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Structural And Semantic Features Of Information Technology Terminology

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Abstract: A large and dynamic system of specialized terminology has emerged as a result of the quick growth of information technology. With an emphasis on word-formation models, formation patterns, and semantic evolution, this article examines the structural and semantic characteristics of information technology (IT) terminology. The productivity of borrowing, compounding, and shortening is highlighted in the paper as important structural mechanisms influencing IT vocabulary. Semantic characteristics of IT terminology are analyzed, including polysemy, metaphorization, and restriction of meaning. Additionally, the study looks into how conceptualization and word creation in the digital sphere are influenced by cognitive and cultural aspects. The study attempts to elucidate the mechanisms behind term creation and semantic change by examining real linguistic data from English-language IT sources. The results advance our knowledge of how terminology represents the changing link between human cognition and digital reality and how language adjusts to technological progress.

Keywords: Information technology, terminology, structural features, semantic features, term formation, cognitive linguistics, digital communication.

Introduction: Information technology (IT) has emerged as a key area influencing human contact, communication, and knowledge exchange in the current era of globalization and technical growth. Alongside its quick development, the IT industry has produced a wide range of new terms that capture the English language's semantic vitality and structural flexibility. Understanding how language changes to meet the cognitive and communication needs of the digital age so requires an understanding of information technology terminology. Linguistic analysis of IT terminology reveals that this layer of vocabulary is characterized by a high degree of productivity and diversity in its structural patterns. Terms in this field are frequently formed through compounding (e.g., database, firewall), abbreviation and acronymization (e.g., HTML, AI), and borrowing from other disciplines, particularly electronics, mathematics, and telecommunications. These word-formation mechanisms contribute to the rapid enrichment of IT vocabulary and reflect the interdisciplinary nature of modern technological discourse.

From a semantic perspective, IT terminology exhibits a complex interaction between polysemy, metaphor, and semantic restriction. As new technological concepts are named using words from common English, many phrases undergo metaphorical expansion, such as cloud, mouse, and virus. These procedures show how people can understand abstract technology events using well-known linguistic frameworks thanks to cognitive mechanisms like conceptual metaphor and analogy. Furthermore, when general terms take on specific meanings in an IT context, like server or window, semantic narrowing frequently takes place.

The study of the structural and semantic characteristics of IT terminology also advances more general linguistic research, such as applied translation studies, terminology theory, and cognitive linguistics. In addition to supporting linguistic study, an understanding of the creation, classification, and semantic transformation of IT terminology has practical

consequences for lexicography, technical communication, and educational technique.

Therefore, the aim of this article is to present a thorough examination of the structural and semantic idiosyncrasies of English language related to information technology. It highlights the relationship between language creativity and technical innovation by examining the primary patterns of word generation, semantic development, and conceptual representation. By using this method, the study aims to improve our comprehension of how terminology reflects human cognition in the information era and how language adjusts to the always changing digital world.

METHODS

The structural and semantic characteristics of English information technology (IT) terminology are examined in this study using a descriptive-analytical method. The study integrates aspects of cognitive linguistics, terminology theory, and corpus-based linguistics to enable a methodical examination of words' morphological and semantic properties. To guarantee validity and dependability in the process of gathering and analyzing data, a mixed-method design was used, combining quantitative and qualitative approaches.

Corpus selection

Terms from several reliable sources, such as scholarly papers, technical manuals, IT glossaries, and internet resources, make up the primary dataset. The corpus contained materials produced between 2015 and 2025 that reflected modern IT language in order to guarantee relevance and thoroughness. Official programming language documentation, ISO and IEEE IT standards, online technology news portals, and peer-reviewed journals with an emphasis on computer science, AI, and information systems were among the important sources. The inclusion of terms was determined by their technical specificity, recognition in professional discourse, and frequency of recurrence.

Inclusion and Exclusion Criteria

Terms must be commonly used in IT environments, have distinct definitional boundaries, and exhibit structural or semantic qualities appropriate for analysis in order to ensure data dependability. Terms that were too context-specific, out-of-date, or mostly colloquial were not included. The final dataset included about 1,200 terms that were classified by linguistic type (compound, acronym, borrowed phrase) and domain (software, hardware, networks, AI, etc.).

Structural analysis

The morphological and syntactic patterns of term generation were the main focus of structural analysis. The study looked at common procedures including borrowing, compounding, affixation, and acronymization and abbreviation. The word class, derivational process, and morphological composition of each term were recorded. Each structure type's frequency counts were noted, giving a numerical summary of production trends. To find trends across several IT subdomains, a comparative analysis was carried out.

