



EQUIVALENCE AND ADEQUACY IN THE TRANSLATION OF SCIENTIFIC AND TECHNICAL TERMS: A COMPARATIVE APPROACH

G'afurova Nazokat Bakhridin's

*daughter student of Tashkent State of
transport university*

Annotation: This paper examines the concepts of equivalence and adequacy in the translation of scientific and technical terms, using the theoretical frameworks of Newmark, Koller, and Vinay & Darbelnet. It explores the nature of terminological correspondence between source and target languages and discusses the challenges of preserving meaning, function, and form. Through examples from engineering, IT, and medical texts, the paper compares strategies that aim at formal, dynamic, and functional equivalence. The study concludes by suggesting flexible strategies tailored to the purpose, text type, and reader knowledge.

Keywords: equivalence, adequacy, scientific translation, technical terms, translation theory, Newmark, Koller

Annotatsiya: Ushbu maqolada ilmiy va texnik terminlarni tarjima qilishda ekvivalentlik va adekvatlik tushunchalari tahlil qilinadi. Mualliflar Newmark, Koller hamda Vinay va Darbelnetning tarjima nazariyalari asosida manba va tarjima tillari o'rtasida terminologik moslikni ta'minlashda uchraydigan muammolarni yoritadilar. Muhandislik, axborot texnologiyalari va tibbiyot matnlaridan olingan misollar orqali formal, dinamik va funksional ekvivalentlik strategiyalari solishtirib chiqiladi. Tadqiqot xulosasida matn turi, maqsadi va auditoriya bilim darajasiga mos strategiyalarni tanlash taklif etiladi.

Kalit so'zlar: ekvivalentlik, adekvatlik, ilmiy tarjima, texnik terminlar, tarjima nazariyasi, Newmark, Koller



Аннотация: В статье рассматриваются понятия эквивалентности и адекватности при переводе научной и технической терминологии. Анализ проводится в рамках теорий Ньюмарка, Коллера и Вине с Дарбельне, с акцентом на трудности сохранения значения, функции и формы терминов. На примерах из инженерии, ИТ и медицины сравниваются стратегии формального, динамического и функционального эквивалента. В заключение предлагаются гибкие переводческие подходы в зависимости от цели текста, его жанра и уровня подготовки целевой аудитории.

Ключевые слова: эквивалентность, адекватность, научный перевод, технические термины, теория перевода, Ньюмарк, Коллер

Equivalence and adequacy are two foundational yet contested concepts in translation studies. In the field of scientific and technical translation, they are particularly crucial, as the translator must maintain both the **referential precision** of the term and its **functional value** in the target language. However, achieving perfect equivalence is often impossible due to systemic differences in terminology, conceptual frameworks, and pragmatic conventions [1, p. 7].

This article adopts a comparative approach, analyzing the theoretical perspectives of Peter Newmark, Werner Koller, and Jean-Paul Vinay & Jean Darbelnet, and applying their models to real-world examples from engineering, IT, and medical texts.

Types of Equivalence (Koller's Five Types)

Werner Koller identifies five types of equivalence:

1. **Denotative equivalence** – correspondence in content (what is being referred to).
2. **Connotative equivalence** – similarity in stylistic value or tone.
3. **Text-normative equivalence** – adherence to textual conventions of the target genre.
4. **Pragmatic equivalence** – relation to the target reader's knowledge.



5. **Formal equivalence** – structural similarity in syntax or morphology [2, p. 99].

Example: The English term *pacemaker* (medical device) has a denotative equivalent in Uzbek: *yurak ritmini boshqaruvchi moslama*, but connotative and pragmatic equivalence may vary depending on the text type (e.g., academic vs. popular science).

Newmark's Semantic and Communicative Translation

Newmark distinguishes between **semantic translation** (focused on the source text and author's intention) and **communicative translation** (focused on the reader's reception) [3, p. 39].

“Semantic translation attempts to render, as closely as possible, the contextual meaning of the original, while communicative translation produces the same effect on the target readership” [3, p. 39].

In technical texts, a semantic approach ensures terminological fidelity, but a communicative strategy may be more suitable for user manuals or public-facing materials.

Vinay and Darbelnet's Procedures

Vinay and Darbelnet propose **seven translation procedures**, including:

- **Literal translation** – used when structures align closely.
- **Transposition** – changing grammatical categories.
- **Modulation** – altering perspective (e.g., *overheating* → *issiqdan chiqish*).
- **Equivalence** – using idiomatic expressions.
- **Adaptation** – cultural substitution [4, p. 84].

Example: *Firewall* (IT) may be translated literally as *xavfsizlik devori*, but adapted as *tarmoq xavfsizlik tizimi* to suit educational contexts.

Adequacy in Terminological Translation



Adequacy focuses on how well the translation fits the communicative situation, text type, and target audience expectations. A term may be equivalent in content but **inadequate** if it fails pragmatically.

For instance, in a legal contract, using a descriptive equivalent may be inadequate if it introduces ambiguity. Instead, a formal or standardized term is preferred [5, p. 131].

Comparative Table of Strategies

Theorist	Strategy	Strengths	Weaknesses
Koller	Five equivalence types	Multi-dimensional approach	Complex to implement
Newmark	Semantic vs. Communicative	Balances fidelity and audience	May oversimplify technical terms
Vinay& Darbelnet	Procedural approach	Practical and adaptable	Requires high translator competence

Equivalence and adequacy in the translation of scientific and technical terminology are not absolute values but dynamic, context-dependent parameters. Translators often encounter terms that lack direct lexical counterparts in the target language, especially when dealing with innovations or culturally embedded concepts. Therefore, the translator's task is not merely to search for lexical similarity but to ensure that the translated term performs an equivalent **communicative and cognitive function** in the target context.

Koller's multidimensional model demonstrates that equivalence exists on several levels—denotative, connotative, pragmatic—and each must be weighed according to the **purpose and genre** of the translation. Newmark's distinction between



semantic and communicative translation highlights the **tension between fidelity to the source and accessibility for the reader**, which is especially critical in translating instructional, medical, or legal texts. Meanwhile, Vinay and Darbelnet provide a set of **procedural tools** that allow translators to creatively manage structural and cultural differences.

An important insight is that **absolute equivalence is rarely achievable**; what matters is adequacy in function, clarity, and contextual appropriateness. In practice, hybrid strategies—combining semantic precision with functional clarity—often offer the most balanced results, particularly when translating for multilingual or lay audiences.

Ultimately, successful translation of scientific and technical terms demands:

- **Linguistic competence** (to recognize terminological structures),
- **Domain expertise** (to understand term usage),
- **Intercultural awareness** (to ensure target-language appropriateness),
- And a **strategic mindset**, grounded in established translation theories.

Thus, the translator becomes not merely a language mediator, but a knowledge broker—someone who facilitates the transfer of specialized concepts across linguistic and cultural boundaries with precision and responsibility.

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