by leveraging authentic corpus data to address a critical, often overlooked aspect of specialized text translation.

**Keywords:** translating, scientific texts, corpus linguistics, adverbs.

### Resumen

Los adverbios epistémicos presentan desafíos en la traducción científica debido a su expresión matizada de certeza y variaciones lingüístico-culturales. Este estudio analiza su tratamiento en la asignatura Traducción II de la Universidad Central "Marta Abreu" de Las Villas, donde los estudiantes enfrentan dificultades con estos marcadores. Mediante el análisis del corpus paralelo inglés-español ParaCorp2020, se desarrolló un banco pedagógico de 26 adverbios epistémicos y sus traducciones, acompañado de 12 ejercicios para el aula. La metodología combina análisis de corpus con investigación de métodos mixtos para diagnosticar las dificultades estudiantiles y validar el recurso. Los resultados destacan la eficacia de la herramienta para mejorar la competencia traductora y fomentar el aprendizaje activo. El enfoque estructurado del banco, que categoriza los adverbios por estrategias de traducción, salva las brechas teórico-prácticas en el currículo de Traducción II. Especialistas confirmaron su precisión, aplicabilidad y potencial para reducir la dependencia de la intuición docente. Este trabajo contribuye a la pedagogía de la traducción al utilizar datos de corpus auténticos para abordar un aspecto crítico y frecuentemente ignorado en la traducción de textos especializados.

**Palabras clave:** traducción, textos científicos, lingüística del corpus, adverbios.

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## Introduction

It is widely acknowledged that translation has played a major role in the dissemination of knowledge for ages (Karimnia, 2015). Since today's world is more globalized than ever, there is a constant need for better and more accurate ways of communication.

For decades, translation has been approached from different points of view, from being regarded as a literary art to be treated as a problem in computer programming; it has generated discussions about the problem of "faithfulness" of rendering, whether words or "ideas" are to be translated, or the routines to be set up for stem and affix recognition in machine translation (Catford, 1965).

Justa Holz-Mänttär consider translation mainly as a "process of intercultural communication whose end-product is a text which is capable of functioning appropriately in specific situations and contexts of use" (Holz-Mänttär, 1984). Nevertheless, translation is more than finding an equivalent for each word in the target language; it is important to assume that translation is seen not just faithful to the original but also accurate and coherent with the target system of language. A good example of this is Weaver's remark in the foreword of *Machine Translation of Languages* (Locke & Booth, 1955): "When I look at an article in Russian, I say: This is really written in English, but it has been coded in some strange symbols. I will now proceed to decode" (p.18). Readers should perceive the translated text as if it were the original, so no aspect or structure should be out of place. Hence, as Robinson's thesis stipulates "translation is an intelligent activity involving complex processes of conscious and unconscious learning" (Robinson 2003, p. 49).

This challenges the commonly held belief that individuals who are bilingual in two different countries possess an inherent ability to translate. Gouadec (2007) claims that "no one is a 'born' translator" and "translation skills are acquired, either through training or through practice" (p. 166). It seems reasonable to suggest that translation competence may be underpinned by understanding, but not only the understanding of the meaning but also of the whole range of knowledge-related aspects of translation. It is therefore the understanding of a subject domain, the linguistic genre, the purpose of the source text, time constraints and creativity (Pietrzak, 2019, p.319). Even when Neubert (2000) points out that "a near-perfect knowledge of the niceties of the grammatical and the lexical systems of the source and target language are basic ingredients of translation competence" (p.7), it does not suffice.

With regard to the concept of translation competence, it might be helpful to consider the definition proposed by Fraser (2000). He considers the term translation competence to be a "shorthand for the skills, expertise

and judgement that a professional translator develops from a combination of theoretical training and practical experience" (p. 53). Likewise, Šeböková (2010) states that "the links between respective sub-competency areas emerge and are fostered with experience and with further theoretical input" (p. 58).

A valuable attempt to standardize translation competence was the 2009 EMT (European Master's in Translation) model. The EMT Model of Translation Competence includes six areas of interdependent competencies comprising marginal competencies: language, thematic (knowledge about a specialist field), technological (mastery of tools), info-mining (familiarity with databases), and intercultural (a dual perspective competence including socio-linguistic and textual dimensions). In addition, there is a central competence of translation service provision (market-related services consist of interpersonal and production subdivisions). They define competence as the combination of aptitudes, knowledge, behavior and know-how necessary to fulfill a given task under given conditions which are recognized and legitimated by a responsible authority (Gambier, 2009).

Pietrzak (2019) added: "The list of all the skills required for a successful completion of a translation should also include such abilities as proofreading, revising, editing and, last but definitely not least, self-assessment. Needless to say, apart from the structure of a translated text, its content is what predetermines translation competence as well. Not only does translation competence require the ability to form a text with all the necessary devices used in the process of translation but also a great deal of knowledge in the field the text is written in" (p. 330).

It is certainly true that each text has a different purpose and, as a result, specific features. These allow us to differentiate a scientific text from a novel or a poem. Consequently, it may be helpful to consider these distinctive features before attempting to translate a text.

In the case of science and technology texts, it might be helpful to bear in mind that, as they are primarily concerned with the presentation of scientific facts through a logical and objective approach, they tend to employ a formal language and place significant emphasis on the coherence of the narrative logic and the clarity of expression (Wei & Yu, 2019, p. 948). It could be argued that any scientific text, whether original or translation, is different from other texts because it is factual and information-oriented. Similarly, the text structure tends to follow a clear pattern and the language is generally straightforward and unambiguous. This is in contrast to literary texts, where the style is often more figurative and the language is more complex, with multiple layers of meaning. (Sankaravelayuthan & Vidyapeetham, 2020).

Clear concepts, clear logical relations, accurate data and concise and clear text are the most important points when translating science and technology texts. This requires the translator to make corresponding modifications in the process of translation, and at the same time to construct the translated text according to the original author's intention and in combination with the logical relations and structural methods of the text (Wei & Yu, 2019, p. 948).