Semantic analysis

The meaning-related characteristics of IT terminology were investigated through semantic analysis. Polysemy, semantic narrowing or broadening, metaphorical extension, and cognitive mapping were important factors. To ensure semantic dependability, each term was examined in context, taking into account its usage in various sources. Lakoff and Johnson's (1980) conceptual metaphor theory framework, which emphasizes how abstract technological concepts are rooted in well-known experiential domains, was used to identify metaphors. To evaluate links between phrases, semantic linkages including synonymy, hyponymy, and semantic fields were also investigated.

Data Validation and Reliability

Reliability and validity were ensured through several measures. First, all terms were cross-checked across multiple sources to confirm their existence and standard usage. Second, structural classifications were independently verified by two linguistic experts to minimize subjective bias. Third, semantic interpretations were compared with definitions in authoritative IT glossaries and peer-reviewed literature. Finally, the entire dataset and coding scheme were pilot-tested on a sample of 100 terms to refine analytical procedures and ensure consistency.

RESULTS

The analysis of 1,200 IT terms revealed distinct patterns in both structural and semantic features, highlighting the interplay between linguistic form and conceptual meaning. The results are presented in two main subsections: structural characteristics and semantic characteristics, followed by illustrative examples and cross-domain observations.

1. Structural Features

The structural analysis identified four primary mechanisms of term formation: compounding, abbreviation/acronymization, affixation, and borrowing.The frequency distribution of these structural types within the corpus.

Frequency of Structural Types in IT Terminology

Structural Type Frequency Percentage (%)

Compounding 580 48.3

Abbreviation/Acronym 420 35.0

Borrowing 140 11.7

Affixation 60 5.0

Total 1,200 100

Compounding emerged as the most productive mechanism. Terms such as firewall, cloud computing, and data mining illustrate semantic transparency and compositionality, combining familiar lexical items to convey novel technological concepts. Abbreviations and acronyms were the second most frequent, reflecting efficiency and standardization in professional communication (e.g., AI, HTML, IoT). These items also facilitate international usage due to their brevity and recognizability.

Borrowing accounted for 11.7% of terms, demonstrating the interdisciplinary nature of IT terminology. Examples include algorithm (from Arabic) and kernel (from general English), showing adaptation to technical discourse. Affixation was less frequent but observed in terms such as virtualize and networked, reflecting derivational productivity in forming verbs and adjectives from noun bases.

Cross-domain analysis indicated that software-related terms relied heavily on compounding and acronyms, whereas hardware and networking terms exhibited a higher proportion of borrowed words. This suggests that the structural pattern of term formation is influenced by the subdomain and historical evolution of technological concepts.

2. Semantic Features

Semantic analysis focused on polysemy, metaphorical extension, semantic narrowing, and cognitive mapping.

Polysemy was widespread; for instance, the term window retains its general meaning of a “physical opening” but acquires a specialized IT meaning as a “graphical interface element.” Similarly, server in general English denotes a person providing service, whereas in IT it refers to a system providing resources to clients. Semantic narrowing occurred when general terms were restricted to domain-specific meanings, enhancing precision.

Metaphorical extension was also a prominent feature. Familiar experiential domains were mapped onto abstract technological concepts, as in cloud (representing remote storage) and virus (denoting malicious software). According to Lakoff and Johnson (1980), such metaphorical mechanisms reflect cognitive strategies that facilitate comprehension of complex phenomena.

Additionally, semantic relationships among terms were observed. Synonymy (e.g., bug / defect), hyponymy (e.g., router as a type of network device), and semantic field clustering provided insights into conceptual organization. These relationships demonstrate that IT terminology is not only structurally organized but also semantically interconnected, allowing coherent conceptual mapping within the domain.

3. Cross-Linguistic Observations

Comparative analysis with Russian and Uzbek IT terminology revealed adaptation strategies such as calquing, transliteration, and morphological integration. For example, firewall is often transliterated as файерволл in Russian, while in Uzbek it appears as fayervoll, maintaining semantic and phonological recognizability. These observations highlight the influence of English as the primary source of IT terminology and the necessity of local adaptation mechanisms to fit morphosyntactic rules of recipient languages.

Summary of Findings

The study demonstrates that:

1. Compounding and acronymization dominate structural productivity in English IT terminology.

2. Semantic features such as polysemy, metaphor, and semantic narrowing are pervasive and essential for conceptual precision.

3. Subdomain differences affect structural preferences, with software-related terms favoring compounding and acronyms, while hardware/networking terms rely more on borrowings.

4. Cross-linguistic adaptation shows consistent strategies to preserve semantic transparency and ease of integration.

These results provide a comprehensive overview of how structural and semantic features interact in IT terminology, forming a basis for discussion on language adaptation, cognitive strategies, and cross-linguistic transfer.

DISCUSSION

The current study offers a methodical examination of the structural and semantic characteristics of English IT terminology, emphasizing the cognitive processes that underlie meaning as well as the mechanisms of term generation. The results validate and expand upon the findings of previous terminology researchers, highlighting the dynamic interaction between linguistic form, conceptual representation, and professional communication.

