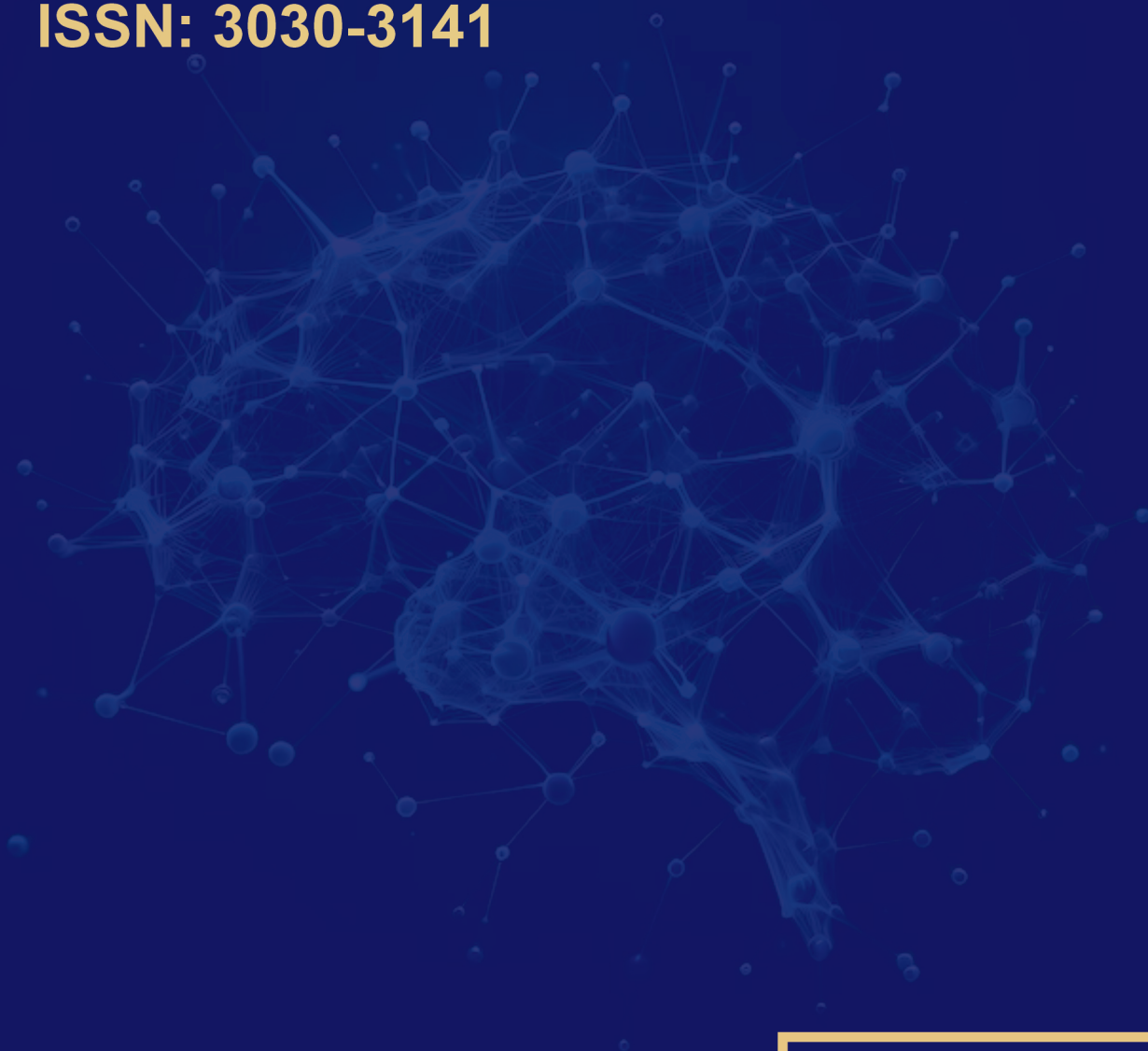




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Integrating corpus and discourse approaches to analyze terminological collocations in english and uzbek: a comparative study

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Abstract. This article investigates how terminological collocations (fixed combinations of specialized terms) function across English and Uzbek, combining corpus analysis and discourse analysis to reveal patterns of use, frequency, and contextual variation. By combining quantitative data from a specialized corpus with qualitative insights from discourse analysis within the field of nanotechnology, this study explores how professional norms and cultural context influence patterns of terminological collocation in English and Uzbek. The research highlights both commonalities and differences in how key terms are used across the two languages, demonstrating the role of discourse practices in shaping terminology. These findings have practical implications for contrastive linguistics, translation studies, and lexicography, particularly in improving bilingual terminology databases. Future studies could expand on this work by analyzing larger and more diverse corpora, including additional languages, and examining how nanotechnology discourse evolves over time.