Karimnia (2015) highlights that “science and technology texts are not culture free (acultural)” (p. 37). It would be beneficial for a scientific and technical translator to consider cultural differences between languages and make adjustments where necessary. There are several cultural differences in science and technology texts, such as the nuances of technical terminology, text structure, and the various ways of conveying information, including the use of personal and demonstrative pronouns (Karimnia, 2015, p.37).

One of the most challenging expressions to translate is modality. It is often overlooked in science and technology texts (Aijmer, 2002). Overall, modality encompasses expressions in language that are attitudinal, or non-factual (Halliday, 1985). Palmer (2001) defined it as the semantic information associated with the speaker's attitude or opinion about what is said. This aspect of language is relatively complex since “writer commitment can be expressed in an enormous variety of ways and these expressions can convey a wide range of meanings” (Hyland and Milton, 1997, p. 371).

Hence, modality has been divided into various categories (Bybee, 1985; Palmer, 2001; Halliday, 2014; Nuyts, 2016; Portner, 2018; Narrog, 2021). However, a special attention has been paid to epistemic modality.

The term epistemic modality derives from the Greek word “episteme”, which means “knowledge” and refers to “matters of knowledge, belief or opinion rather than fact” (Lyons, 1977, p. 793).

The traditional concept of “epistemic modality” partly overlaps with more recent studies devoted to the category of “evaluation,” “the broad cover term for the expression of the speaker or writer's attitude or stance towards, viewpoint on, or feelings about the entities or propositions that he or she is talking about” (Thompson & Hunston 2000, p. 5). In other words, epistemic modality is a linguistic device that allows the speaker to indicate a general lack of commitment to the veracity of the utterance. (Larina et al., 2019, p. 13).

Epistemic modality demonstrates a speaker's awareness of the proposition and the degree of certainty associated with it. This may be classified as certain, probable, or possible (Suhadi, 2011) . This field of study is particularly intricate due to the varying degrees of commitment exhibited by the author, as previously

discussed. This commitment may be represented linguistically in numerous ways (Ramón, 2009, p.75).

Epistemic modality is expressed mainly through modal verbs, epistemic adverbs, epistemic adjectives, epistemic nouns and lexical verbs (Hyland, 1998). In English, modality is commonly expressed through the use of modal verbs that occur before a main verb and qualify its meaning (Biber, 1999). Varttala (2001) identifies eight different modal verbs: *can, could, may, might, must, should, will* and *would*.

Epistemic adverbs are used to indicate the speaker's assessment of the likelihood of a situation. They can be used to convey that a situation is possible, impossible, probable, certain, or uncertain. English has a much larger repertoire of epistemic adverbs than other European languages, with a range that may be unparalleled in other languages worldwide (Wierzbicka, 2006). A variety of adverbs can be used to convey epistemic meanings, including: *usually, slightly, occasionally, almost, likely, apparently, potentially, possibly, maybe, often, seldom, relatively, about, nearly, roughly*, among others (Varttala, 2001).

Adjectives and nouns can also be used to indicate epistemic modality in a sentence. Endley (2010) notes that: “a situation might be described as possible, probable, necessary, or certain” (p. 264). Additionally, nouns such as *fact, statement, assumption, evidence, claim*, and *belief*, among others can be classified according to their modal characteristics . Lexical verbs such as *think, believe, appear*, and *tend* can also be used to express epistemic modality.

The use of these markers varies significantly across languages, making the task of their translation complex . With regard to epistemic adverbs in English and Spanish, the majority of them are lexical cognates with analogous syntactic and semantic properties. However, there are notable differences in their usage , frequency and the structures in which they are used (Ramón; 2009).

In English, modal verbs and adverbs with modal meaning co-occur “pleonastically” (Palmer 1979, p. 57). When the meaning of the modal adverb aligns with that of the modal verb, the resulting collocation is regarded as modally harmonious (Lyons 1977, p. 807). However, it should be noted that there are slight differences between the modal verbs used in English and Spanish. In Spanish, modal adverbs are combined with different moods and tenses to imply lower degrees of probability. The majority of these expressions are linked to the subjunctive and conditional moods, as well as the future tenses. Primary means of conveying modal meaning in Spanish is through a limited set of fully-inflected lexical verbs. In particular, *poder* and *deber* play a significant role in Spanish epistemic modality.

Furthermore, it is notable that the “-ly forms (adverbs) have a much wider currency and acceptance in English than their Spanish counterparts ending in *-mente*” (Hoye 1997, p. 258). While adverbs ending in *-ly* are relatively neutral style in English, Spanish adverbs ending in *-mente* have strong stylistic and pragmatic connotations. As a group, they are considered rather formal and are typically avoided by native speakers because of their length, which makes them cumbersome and less flexible than prepositional phrases, which are used much more readily to express adverbial meanings (Hoye 1997; Rabadán et al. 2006). The excessive use of *-mente* adverbs in translated Spanish may be indicative of what is commonly referred to as “translationese.” This term describes instances in translated language where the influence of the source language can be discerned. (Mauranen, 2000).

It is regrettable that, since epistemic markers are often considered less relevant to the meaning, they are most likely to be omitted in translations (Ramón, 2009). Aijmer (2002) states that “since modality does not add anything to the propositional content of an utterance, it often disappears in the translation” (Aijmer 2002, p 97). It is important to note that epistemic items serve as meaningful pragmatic markers. In some cases, the mistranslation or total omission of this rhetorical device may result in a less polished or impolite tone when conveying the message of the source language.

In conclusion, it is becoming increasingly evident that epistemic modality plays a significant role in today's academic discourse. For this reason, many researchers have dedicated their efforts to studying and describing it. However, translating epistemic meaning remains a controversial topic among students. Consequently, students are often uncertain about epistemic markers and unable to translate them accurately, leading to misunderstandings and potential translation errors. A valuable resource for guidance in this matter is corpus and corpus linguistics.