The work of Crystal (2003), who highlighted the compositional structure of technical vocabulary in English, is consistent with compounding's supremacy as

the most productive structural mechanism. Rapid innovation in the IT field is made possible by compounding, which enables preexisting lexical terms to produce new concepts with little cognitive strain. Similarly, the use of acronyms and abbreviations supports Gotti's (2008) finding that acronyms have both communicative and mnemonic purposes, confirming the efficiency-driven nature of technology discourse. These structural mechanisms show that functional demands for clarity, conciseness, and standardization shape IT language in addition to reflecting conceptual requirement.

Software-related phrases tend to favor compounding and acronyms, while hardware and networking terms contain more borrowings, according to the distribution of structural types among subdomains. This pattern reflects both disciplinary and historical factors: hardware terminology often integrates existing technical vocabulary from physics, electronics, and engineering, demonstrating the interdisciplinary integration of IT lexicon, while software terminology frequently comes from English-speaking communities and is newly coined.

Semantic constriction, metaphorical extension, and widespread polysemy are shown by the examination of semantic traits. Terms like server and window are examples of polysemy, which enables conceptual economy by repurposing well-known words in unfamiliar settings. By limiting broad concepts to specific domain applications, semantic narrowing guarantees accuracy. Terms like cloud and virus serve as examples of metaphorical extension, which highlights how cognitive mapping helps people understand abstract concepts. Lakoff and Johnson (1980) assert that metaphors in language are cognitive tools that organize cognition and are rooted in human experience. In IT terminology, metaphorical strategies bridge the gap between everyday conceptual schemas and complex technological processes, enhancing learnability and usability.

The idea that IT terminology is conceptually networked, allowing for coherent organization within the domain, is supported by the discovery of semantic links, such as synonymy, hyponymy, and semantic fields. This result is consistent with the theoretical framework of Sager (1990), which highlights semantic interconnectedness as a key idea in specialized communication. The study verifies that IT terminology is a linguistic, cognitive, and functional system at the same time by exhibiting both structural regularity and semantic systematicity.

LIMITATIONS AND FUTURE RESEARCH

Although the paper provides a thorough analysis, it only includes a few cross-linguistic comparisons and is restricted to English IT terminology. Future studies could investigate diachronic semantic changes in IT terminology and broaden the sample to include more varied languages. Psycholinguistic research could also look at how various user groups' understanding and adoption of IT words are influenced by cognitive techniques like metaphorical mapping.

CONCLUSION

Information technology terminology is one of the most dynamic and quickly changing lexical domains in contemporary language, according to research on the subject. IT phrases are remarkably flexible structurally, with the most effective word-formation techniques being compounding, derivation, and shortening. In terms of semantics, metaphorization, specialization, and polysemy are essential for forming meaning and promoting conceptual comprehension. These processes demonstrate how language adjusts to technological advancement in addition to reflecting linguistic originality. Additionally, the predominance of English in international IT communication encourages interlingual adaptation in other languages and international standardization of terminology. Overall, IT terminology embodies the intersection of language, cognition, and technology, where linguistic evolution mirrors the continuous progress of the digital age. Understanding its structural and semantic features is therefore vital for effective professional communication, translation, and linguistic research in the field of modern information technology.

REFERENCE

1. Cabré, M. T. (1999). Terminology: Theory, Methods and Applications. Amsterdam: John Benjamins Publishing Company.
2. Crystal, D. (2003). The Cambridge Encyclopedia of the English Language. Cambridge: Cambridge University Press.
3. L'Homme, M.-C. (2020). Lexical Semantics for Terminology: An Introduction. Amsterdam: John Benjamins Publishing Company.
4. Temmerman, R. (2000). Towards New Ways of Terminology Description: The Sociocognitive Approach. Amsterdam: John Benjamins Publishing Company.
5. Lakoff, G., & Johnson, M. (2003). Metaphors We Live By. Chicago: University of Chicago Press.
6. Faber, P., & Cabré Castellví, M. T. (2012). "Terminology and Specialized Knowledge Representation." In Handbook of Terminology (Vol. 1, pp. 1–28). Amsterdam: John Benjamins Publishing Company.
7. Yus, F. (2021). Cyberpragmatics: Internet-Mediated

Communication in Context. Amsterdam: John Benjamins Publishing Company.

8. Pearson, J. (1998). Terms in Context. Amsterdam: John Benjamins Publishing Company.
9. Grinev-Grinevich, S. V. (2008). Terminology Studies. Moscow: Academia.
10. Daille, B. (2017). “Term Extraction and Terminology: An Overview.” Terminology, 23(1), 1–20.