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EQUIVALENCE CHALLENGES IN TRANSLATING SCIENTIFIC AND TECHNICAL TEXTS

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Abstract

Translating scientific and technical texts requires more than just linguistic fluency—it demands deep understanding of specialized terminology, domain-specific conventions, and a strong grasp of cultural and contextual relevance. This paper explores the primary challenges associated with achieving equivalence in the translation of scientific and technical materials. Drawing upon theories of translation and real-world examples, the paper identifies linguistic, cultural, terminological, and functional barriers that often hinder equivalence. The study concludes by emphasizing the necessity for interdisciplinary competence and standardization, recommending strategies to enhance equivalence and translation accuracy in specialized texts.

Keywords: equivalence, scientific translation, technical texts, terminology, linguistic challenges, cultural context, translation theory

Introduction

In the era of globalization and rapid technological advancement, scientific and technical texts are increasingly disseminated across linguistic borders. These texts—ranging from research articles to user manuals, patents, and technical specifications—play a vital role in disseminating knowledge and supporting industrial development. However, ensuring accurate and meaningful translation of such documents is a complex process, often hindered by the concept of equivalence. In translation studies, equivalence refers to the degree to which a translated text accurately reflects the meaning and function of the original. This paper aims to explore the multifaceted challenges of achieving equivalence in scientific and technical translation and proposes solutions for overcoming these challenges.

1. Defining Equivalence in Translation Studies

Equivalence is a foundational concept in translation theory. Nida (1964) distinguishes between formal and dynamic equivalence: the former focuses on linguistic accuracy, while the latter emphasizes the effect of the text on the target audience. In scientific and technical translation, both types of equivalence are crucial. Formal equivalence ensures that technical data is transferred accurately, whereas dynamic equivalence makes the information understandable and usable in the target language.

2. Terminological Challenges

One of the most prominent issues in scientific and technical translation is terminology. Scientific language often involves specialized terms that may not have direct equivalents in the target language. For instance, emerging technologies often outpace linguistic adaptation, leaving translators to coin neologisms or adapt existing terms. Furthermore, some terms may be "false friends"—words that look similar across languages but differ in meaning. The translator must also be aware of discipline-specific usage; for example, the word strain may have different implications in biology, engineering, and materials science.

Solution:

Use of standardized terminological databases (e.g., IATE, Termium Plus), close collaboration with subject matter experts, and continuous professional development in relevant scientific fields.

3. Linguistic and Syntactic Issues

Scientific texts often rely on complex sentence structures, passive voice, and nominalization, all of which can be difficult to replicate while maintaining readability. For example, English scientific writing often uses passive constructions ("The sample was heated to 100°C"), which may be less natural in other languages.

Solution:

Translators must balance fidelity to the source with clarity in the target language. Familiarity with stylistic norms in both source and target scientific writing is essential.

4. Cultural and Contextual Barriers

Scientific and technical texts are not entirely culture-free. Measurement units, reference systems, and even color conventions may vary across countries. For instance, date formats (MM/DD/YYYY vs. DD/MM/YYYY) or measurement systems (imperial vs. metric) can lead to confusion if not properly adapted.

Solution:

Cultural localization is key. Translators must not only convert language but also adapt content for functional use within the cultural context of the target audience.

5. Ambiguity and Lack of Context

Unlike literary texts, technical writing aims to be precise; yet ambiguity can still arise due to poor source text quality, unclear diagrams, or context-dependent meanings. This problem is compounded when translators do not have access to the full context (e.g., missing schematics, lack of author consultation).

Solution:

Where possible, translators should seek clarification from original authors or consult parallel texts. Building a glossary of context-specific terms is also recommended.

6. Functional Equivalence and End-User Needs

Ultimately, the goal of translating scientific and technical texts is functionality. If the translated text cannot be used effectively by the target audience—whether engineers, technicians, or laypersons—it fails in its purpose, regardless of linguistic accuracy.

Solution:

Usability testing and feedback from native speakers in the target field can help assess whether the translation achieves its communicative goals. Emphasis should be placed on functional equivalence rather than word-for-word translation.

Conclusion

Equivalence in scientific and technical translation is a nuanced and multifaceted concept, influenced by linguistic, cultural, terminological, and contextual factors. The challenges involved are significant, but not insurmountable. By adopting a flexible approach that combines linguistic accuracy with functional effectiveness, and by leveraging both technological tools and human expertise, translators can improve the quality and reliability of their work. As scientific collaboration continues to expand globally, the demand for accurate and equivalent translation will only grow, reinforcing the need for professional excellence and interdisciplinary understanding.

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