In the field of linguistics, a corpus is defined as a collection of texts that serves as the empirical basis for the study of natural languages (Barth & Schnell, 2022). According to Sinclair (2005): “a corpus is a collection of pieces of language text in electronic form, selected according to external criteria to represent, as far as possible, a language or language variety as a source of data for linguistic research” (p. 16).

There are numerous varieties of corpora, which differ depending on the linguistic objectives of their creation. They can be broadly grouped according to the source of the content, metadata, number of languages, objective, and other factors. One of the main distinctions is made by John Sinclair (1996) between monolingual and multilingual corpora. Among multilingual corpora, there are three main categories: parallel, parallax, and

comparable corpora (Fantinuoli & Zanettin, 2015). The present research will focus on parallel corpora, as they are a vital tool to strengthen translation competence.

In regard to corpus linguistics, Sara Cushing (2017) asserts that it is a research methodology utilized to study linguistic phenomena through extensive collections of machine-readable texts, including both written and oral sources. In essence, corpus linguistics is a systematic approach to studying languages by analyzing how they are utilized in context (Barth & Schnell, 2022).

Corpus linguistics is a field of study that looks beyond established rules of what is considered correct to say, sign, or write. Instead, it considers what has been said, signed, or written in specific contexts. This is evidenced in recorded texts contained in a corpus, which allows the field to state what people are most likely to say, sign, or write given the same contextual circumstances (Barth & Schnell, 2022). Corpus linguistics is best described as the study of language based on examples of “real-life” language use (McEnery & Wilson 2001).

It is now widely accepted in the field of translation studies that the use of corpora should not be viewed as a standalone skill to be developed separately from the core competencies of translation. Instead, it is seen as an integral part of broader translation competence (Rodríguez-Inés, 2009).

In the context of parallel corpora, these are texts that have been translated from one language to another. They often exhibit precise equivalences in terms of structure or comparable constituents within the same discourse context (Barth & Schnell, 2022).

In 1993, Baker (1993) forecast that the accessibility of extensive collections of source and target texts, coupled with the advancement of corpus-driven methodologies, would empower translation scholars to elucidate “the nature of translated text as a mediated communicative event.” (p. 243).

As Krüger (2012) explains, parallel corpora basically represent an extension of the long-practiced comparison between the source text and the target text. They are usually associated with a more rigorous methodology and provide a better empirical basis than isolated case studies. Indeed, Sabtan (2016) asserted that parallel corpora have become a vital resource for training data in statistical machine translation, as well as for developing or expanding bilingual lexicons and terminologies. Parallel corpora offer a range of benefits to professional and academic translation bodies and individuals. They serve two distinct purposes: descriptive and applied. Whether used by professional or trainee translators, parallel corpora can offer valuable insights and support the development of effective translation skills (Marco, 2019).

Corpus-based studies typically employ a rigorous methodology with a set of precise design criteria, enabling more effective contextualization and control of the texts under investigation. This approach also enhances the representativeness, generalizability, and replicability of the findings (Krüger, 2012). A parallel corpus is a valuable resource for translators, providing the ability to view terms in a variety of contexts simultaneously. This allows for the selection of the most appropriate equivalents for each context (Shen, 2011). Similarly, Alhassan (2015) stated that it offers “insights into dealing with and observing how and what strategies expert/professional translators adopt to overcome typical translation problems” (p. 34). For example, parallel corpora may reveal translation strategies used in dealing with specific lexical components of the translated text, including synonymy, idioms, collocational patterns, and other lexical sequences. Additionally, they can assist in identifying distinctive features across different text types, such as syntactic, semantic, and communicative features (Alhassan et al., 2021, p. 47). By comparing the use of fixed phrases or collocations in the source language and their translation, as well as analyzing the frequency of certain expressions, the translator is better prepared to make a linguistic choice, enhancing the accuracy of the final work. Similarly, in *The importance of corpora in translation studies: a practical case*, Monserrat Bermúdez Bausela (2016) highlights the value of corpora in the translation of specialized texts: “From the observation of specialized corpora, it is possible to identify specific patterns, phraseology, terminological variants, and the frequency of conceptually relevant words, cohesive features and so forth. The access to this information will allow the translator to produce quality texts” (p. 364). In other words, a parallel corpus offers valuable insights into specific terminology and phraseology, while also elucidating the nuances of the genre and text domain. This enhances the bilingual translation sub-competence.

Furthermore, parallel corpora are relevant for both teaching translation and training translators (Doval & Nieto, 2019). In their commentary on the pedagogical value of parallel corpora, Doval and Nieto (2019) stated: “Even if their primary use is within linguistic and translation research, parallel corpora are also becoming increasingly present in foreign language and translation learning and teaching, providing plenty of translation suggestions through examples of real usage” (p.4).

One of the key benefits of using corpora in translation teaching is that it minimizes the influence of the teacher's intuition in the classroom, while placing greater emphasis on student documentation skills (Rodríguez-Inés, 2009, p. 131). Consequently, a parallel corpus is an ideal tool for selecting the most accurate forms, ensuring translations are appropriate and therefore more readily

accepted as if they had been originally produced in the target language.

These theoretical and pedagogical considerations are particularly relevant at Universidad Central “Marta Abreu” de Las Villas, in the Translation II subject, where third-year students of the Degree Course English Language with A Second Foreign Language consistently struggle with rendering epistemic adverbs in scientific and technical texts. Given the critical role these markers play in academic discourse, there is a pressing need to implement research-based tools. To address this specific competence gap, the present study turns to parallel corpora, a strategic decision that provides learners with authentic examples of professional epistemic modality translation. This corpus-based approach directly targets the observed deficiencies while fulfilling contemporary translation pedagogy’s demand for empirical, students-centered resources.