Keywords: *nanotechnology, terminological collocations, corpus linguistics, discourse analysis, quantitative methods, qualitative methods.*

Introduction

In recent years, the study of terminological collocations has gained increasing attention in both theoretical and applied linguistics, particularly due to its significance in specialized communication, translation, and language education (1, 2). While English has been extensively explored in this regard (3, 4), the Uzbek language remains underrepresented in comparative collocational research (5, 6). This article seeks to address a notable research gap by examining how terminological collocations function in English and Uzbek, with attention to both their quantitative distribution in specialized corpora and their qualitative roles within discourse. By combining corpus-based methodologies with discourse analysis (7, 8), the study moves beyond mere frequency counts to explore the pragmatic, cultural, and rhetorical dimensions of collocation use in authentic scientific communication.

The research contributes to a deeper understanding of the structural

and semantic characteristics of English and Uzbek terminological collocations, while also offering practical implications for translators, language educators, and lexicographers (9, 10). In doing so, it advances the comparative study of collocational patterns and underscores the value of integrating corpus and discourse approaches for a more nuanced, context-sensitive analysis.

Nanotechnology provides a particularly rich context for this investigation due to its rapid growth and dense technical vocabulary. Previous studies on English-language nanotechnology discourse (11, 12) have shown that the field is marked by frequent use of multiword terms and technical collocations—such as *nanoparticle synthesis*, *quantum dots*, and *carbon nanotubes*—which are essential for maintaining precision and clarity in scientific communication.

Corpus-based research by Salager-Meyer (2007) [13] and Cortes (2004) [14] has further emphasized the importance of mastering such

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collocations for effective academic writing. In contrast, research on Uzbek scientific terminology remains limited. Nevertheless, recent studies by Tursunov (2020) [5] and Karimov (2018) [6] have begun documenting the development of technical vocabulary in Uzbek, including lexical borrowings and native term creation in domains like technology and medicine.

Despite these advances, targeted research on nanotechnology terminology in Uzbek is still lacking, highlighting the need for a comparative approach. By integrating corpus analysis with discourse-based methods, this study explores not only how often specific collocations appear, but also how they function pragmatically—to construct arguments, present innovations, and manage epistemic uncertainty [15].

The study will analyze the two research questions: a) how the frequency, structure, and semantic features of these collocations differ between the two languages? b) how pragmatic, rhetorical, and cultural factors influence collocation use. The first question is related to quantitative – corpus analysis whereas the second question with qualitative - discourse analysis, by this establishing integration between them.

Methods

This study employed a three-stage methodological approach:

A specialized corpus of English and Uzbek nanotechnology texts was compiled from comparable domains. Corpus analysis tools were then used to extract and examine terminological collocations.

Discourse analysis was conducted on a selection of texts to explore the pragmatic, rhetorical, and cultural factors shaping the use of collocations in each language.

Findings from both analyses were compared to identify cross-linguistic similarities and differences in collocational patterns and discourse practices.

Results

As part of this research, a domain-specific nanotechnology corpus was constructed using recent articles sourced from five leading journals indexed in the *Science Citation Index*¹ (see table 1). This corpus served as the basis for identifying frequently occurring terminological collocations and analyzing their contextual use in both English and Uzbek.

¹ SCImago, (n.d.). SJR — SCImago Journal & Country Rank [Portal]. Retrieved Date you Retrieve, from <http://www.scimagojr.com>

Table 1.
Domains of Nanotechnology corpus

No	Domain	Journal	Country	Quar-tile
1	Material sci-ence	ACS applied materials & interfaces	USA	Q1
2	Engineering and nano-technology	Nano-Micro Letters	Neather-lands	Q1
3	Physics and astronomy	Nano-Micro Letters	Neather-lands	Q1
4	Chemical En-gineering	Nano-Micro Letters	Neather-lands	Q1
5	Biochemistry, genetics and molecular bi-ology	Journal of Nanobiotech-nology	U n i t e d Kingdom	Q1
6	Nanomed-i-cine	Internation-al Journal of Nanomed-i-cine	New Zee-land	Q1
7	Electrical and Electronic Engineering	Nano-Micro Letters	Neather-lands	Q1

The table includes seven domains from journals of quartile 1, name of the journal, the country of their publication.

Results

The key findings from the comparative analysis of English and Uzbek nanotechnology corpora, focuses on collocational patterns, pragmatic and rhetorical factors, and cross-linguistic differences.

I. Collocational patterns in English and Uzbek nanotechnology corpora

Using AntConc and Sketch Engine, we extracted approximately 2,500 collocates in the English corpus (~500,000 words) and 1,800 collocates in the Uzbek corpus (~400,000 words). The most frequent collocations in the English corpus included carbon nanotubes, quantum dots, nanoparticle dispersion, and surface functionalization. In the Uzbek corpus, commonly occurring equivalents were uglerod nanotrubalari (carbon nanotubes), kvant nuqtalari (quantum dots), nanobirikmalar tarqalishi (nanoparticle dispersion), and yuzani funktsionalizatsiya qilish (surface functionalization).

