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# THE USE OF METAPHOR IN SCIENTIFIC TECHNICAL TEXTS

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**Annotation:** The article explores the use of metaphors in scientific writing. The metaphor has been reconceived in a way that suggests a cognitive approach to the research, which highlights the dynamic nature of metaphors. Researchers in the fields of philosophy and linguistics study how thinking and metaphor interact. The noun is highlighted among metaphors in the lexical paradigm of nominations. Terminological structure of a scientific text is mostly formed by nouns. In the course of thinking, a live metaphor emerges while in language use, a dead metaphor comes to life.

**Key words and phrases:** metaphor; scientific text; cognitive approach; lexical paradigm; live metaphor; dead metaphor

## Introduction

Metaphor, as a linguistic device, is critical in developing new ideas and broadening our perspective of the world. Metaphor helps us make sense of abstract thoughts and complex situations by contrasting two seemingly unrelated things. It acts as a link between the known and the unknown, allowing us to understand unexpected concepts by connecting them to existing ones.

Metaphor can alter our view and impact our thinking. It provides a tangible and concrete frame of reference for us to make sense of the intangible and abstract. When we say "time is money," for example, we are not literally equating time with money, but rather comparing their value. Metaphor is not restricted to language; it pervades our daily lives. Metaphors are used in our talks, our ideas, and even our actions. They are firmly embedded in our cultural and social fabric, molding our worldview and influencing our conduct.

Metaphor also plays a significant role in scientific and technological advancements. Scientists often use metaphors to explain complex theories and phenomena to the general public. By using familiar metaphors, they make these concepts more accessible and comprehensible to a wider audience.

However, it is important to use metaphors judiciously in technical texts. While they can enhance understanding, they can also introduce ambiguity or confusion if not used carefully. Metaphors should be chosen thoughtfully, ensuring that they accurately represent the underlying technical concepts and do not oversimplify or mislead the reader.

Scientific technical discourse is not an exception to the widespread usage of metaphors that may be found in practically any speech or literature. The language of scientific and technological communication has been impacted by the development of new technology. The use of metaphor

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is now ubiquitous in scientific discourse.

Metaphor has evolved into an interdisciplinary academic topic in recent years. Many scientists from many disciplines have diverse perspectives on metaphor in scientific texts. On the one hand, metaphor is a linguistic technique that allows us to express ourselves more effectively. Metaphor is a decorative element that offers functional value to our talks while also helping to lexically expand the article's language. On the other hand, this text decorating position casts the metaphor in an overly positive light. Metaphors, some argue, are an unwelcome addition that divert the reader from correct information and breach the purity of language use inherent in scientific texts. The final idea is that metaphor is a type of thinking in and of itself.

The aim of this article is to demonstrate the use of metaphor in scientific technical texts and to call attention to the changes that have occurred in this field as a result of the advent of new technologies that have altered the writing style of scientific publications.

Our research is based on scientific texts from many scientific and popular journals in the field of mechanical engineering. The primary focus of this research is metaphor in scientific and technical publications, as well as metaphor-terms.

**Theoretical basis**

Metaphor is viewed differently by philosophers and linguists. Consider Richards' definition of metaphor: " two thoughts of different things active together and supported by a single word, or phrase, whose meaning is a result of their interaction".[1, p. 95] According to J. Ortega y Gasset, metaphor is a necessary tool of the intellect, a type of scientific thinking. [2] Metaphor, according to E. S. Kubryakova, is a vivid manner of portraying information in language form by viewing one item through the prism of another. [3, p. 245]

Metaphor is a fundamental component of technical specialities theories. Because engineers' scientific and technical texts and technological findings of researchers are linked to everyday experience and each person's social existence, it may be argued that the theories and hypotheses advanced constitute part of speech. The emergence of a metaphor is intimately tied to conceptual systems of native speakers, with their typical views about the world, with a system of judgments that exist in the world on their own and are only verbalized in language. We can deduce that a metaphor in a scientific text is a model of inferential knowledge, a model of putting forward hypotheses, because a scientific text comprises many theories and hypotheses.