In this article, the authors present the findings of a study whose overall aim was to develop a bank of epistemic adverbs used in science and technology texts, accompanied by their corresponding translations from parallel corpora in order to enhance students’ translation competence. In order to fulfill the aforementioned overall aim, some specific objectives were accomplished, including:

- To establish the theoretical foundations related to translation, modality, epistemic modality, its presence in translation studies, and corpus linguistics.
- To diagnose the existing situation with respect to the translation of epistemic adverbs by third-year students of the Degree Course English Language with A Second Foreign Language at Universidad Central “Marta Abreu” de Las Villas.
- To create a bank of epistemic adverbs in science and technology texts and their appropriate translation.,
- To assess the applicability and usefulness of the bank of epistemic adverbs in science and technology texts and their appropriate translation by specialists.

The research is significant as it may help students with their translation competence, particularly in relation to the translation of epistemic adverbs. It may be particularly beneficial for Translation II students, providing a valuable resource to enhance their learning process. It can also serve as an invaluable aid for professional translators.

## Methodology

### Type of study

In order to gain a more comprehensive understanding of the research problem, the authors employed a mixed-method approach, which allows for more nuanced examination of the subject matter than would be possible

with either approach in isolation (Creswell and Plano, 2011). Consequently, the collected data subjected to both quantitative and qualitative analysis in order to facilitate the interpretation of the results.

Hence, a descriptive-exploratory non-experimental research was conducted. The study was cross-sectional, with all data collected during a single academic semester. Without manipulating variables, the existing pedagogical dynamics were observed to understand how epistemic adverbs are translated in science and technology texts withing the local academic context. The principal variables analyzed included: (1) translation competence development (dependent variable) and (2) a corpus-derived epistemic adverb bank and exercises (independent variable), addressing specific needs of Cuban translator training programs.

### Participants

The study herein presented was conducted at Universidad Central "Marta Abreu" de Las Villas, School of Humanities, English Language Department and it focused on the subject Translation II of Curriculum E of the Degree Course English Language with A Second Foreign Language. As mentioned above, it aimed at the creation of a bank of epistemic adverbs in science and technology texts and their appropriate translation.

The present research involved a sample of five third-year students and ten fourth-year students enrolled in the Degree Course English Language with a Second Foreign Language at the School of Humanities at Universidad Central "Marta Abreu" de Las Villas. Additionally, eight professors from the Department of English Language at the same university participated in the study.

Although the reduced number of the sample (n=15) limits statistical generalizability, purposeful sampling ensured contextual representativeness for Universidad Central "Marta Abreu" de Las Villas. The criteria considered for choosing the sample were:

*Academic level of students:* third-year and fourth-year students were chosen since the former are taking the subject and the latter had already taken it. Therefore, through this sample, the results could show a more comprehensive view of the discipline implemented in the aforementioned degree course.

*Academic and scientific degree of professors:* professors who have published scientific articles in English as authors and as co-authors. Most of them held scientific degrees of PhD and MSc, and academic degrees of instructor, assistant professor, associate professor or full professor.

*Willingness:* all the students and professors included in the sample were willing to collaborate.

### Materials and methods

The methods applied were:

*Theoretical methods:* historical and logical analysis, synthesis, and inductive and deductive reasoning. These were used to construct a theoretical framework which systematizes the main concepts associated with the topic of research and their relationships.

*Empirical methods:* document analysis, participant observation, questionnaire and corpus linguistics. They were used for collecting and processing data.

*Statistical and mathematical methods:* the percentage analysis allowed for the tabulation and analysis of data.

### Procedure

The research process was organized into four principal stages. The initial stage of the research process entailed a bibliographic review, which served to construct a theoretical framework that outlined the principal concepts associated with the research topic and their interrelationships. Consequently, it offers valuable insights into the areas of translation, modality, epistemic modality, and corpus linguistics.

The second stage of the research process entailed a diagnosis of the current situation with respect to the teaching and learning process of epistemic adverbs and their translation in science and technology texts in the degree course English Language with A Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas. To this end, three research instruments were designed and implemented for the collection of data: a guide for document analysis, a guide for participant observation, and a questionnaire provided to students.

The third stage of the research process involved the creation of a bank of epistemic adverbs in science and technology texts and their appropriate translation as a supplementary source to enhance students' translation competence. This design was based on the constructed theoretical framework.

The fourth stage involved an assessment of the applicability and usefulness of the bank of epistemic adverbs in science and technology texts. This assessment was conducted through the administration of a questionnaire to professors of the degree course under study, with the aim of determining an appropriate translation of the aforementioned adverbs.

### Results

#### *Diagnosis of the current situation of students' translation of epistemic adverbs*

In order to diagnose the current status regarding the teaching and learning process of epistemic adverbs and their translation in science and technology texts in the

degree course previously mentioned, three main techniques for collecting data were used: document analysis, participant observation and questionnaire. Since the authors of the research herein presented adopted a mixed approach, the data was analyzed qualitatively and quantitatively.

*Document Analysis*

Two documents were analyzed: Curriculum E and the syllabus of the discipline Translation, which are reviewed below.

Curriculum E encompasses three subjects related to translation, which collectively address the majority of the topics included in the preceding curriculum. Within the context of Translation II, one unit is assigned to the translation of science and technological texts, with a total of 48 instructional hours.

In order to complete their training as future translators, students are taught to situate themselves in the extra-linguistic reality that conditions the text, as well as to ascertain the author's communicative purpose and to identify the relevant linguistic elements occurring in the text. In the translation process, it is essential for students to identify the stylistic, morphosyntactic and lexical means employed by the author in order to comprehend the text as a whole. However, epistemic modality, and the translation of epistemic adverbs are not addressed explicitly, which may result in students being unaware of these concepts when encountering expressions containing epistemic adverbs. This lack of understanding may, on occasion, lead to translation errors.