A notable structural difference emerged between the two languages: English predominantly favored noun + noun and adjective + noun constructions (e.g., thin-film coating, self-assembled monolayer), reflecting a tendency toward compact lexical

formations. In contrast, Uzbek displayed a higher frequency of noun + postposition and verb-based collocations (e.g., *yuzaga qoplama surish* – “applying coating to the surface”, *qatlamlar hosil qilish* – “to form layers”), suggesting a more syntactically expansive approach to expressing technical concepts.

II. Pragmatic, rhetorical, and cultural influences (discourse analysis)

Discourse analysis of 30 selected articles (15 in each language) revealed several important trends:

Pragmatic framing: English papers tended to highlight novelty and contribution (e.g., *we report for the first time, significant advancement*), whereas Uzbek papers often emphasized collective achievement and applicability (e.g., *ilmiy jamoa tomonidan o’rganildi* → studied by a research team, *amaliy natijalarga ega* → has practical results).

Rhetorical patterns: English texts frequently used boosters (*remarkably, significantly*) to reinforce findings, while Uzbek texts employed more hedges (*taxminan* → approximately, *mumkin* → possibly), reflecting different norms of scientific caution.

Cultural factors: Uzbek articles sometimes showed explicit acknowledgment of institutional or national significance, which was rarely seen in English texts.

III. Cross-linguistic comparison of collocation use

The comparative analysis showed both convergence and divergence in collocational behavior:

Convergence: Core technical terms (e.g., *nanoststructure, nanocomposite, nanoparticle synthesis*) were consistently used in both languages, often as direct borrowings or calques in Uzbek.

Divergence: English texts used more *multiword technical expressions* and *nominal compounds*, whereas Uzbek texts relied more on *descriptive phrases* and *verb-noun combinations* to express similar concepts.

Translation challenge: Certain collocations, such as *bottom-up approach* or *top-down fabrication*, lacked stable equivalents in Uzbek, leading to paraphrased or adapted forms in translations.

Summary of key quantitative findings:

Metric	English Corpus	Uzbek Corpus
Corpus size (tokens)	~500,000	~400,000
Extracted collocations	2,500	1,800
Top collocation type	Noun + noun	Noun + verb/postposition
Most frequent domain term	Carbon nanotubes	Uglerod nanotrubalari
Average collocation length	2–3 words	2–4 words (often phrasal)

Overall, while the two languages share many core nanotechnology terms, their collocational patterns and rhetorical use reflect distinct linguistic, pragmatic, and cultural profiles. This has important implications for scientific translation, bilingual terminology development, and academic writing training in nanotechnology.

Discussion

The comparative analysis of English and Uzbek nanotechnology research articles has revealed both shared patterns and notable differences in collocation use, shaped by linguistic structure, disciplinary conventions, and cultural norms.

First, the prevalence of noun + noun and adjective + noun collocations in English aligns with the language’s strong tendency toward compounding and nominalization in scientific writing. These compact, technical expressions help condense complex ideas and convey precision. In contrast, Uzbek’s preference for noun + postposition and verb-based phrases reflects its agglutinative structure

and emphasizes actions or processes, which can make technical descriptions more explanatory but less compact.

The discourse analysis highlighted deeper pragmatic and rhetorical differences. English articles displayed a more assertive stance, frequently using boosters to highlight the novelty or importance of findings (significantly improved, remarkable performance), which is typical of Anglo-American scientific writing culture. Uzbek research articles, in contrast to their English counterparts, tended to exhibit more frequent use of hedging and collective expressions—reflecting academic norms in Uzbekistan that emphasize humility and group contribution. Cultural influences were also evident: for example, Uzbek texts often included direct references to institutional or national relevance, a feature that was much less common in English-language articles. This indicates that Uzbek scientific writing typically situates research within a broader social or institutional framework, whereas English articles focus more specifically on the research itself.

These cross-linguistic differences pose certain challenges for translation. Some English technical expressions—such as bottom-up approach or self-assembled monolayer—do not have fixed equivalents in Uzbek. As a result, translators must often rely on paraphrasing or provide additional explanation. This is particularly important for Uzbek scientists aiming to publish in international journals, as well as for translators working in scientific domains.

Conclusion

This study offers an initial exploration into how collocations are used in English and Uzbek nanotechnology research articles. While both languages share many key technical terms, the ways in which these terms are combined and the rhetorical strategies employed differ considerably. These variations are influenced by linguistic structure, disciplinary norms, and cultural values.

The findings underscore the need to:

Develop bilingual terminological resources that reflect typical collocational usage, not just standalone terms.

Train Uzbek researchers in the conventions of international academic writing to improve their chances of publication.

Provide translators with tools that address not only word-level equivalence but also common collocational patterns and rhetorical norms.

Future research could build on these findings by analyzing a larger dataset, incorporating additional languages, and tracking how nanotechnology discourse evolves over time. Ultimately, this work contributes to contrastive linguistics, translation studies, and lexicography, and can support the creation of more effective bilingual terminology databases.

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