ISSN 2181-

THE ROLE OF METAPHOR AND ANALOGY IN TRANSLATING SCIENTIFIC DISCOURSE

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Abstract. *Scientific discourse often relies on metaphor and analogy to make abstract concepts intelligible. This article, investigates how metaphors and analogies are translated across languages, focusing on the balance between semantic fidelity and conceptual accessibility and it concludes with some observations.*

Keywords: *metaphor, global dissemination, genetic code, black hole, analogy, scientific translation, English–Uzbek, conceptual metaphor, discourse, approach.*

Science, often viewed as a domain of objective facts and precise terminology, is deeply shaped by metaphorical and analogical thought.

Science is often regarded as a field of precision and objectivity, yet it depends heavily on figurative language. Scientists use metaphors and analogies to visualize invisible processes, describe abstract phenomena, and communicate novel discoveries. The metaphor *genetic code*, for instance, frames heredity as a form of written language, while *electric current* conceptualizes electricity as a flowing liquid. Such metaphors help both scientists and lay readers comprehend complex ideas.

Translating these metaphors into another language such as from English into Uzbek presents a unique challenge. Uzbek scientific discourse has evolved under

different historical and linguistic influences, particularly Russian and Persian. As a result, some English metaphors have direct equivalents (*black hole → qora tuynuk*), while others require adaptation or paraphrase (*genetic blueprint → irsiy tuzilma rejasi* or *genetik chizma*). A translator must therefore navigate not only linguistic differences but also the underlying conceptual systems that give metaphors their meaning.

This study draws primarily on Conceptual Metaphor Theory (Lakoff, Johnson, 1980), which argues that metaphor is not merely a linguistic ornament but a fundamental mechanism of thought. Scientific metaphors like the genetic code or the flow of current map abstract domains (genetics, electricity) onto more concrete, experiential ones (language, motion). Another relevant framework is Relevance Theory (Sperber, Wilson, 1995), which emphasizes that meaning is derived from contextual inference. Translators interpret metaphors not by matching words but by reconstructing the intended concept in the target language. Both frameworks highlight that successful translation requires cognitive equivalence, not just lexical correspondence.

In Uzbek translation studies, attention to metaphor in scientific discourse remains limited. Most focus has been on terminological consistency (Abdullaeva, 2019). Yet, as science education globalizes, understanding how metaphors transfer across languages becomes increasingly important for clear communication.

Metaphors and analogies were identified and classified according to their conceptual domains. Translation strategies were then analyzed based on equivalence, cultural resonance, and communicative effectiveness.

The data reveal that literal translation works effectively when scientific metaphors have already been naturalized in Uzbek academic discourse. Terms like *genetik kod* and *qora tuynuk* have become standardized borrowings.

However, substitution or paraphrase is required for culturally unfamiliar metaphors. For example, *blueprint of life* uses an architectural metaphor that may not resonate in Uzbek culture; translators often prefer *hayot loyihasi* ("project of life") to maintain the conceptual sense without confusing readers.

Explicitation also plays a key role. Translators sometimes expand metaphors for clarity, e.g., *genetic switch* → *gen faolligini boshqaruvchi mexanizm* ("mechanism controlling gene activity"). This approach prioritizes comprehension over figurative fidelity. Overall, the translator's task is not merely to reproduce the surface metaphor but to reconstruct the scientific concept within Uzbek linguistic and cultural cognition.

There are some examles are shown:

English Expression	Literal Uzbek Translation	Strategy Used	Notes
Genetic code	Genetik kod	Literal	Works naturally in Uzbek; widely adopted scientific term.
Blueprint of life	Hayot reja chizmasi / hayot loyihasi	Paraphrase / substitution	"Blueprint" lacks cultural salience; translators use *reja* or *loyiha*.
Black hole	Qora tuynuk	Literal	Direct translation accepted in Uzbek astronomy.
Information stored	DNKda	Literal / conceptual	Matches conceptual

in DNA	saqlanadigan axborot		metaphor “DNA as information.”
Energy flow in ecosystem	Ekotizimdagi energiya oqimi	Literal	Uzbek also uses *oqim* (“flow”), same metaphor preserved.
Neural network	Neyron tarmoq	Literal	Common borrowing; metaphorical meaning retained.
Big bang	Katta portlash	Literal	Conceptually equivalent; culturally understandable.
Gene editing	Gen tahriri	Literal	The metaphor of “editing” text for genetic material is retained.

Metaphor and analogy are essential to scientific discourse, not peripheral. They shape how concepts are created, explained, and understood. In English–Uzbek translation, most scientific metaphors are preserved literally, reflecting the growing internationalization of scientific terminology. Yet, challenges remain where cultural associations differ or metaphorical models are unfamiliar.

Effective translation of scientific metaphors thus requires both linguistic accuracy and **conceptual sensitivity**. Translators must grasp the scientific meaning

behind figurative expressions and determine how best to represent them in Uzbek so that readers can reconstruct the intended concept naturally. This study highlights the need for further corpus-based research on figurative language in Uzbek scientific translation, as well as for specialized training programs to develop translators' awareness of conceptual metaphors in science.

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