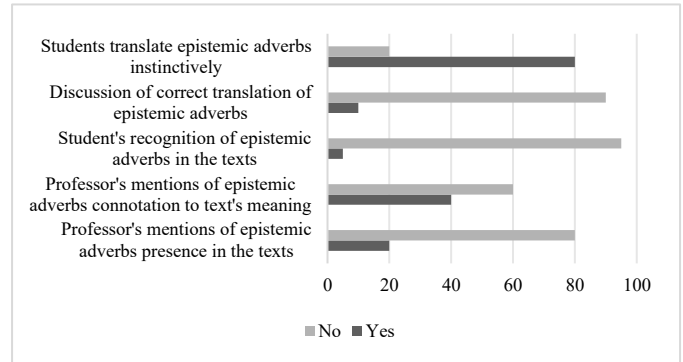
The translation discipline within the Degree Course English Language with A Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas is primarily practical in nature, wherein students learn through direct engagement with the provided texts. Nevertheless, the syllabi encompass bibliography on translation-related topics, terminology pertinent to each specific field, English composition and styles, and Spanish syntax. Moreover, students are required to utilize specialized dictionaries, including both monolingual and bilingual resources, as the primary tools in the translation process. As well, the accuracy of field terminology and the quality of the resulting Spanish text are of particular importance. However, the syllabi do not explicitly identify which specific structures may lead to significant misunderstandings due to cultural or linguistic differences between English and Spanish. Therefore, a thorough analysis of these structures is essential. Additionally, it is noteworthy that the bibliography suggested for the degree course does not include any references to epistemic modality or its markers.

*Participant Observation*

The authors of this paper observed fifteen lessons of the subject Translation II in third year. The results can be appreciated in the Figure 1 below.

**Figure 1**

*Lesson observation*



*Note.* Own elaboration

*Questionnaire to students*

A questionnaire was administered to a sample of ten students ten (10) fourth-year students and five (5) third-year students of the academic year 2022 of the above-mentioned degree course, with the objective of eliciting their opinions regarding the translation of epistemic adverbs in science and technology texts. Their answers are depicted in the Table 1 below.

**Table 1**

*Students' perception about using and translating epistemic adverbs*

| Variable   | Category                      | Porcentaje |
|--|-------------------------------|------------|
| Using epistemic adverbs                          | Very relevant                 | 42.9%      |
|  | Relevant                      | 57.1%      |
|  | Not relevant                  | 0%         |
| Consequences of mistranslating epistemic adverbs | Change the meaning as a whole | 28.6%      |
|  | Partially change the meaning  | 71.4%      |
|  | Not change the meaning at all | 0%         |
| Translating epistemic adverbs                    | Very easy                     | 0%         |
|  | Easy                          | 28.6%      |
|  | Not easy                      | 71.4%      |
| Confidence in translating epistemic adverbs      | Very prepared                 | 0%         |
|  | Prepared                      | 42.9%      |
|  | Not prepared enough           | 57.1%      |

|   |                          |       |
|---|--------------------------|-------|
| Tools for translating epistemic adverbs                 | Monolingual dictionaries | 0%    |
|   | Bilingual dictionaries   | 85.7% |
|   | Glossaries               | 14.3% |
| Need for more training in translating epistemic adverbs | Yes                      | 85.7% |
|   | No                       | 14.2% |

*Note.* Own elaboration

### Results of the diagnosis

Overall, the diagnosis stage showed that:

- The students demonstrated a lack of knowledge regarding epistemic adverbs.
- The subject Translation II appears to devote minimal attention to epistemic adverbs.
- No supporting materials dealing with epistemic adverbs are included in the recommended bibliography.
- Epistemic adverbs and their corresponding translations are not typically addressed in translation lessons.
- The unawareness of epistemic adverbs and their role in translations was evident in the observed lessons.
- The majority of students agreed that epistemic adverbs are relevant for the meaning of the texts and expressed difficulties in their translation.

These regularities demonstrated shortcomings in the teaching and learning process of translation, particularly in the context of translating epistemic adverbs in science and technology texts. They also illustrated the potential benefits of a new assisting tool for the teaching and learning of translation, which could significantly enhance students' translation competence.

### Creating a bank of epistemic adverbs in science and technology texts and their appropriate translation

The design of the bank of epistemic adverbs in science and technology texts and their appropriate translation consisted of five interrelated steps: (1) corpus selection, (2) corpus processing, (3) search of epistemic adverbs, (4) arrangement of epistemic adverbs, occurrences in the source language and their corresponding translations into Spanish and (5) edition of the bank. These steps are explained below.

#### Corpus selection

The corpus selected for the present study was ParaCorp2020 (Rodríguez Aguila, 2021), which proved

to be adequate. It includes texts from the domains of medicine, physics, chemistry and artificial intelligence.

The ParaCorp2020 corpus comprises 50 texts in English and their respective translations into Spanish, resulting in a total of 100 texts. These texts were retrieved from three sources: the World Health Organization (WHO) official website, the Nobel Prize official website, and the Encarta Encyclopedia Student Premium 2009. Furthermore, the texts were classified according to their format and style, namely as specialized, expository, or journalistic, and were published between 2009 and 2020 (Rodríguez Aguila, 2021).

This corpus was selected because it aligns with the specific attributes of the subject matter, namely the translation of scientific and technological texts. Moreover, as ParaCorp2020 is a sentence-aligned English-Spanish parallel corpus, it enables an investigation of the vocabulary and terminology in English within the context of their corresponding equivalents in Spanish.

The characteristics of the selected corpus are summarized in the Table 2 below.

**Table 2**

#### Characteristics of ParaCorp2020

|                         |   |
|-------------------------|---|
| Size of the corpus      | 125,860 word tokens   |
| Transmission mode       | Written transformed into .txt format  |
| Level of specialization | Specialized texts of specific domain of medicine, physics, chemistry and artificial intelligence              |
| Type of texts           | Published research articles   |
| Authorship              | Varies from science specialist explaining a discovery to journalist reporting a specific scientific milestone |
| Language of the corpus  | Texts originally written in English   |
| Date of publication     | Texts published from 2009 to 2020   |

*Note.* Taken from Rodríguez Aguila (2021)

#### Corpus processing

As epistemic adverbs are formal items in English, the search process was readily accomplished with the aid of Xbench software, a corpus processing tool. The software was selected for its suitability and availability. It is a user-friendly software that simplifies the process of bilingual text analysis. In fact, it is designed to load and perform powerful searches in numerous bilingual formats (including TMX files as ParaCorp2020). Its most useful application is that it allows word and phrase searches in both the source and target languages. Additionally, Xbench is available in free versions on the Internet.