According to H. Ortega y Gasset, metaphor in science is utilized when a scientist discovers a new phenomenon, or constructs a new concept and seeks a label for it. Because the new word has no meaning to people around him, he is compelled to resort to everyday verbal use, where each word already has a meaning written down. For the sake of clarity, the scientist eventually selects a word that has a similar meaning to the constructed notion. As a result, the term gains a new semantic connotation while retaining past connotations. This is a simile [2]. Cognitive science has provided a new viewpoint on the study of metaphor. The cognitive paradigm of knowledge impacted attitudes of linguists toward metaphor in scientific and technical texts, as well as readers' perceptions of it. This shift in attitude toward metaphor in scientific and

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technical texts reflects a new understanding of language's function in all human speech and mental activity. Metaphor has progressed from being a "figure of embellishment" to being appropriate for any scientific work, including scientific and technical ones.

Recognizing cognitive analogies in scientific material can be difficult. This is determined by the individual style of the author, which began to be utilized while writing scientific publications, as well as the changes between sections of the text when presenting new theories and hypotheses. It is impossible to say whether the type of scientific article influences the use of metaphors in scientific text. It is also difficult to discern whether such behaviours are influenced by the style of speech.

Engineers use metaphors to explain technical components to non-experts (akin to how a doctor communicates with a patient or a teacher interacts with a student). Metaphors are used to help readers understand the text. They are a common method for conveying the author's evaluations and attitudes, as well as for expressing thoughts and conceptualizing the researcher's experience.

Metaphor can be used as a conceptual tool to solve new complicated problems in mechanical engineering, such as engine advancements, cryotechnology and freezing issues, and environmental health and safety concerns. In this scenario, metaphor is an organic manifestation of a method of thinking and cognition rather than a decoration of the text style.

According to E.McCormack, metaphors serve as cognitive processes via which we enhance our understanding of the world and generate new hypotheses. When a new concept is processed by comparison with an old, already known one, metaphor is a particularly strong technique of cognition. [4, p. 418-420]

Cognitive metaphor serves a cognitive (epistemological) purpose. According to V. G. Gak, metaphor is an inevitable phenomenon of human thinking and human language, which has the most important function in cognition and description of the world. [5, p. 13]

H. Ortega y Gasset believes that metaphor is the only technique to capture and adequately define high-level abstraction objects seen in scientific texts. Metaphor not only shapes an object's idea, but it also shapes the approach and style of thinking about it. "...we need it [metaphor] not just so that, having found a name, we can draw others' attention to our thoughts - no, we need it for ourselves: without it, it is impossible to think about some special, difficult for the mind subjects. It is not simply a means of expression, but also one of the primary cognitive tools... Metaphor is a mental action that allows us to comprehend what is beyond the power of concepts... Few people grasp that metaphor is the truth, that it penetrates reality...". [ 2, c. 68]

M. Black demonstrates that using additional figurative meaning through metaphor is a unique intellectual operation that necessitates simultaneous awareness of both topics while avoiding drawing parallels between them. Metaphors allow us to establish new connections and see things in new ways.

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M. Black doubts that Kelvin's mechanical models, Rutherford's radioactive phenomena, and Bohr's atomic model could bear fruit without the use of metaphor, because metaphor is a feature of excellent theoretical physicists' work. [6]

According to Mark Coeckelbergh, metaphors are not a veil behind which beauty is hidden, but rather the foundation of introspection. They are the building blocks of thought /...they are the foundation of reflection. They are not paint, but rather building elements for the development of ideas. [7]

Discussion

We feel that if metaphors are not used, our ability to communicate ourselves will be severely limited. We not only learn new things about the world through metaphors, but we also teach new things and give new information to others. A study of the style of scientific and technical publications revealed that metaphor exists in scientific speech to the same amount that it does in language as a whole.

All metaphors, as well as all significant lexical classes, are united by the lexical paradigm of nomination– paradigmatic series (noun – verb – adjective – adverb). [8, p. 31]

The noun is given specific attention since it is fundamental to the lexical paradigm of nomination. The noun reflects the primary function of the word, and its nominative capabilities predict the noun's high degree of neogenicity.