#### Search of epistemic adverbs

The search for adverbs with epistemic meaning in the corpus was conducted in two principal stages. Initially, a

preliminary list of items was constructed. Subsequently, a new project was created in Xbench.

First, it was essential to make a list of epistemic adverbs for an initial search. The epistemic adverbs analyzed in this study were taken from various sources: Quirk et al. (1985, p. 620–621), Biber et al. (1999, p. 855), Huddleston & Pullum (2002, p. 767), Varttala (2001) and Wierzbicka (2006, p. 247), as these contain the most comprehensive listings of the items under analysis. It is also important to highlight that these well-known grammarians have devoted a great part of their work to modality and epistemic markers.

Although some of these authors use different terminology to classify epistemic adverbs, the items tend to coincide. As a result, the preliminary search list included the following sixty (60) epistemic adverbs: *about, admittedly, allegedly, almost, apparently, arguably, assuredly, avowedly, certainly, clearly, conceivably, decidedly, definitely, doubtless, evidently, frequently, hardly, incontestably, incontrovertibly, indeed, indisputably, indubitably, ineluctably, inescapably, likely, manifestly, maybe, nearly, necessarily, no doubt, occasionally, obviously, of course, often, patiently, perhaps, plainly, possibly, potentially, practically, presumably, probably, purportedly, relatively, reportedly, reputedly, roughly, seemingly, seldom, slightly, somewhat, supposedly, surely, truly, unarguably, unavoidably, undeniably, undoubtedly, usually and unquestionably.*

Once the preliminary list was generated, the search phase could commence. Consequently, the texts were imported into a new Xbench project, and the author proceeded to search for and extract the relevant epistemic adverbs using the provided search functionality. In order to confirm the inclusion of all adverbs carrying an epistemic meaning, the texts were subsequently revised.

#### *Arrangement of epistemic adverbs, occurrences in the source language and their corresponding translations into Spanish*

A search of the epistemic adverbs in the English corpus revealed that they are translated into Spanish with a variety of structures. Therefore, the authors of this work has opted to organize the specific epistemic adverb and its particular occurrences in the source language, along with their corresponding translations into Spanish, using the labels shown in the Table 3 below.

**Table 3**

#### *Arrangement of specific epistemic adverb and its particular occurrences in the source language and their corresponding translations into Spanish*

| Epistemic adverb | Occurrence in source language (English) | Translation into Spanish |               |                            |                      |                    |
|------------------|---|--------------------------|---------------|----------------------------|----------------------|--------------------|
|                  |   | Equivalent adverb        | Verbal phrase | Attribute (Be + adjective) | Prepositional phrase | Indefinite pronoun |

*Note.* Own elaboration.

#### *Edition of the bank*

After a comprehensive examination of the listed adverbs and a detailed analysis of the texts, it became evident that several adverbs had to be excluded from the preliminary list, as they were not identified in the corpus. Furthermore, the revision of the texts revealed additional adverbs with epistemic connotations that had not been previously considered, and thus were incorporated into the bank.

In order better to facilitate the use of the bank of epistemic adverbs, they were organized alphabetically. Similarly, the entries were limited to a single example per alternative translation, and instances where the epistemic adverb was omitted from the translation were excluded.

The analysis of the corpus revealed that the translations of epistemic adverbs exhibited considerable structural diversity. Consequently, it is essential for students to recognize the distinct characteristics of epistemic expressions in English and Spanish and to understand how they can enhance and refine their own translations.

#### *Assessment of the created bank through specialists' criteria*

Once the bank of epistemic adverbs in science and technology texts and their appropriate translation was completed, it was submitted to some specialists for assessment of its suitability and applicability for the teaching and learning process of translation within the subject Translation II.

A total of eight professors from the English Language Department, School of Humanities at Universidad Central "Marta Abreu" de Las Villas were selected to assess the newly created bank. Four of them held Masters Degrees (MSc) and one Doctoral Degree (PhD). Likewise, four were full professors and four instructors. Their teaching experience varied from two to thirty (30) years. They answered a questionnaire containing 6 indicators and a scale for its assessment. The indicators contained in the questionnaire were: (1) Purpose, (2) Applicability, (3) Accuracy of information/Reliability, (4) Coverage, (5) Format and Presentation, and (6) Originality. The scale ranged from 1 to 5, with five representing the highest value and 1 the lowest. In the

event that the evaluation was less than 4, respondents were asked to provide reasons for their assessment and suggestions for its improvement. Their responses can be appreciated in the Table 4, below.

**Table 4**

*Specialists evaluation*

| <b>Assessment Criteria</b>            | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|---------------------------------------|----------|----------|----------|----------|----------|
| Purpose                               |          |          |          |          | 100%     |
| Applicability                         |          |          |          |          | 100%     |
| Accuracy of information / Reliability |          |          |          |          | 100%     |
| Coverage                              |          |          |          | 12,5%    | 87,5%    |
| Format and Presentation               |          |          |          |          | 100%     |
| Originality                           |          |          |          |          | 100%     |

*Note.* Own elaboration.

The professors concluded that the bank of epistemic adverbs in science and technology texts and their appropriate translation into Spanish is an effective tool for enhancing the translation competence of third-year students enrolled in the Degree Course in English Language with A Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas. The professors thus confirmed the adequacy of the tool for its purpose, as well as its applicability without difficulty, accuracy, and reliability.

With regard to its coverage, while most of the professors expressed satisfaction, one of them stated the need for a greater number of entries in order to make the bank more comprehensive. Lastly, all of them agreed that it has a simple format and presentation, which facilitates access to the information, and recognized its originality.