The noun metaphor is becoming more widespread in mechanical engineering vocabulary used in scientific and technical writings. New terms are created by the use of roots. (*conductor* - a material which contains movable electrical charges; *exciter* **-** a source of the power to the field winding of an electrical machine; *stator* - the stationary portion of a machine.) [9]

The majority of the terms in scientific text are nouns from which other parts of speech can be constructed. Many of the terms evolve into metaphors. As an example, *food chain* - the chain of eating and getting nutrition which starts from a small herbivores animal and ends up at a big carnivorous organism;[10] *brainstorm* **-** try to solve a problem by thinking intensely about it;[11] *raw material* - material suitable for manufacture or use or finishing; *horsepower* - unit of power. 1hp = 746W)[12]
Many technical phrases originated in normal language and found their way into scientific and technical literature. Some of these nouns are: *cookie* - a small piece of information left on a visitor's computer by a website, via a web browser;[13] (E.g. These sites may also set their own cookies or use web storage on your machine.) *net* - in mathematics and science, the **net** is sometimes used as a sum or mean of a set of data or as a pattern that can be folded to form a 3D shape.[14] *stakeholders*- group or individual affected by the outcome of a decision; *cascade* - array of possible actions to take in response to a problem: protocol;[15] *folder* – a type of file that contains other files inside it which makes them easier to manage because you can then use one folder as a container for additional folders. [16]

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Terminological metaphors are derived not just from human experience, but also from human physiology and anatomy. According to Lakoff and Johnson, the human body in its spatial interaction with the environment is the primary source of metaphors [17, p. 242]. All sections of this study contain metaphor terminology linked to human physiology.

Technical texts often use metaphors with:

- human body parts: eyes, neck, nose, ribs, belly, throat, tongue, finger, jaw

For example:

Every few years, the minute *hand* shifted, either forwards or backwards.

By strengthening up the *body* frame and the parts, the *jaw* crusher is much more reliable and its range of use is extended.

Instead of a cap, cylinders commonly have a protective collar or *neck ring* around the service valve assembly.

The network acts as a *backbone* for the entire infrastructure.

- characteristics inherent to the human body: exhaust, fatigue, feeding strain-aging, attack, (un)lock etc.

For example:

The new algorithm is a powerful tool in ***unlocking*** insights from big data.

The defect was caused by metal fatigue, a phenomenon not fully understood at the time.

Their materials must be able to withstand oxidation (*ageing*), wear and chemical attack over a wide temperature range.

Additional functions - e.g. *feeding* calibrating gasses - may be required depending on the application.

- items of human clothing: protective collar; ice cap; clamp sleeve; remove the bonnet, insulator sleeve.

The *ice cap* in this region is now about a mile thick.

The metal *sleeve* has a detachable connecting piece made of ceramic or of the moulding compound.

Together with the *bonnet*, the fenders define the front design part of your vehicle.

*Bootstrap* utilities are small programs that help the computer get started and load the operating system.

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Metaphors are quite dynamic and are linked to the author's cognitive activity. Many artistic elements, including metaphors, involve an element of surprise, according to E. V. Anashkina. As a result, they must be updated on a regular basis in order to function properly [18, p. 22].

Lexicon of a scientific text may contain several "dead" (hackneyed) metaphors. A trite metaphor has a consistent personality and does not elicit any further imagery or emotionally charged situations in the reader (crown with success, shed great light on, catch a glimpse of electricity) [28].

In a scientific text, metaphor is the primary unit of emotional expression. When describing a scientific process or theory, the term "emotion" in scientific publications denotes feelings or human moods.

Metaphors are not only a means of communicating emotions and feelings; they are also one method of linguistically implementing abstract nominations.

An emotional appraisal is always coupled with some kind of emotional drive, represented in the form of a word, most typically figurative [19, p. 215]. Metaphor is a particularly efficient (if not the only) technique of creating imagery that connects the emotional (sensual) and intellectual (mental) spheres of human perception; it does not detract from scientific knowledge, but is part of the text, and no text can exist without it. Metaphor is the primary unit of emotional expression in a scientific writing, conveying the author's knowledge, vision (point of view), and feelings.

Results

The study found that metaphor is a frequently employed stylistic element in scientific technical texts and represents a novel use of language for us. Metaphor is a linguistic method of language utilized in figurative meaning, as well as an instrument of cognition, without which no scientific discovery can occur. The style of writing scientific publications has been altered by new technologies. Many living metaphors have appeared, improving scientific article language. A live metaphor adds freshness to the material and prompts a new metaphorical meaning. A dead metaphor comes to life through linguistic use. The impact of emotions on human brain activities is undeniable, thanks to advances in cognitive research.

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