### Discussion

Overall, the resulting bank of epistemic adverbs in science and technology texts, along with and their appropriate translation into Spanish, constitutes a simple yet effective tool for presenting information in a straightforward manner. In addition, the data are derived from the English-Spanish Sentence-Aligned Parallel Corpus of Science and Technology Texts ParaCorp2020 (Rodríguez Aguila, 2021), which lends considerable reliability to the findings. Consequently, the bank was regarded by the specialists as an efficacious and suitable tool that can be used to foster students' translation competence.

Indeed, the tool provides students with examples from similar translations, which they must analyze in order to develop their reasoning skills and critical thinking in order to discern the best option. Therefore, the tool promotes active learning and engagement, since the choices may be discussed in the classroom. In addition, the bank is held in PDF format, which ensures its

accessibility, as it can be printed and compatibility with all kinds of electronic devices in its electronic form.

Although the number of items is relatively limited, the bank of epistemic adverbs in science and technology texts and their accurate translation into Spanish can prove beneficial for enhancing students' translation competence, particularly when utilized in conjunction with instructional exercises that enable students identify and comprehend the significance of epistemic adverbs within a text, as well as to translate them accurately.

To begin with, the proposed bank is meant to be introduced to third-year students of the Degree Course English Language with A Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas, in the subject Translation II of Curriculum E, because there is a unit devoted to the translation of science and technology texts.

The bank of epistemic adverbs in science and technology texts and their appropriate translation into Spanish is presented in the form of a booklet accompanied by 12 exercises. The booklet is divided into three sections: the first five exercises concern the recognition and use of epistemic adverbs, the next four address translation, and the final three are interactive exercises that guide students through the processes of both producing and translating texts containing epistemic adverbs.

In developing the exercises, the author considered the theoretical foundations of epistemic modality and translation competence as a whole, as well as the regularities identified in the diagnostic phase. Additionally, the author drew on personal experiences as a student and teacher in that same course. Moreover, the majority of sentences utilized in the exercises were extracted from Paracorp2020 (Rodríguez Aguila, 2021).

#### *Exercises of recognition and use of epistemic adverbs*

It is essential that students be provided with an understanding of the concepts of modality, epistemic modality, and its markers, particularly epistemic adverbs, and the meanings and uses of these in science and technology texts. The initial exercises are designed to facilitate the recognition of the various nuances of meaning conveyed by epistemic modality, as well as the identification of epistemic adverbs. The following extracts from Exercise 1, 2, and 3 illustrate this.

Exercise 1. Read the sentences and arrange them according to the certainty degree they express, starting with the highest one:

- a) It is possible that smoking causes lung cancer.
- b) Smoking probably causes lung cancer.
- c) We know that smoking causes lung cancer.

Exercise 2. Read the sentences and choose which meaning they convey:

I. These women and possibly their children are also at increased risk of type 2 diabetes in the future.

- a) The women and their children will have type 2 diabetes in the future.
- b) The women and their children have a large probability of having type 2 diabetes in the future.
- c) The women and their children not necessarily will have type 2 diabetes in the future.

Exercise 3. Two Versions of a Story. Read both texts and answer:

Do they contain the same information? Is it expressed in the same way?

Which one do you think would be better received by an academic audience?

Which expressions soften or intensify the claims? Underline them.

1. Breast cancer is the disease that causes the most deaths in the world due to the lack of prevention in the lower socioeconomic sectors as well as the complete ignorance of the mechanisms of action of the disease, which makes it difficult to combat. However, recent studies try to elucidate the mechanism of reproduction of cancer cells in breast cancer, in order to open a new line of research to discover methods to combat this deadly disease.

2. Breast cancer is one of the diseases that currently causes the most deaths in the world, mainly due to the scarce prevention prevailing in certain geographical areas and socioeconomic sectors, as well as the ignorance of the mechanisms of action of the disease, which makes it potentially difficult to combat. However, recent studies are truly close to elucidating the mechanism of reproduction of cancer cells in breast cancer, which would indeed open a new line of research to discover methods to combat this deadly disease.

#### *Exercises of translation*

Once the students have acquired a working knowledge of epistemic adverbs, they are prepared to proceed with translation. At this point, the instructor should elucidate the distinctions between epistemic adverbs in English and their counterparts in Spanish, with particular emphasis on the implications of their usage in each language. It is recommended that students engage in discourse regarding their responses and perceptions of epistemic meaning. To facilitate this, exercises should be presented in an ascending level of complexity and students should be encouraged to utilize the provided bank of epistemic adverbs in science and technology texts. Exercises 4 and 5 are some examples.

Exercise 4. Mark with an X the correct translation of each expression. Justify your choice. Debate the meaning connotation of the alternative translation.

1. The IBE was established in 1961 and has grown to almost 140 chapters in over 100 countries.

- a) La Oficina se creó en 1961 y ha crecido casi 140 secciones en más de 100 países.
- b) La Oficina se creó en 1961 y ha crecido hasta tener casi 140 secciones en más de 100 países.

2. People with dementia are frequently denied the basic rights and freedoms available to others.

a) A las personas con demencia se les niega las libertades y derechos básicos de los que las demás personas disfrutaban sin problema.

b) Con frecuencia a las personas que padecen demencia se les deniegan libertades y derechos básicos de los que las demás personas disfrutaban sin problema.

Exercise 5. Fill in the gaps to complete the translation.

a) Often, there are no symptoms of the underlying disease of the blood vessels.

\_\_\_\_\_, la enfermedad subyacente de los vasos sanguíneos no presenta síntomas.

b) On the other hand, the researchers' model could find a dose that doesn't necessarily solely maximize tumor reduction, but that possibly strikes a perfect balance between maximum tumor reduction and low toxicity.

Por otro lado, el modelo de los investigadores podría encontrar una dosis que no \_\_\_\_\_ maximice únicamente la reducción del tumor, sino que \_\_\_\_\_ logre un equilibrio perfecto entre la máxima reducción del tumor y una baja toxicidad.

c) Hundreds of thousands of lives have been lost, and the world's economy likely faces the worst recession since the 1930s.

Se han perdido cientos de miles de vidas y la economía mundial \_\_\_\_\_ experimenta la peor recesión desde la década de 1930.

#### *Interactive exercises*

These warm-up exercises are designed to facilitate the introduction of the topic and vocabulary of the class text, as well as to provide an opportunity for students to engage in text production and translation. Given the nature of these exercises, which require students to generate their own texts and translate, it is essential to allow for a sufficient amount of time and to provide guidance in a step-by-step manner. The following section will provide an overview of the proposed exercises.

Exercise 6. The teacher hands out pieces of paper to the students containing a sentence (could have been extracted from the text that will be used in the class), which they will be asked to rewrite paying attention to the epistemic adverb. Then, the teacher collects the resulting sentences, shuffles them and hands them randomly to the class. Students are then asked to translate

the sentence provided by their classmates. At the end of this exercise, the teacher will write on the board the original sentences and the class will try to match them with the final translation and debate the different connotations.

I. Rewrite the sentence so that it has a similar meaning to the first one, substituting the bolded word.

I.I Translate the sentence written by your classmate.

I.II Compare your translated sentence with the sentences on the board. Choose the one that contains the same information. Debate with your classmates the different connotations in English and Spanish. Do you think your sentence would be well received by an academic audience?

Sample sentences, extracted from Paracorp2020:

a) Algorithms can support decision-making by medical professionals, and often outperform the doctor.

b) Maybe there was something wrong with the theoretical calculations of how the neutrinos are produced in the Sun?

c) However, as frequently in science and everyday life, it will be different to eradicate a word widely used in both scientific/medical and lay language, since this term is widely fixed in the mind of people.

Exercise 7. Students are provided with a defective text, to which they need to insert epistemic adverbs. The teacher collects the papers, shuffles them, and then hands them over randomly to the class. Students are then asked to translate their classmate's text.

I. Read the following text and soften its claims by adding epistemic adverbs.

Researchers at MIT designed a new computer program to work as a co-pilot in planes. It will handle the information better in critical moments. Hence, the AI guardian will reduce the risk level of flights and increase the success rate of navigating to target points. This is a milestone that will be taken to other areas as well.

Note: Adapted from MIT News: AI copilot enhances human precision for safer aviation, <https://news.mit.edu/2023/ai-co-pilot-enhances-human-precision-safer-aviation-1003>

I.I Translate the text written by your classmate.

It is essential that the entire process be accompanied by continuous feedback between the teacher and the learners. If teachers assume a supportive role, students may be more perceptive of the connotations of epistemic adverbs and of the potential influence their translation may have on text reception.

When teaching Spanish speakers, it is important to note that the implication of epistemic adverbs in science and technology texts may require a certain degree of

endurance, given that they are quite different from their English counterpart, especially in terms of meaning and use. As Ramón (2009) notes, epistemic adverbs are highly idiomatic. This is precisely why the proposed bank can be an invaluable resource, but students should be encouraged to utilize it. It would be even more beneficial if students were requested to supplement it by compiling their own bank with the challenging expressions they encounter during lessons.

## Conclusions

This research herein reported represents a significant advancement in the development of translation competence of students enrolled in the Degree Course English Language with A Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas. In particular, it focuses on the translation of epistemic adverbs in scientific and technological texts. In general, the following key concepts were examined: translation, modality, epistemic modality and corpus linguistics. Additionally, the necessity for translation competence and the connotation of epistemic modality in science and technology texts were considered, as well as the significance of corpus linguistics for these areas of study.

During the diagnostic phase, it became evident that third-year students require guidance on the translation of epistemic adverbs. As a consequence, a lack of instruction regarding epistemic adverbs was identified. Similarly, the accessibility of supplementary materials pertaining to epistemic adverbs was either limited or inadequate, and the majority of students perceived the subject as highly intricate due to their lack of familiarity with the subject matter. These findings substantiated the imperative to construct a bank of epistemic adverbs in science and technology texts and their optimal translation into Spanish.

The methodology employed for the establishment of the bank of epistemic adverbs in science and technology texts, along with the recommended Spanish translations, was meticulously delineated. The resulting bank comprises entries for 26 adverbs derived from the English-Spanish Sentence-Aligned Parallel Corpus of Science and Technology Texts ParaCorp2020 (Rodríguez Aguila, 2021). Moreover, exercises were devised for the implementation of the aforementioned bank in the classroom, as well as for the purpose of fostering students' awareness regarding epistemic adverbs. This bank is designed to serve as a valuable resource for students seeking assistance and guidance in their studies and translation practice.

In accordance with the assessment criteria established by the authors, eight specialists from the English Language Department assessed the bank of epistemic adverbs in science and technology texts and their appropriate translation into Spanish. They agreed that the presented

bank is accurate and user-friendly. Consequently, it is an effective tool to enhance the teaching and learning process of translation in the Degree Course English Language with a Second Foreign Language at Universidad Central "Marta Abreu" de Las Villas. Furthermore, it represents a valuable contribution to improve the quality of students' translation of epistemic adverbs. Therefore, it proves its suitability for the intended objective.

### Limitations and future investigations

While this research provides a robust pedagogical tool for enhancing epistemic adverb translation, its scope necessitates acknowledging certain constraints. The sample was limited to 15 students at UCLV and the corpus, while representative of core scientific domains, excludes emerging fields. Future investigations could broaden coverage through multi-institutional collaborations, specially across Latin American universities, and by incorporating dynamic corpora. Nevertheless, its modular exercises readily adapt to hybrid learning environments. Finally, the replication of this study for the development of similar subject-specific tools is feasible and even desirable in comparable translator training programs, as long as 2 main conditions be met: (1) discipline-specific corpora exceeding 100k tokens, and (2) instructor training in epistemic modality nuances. Such extensions would powerfully validate the bank's cross-context efficacy while addressing current scope limitations.

### Conflict of interest

The authors do not manifest conflicts of interest.

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