

Semantic shifts in words related to technological advancement in English, Uzbek, and Russian

Sabirova Nigora
UzSWLU graduate student

Annotation. The rapid pace of technological advancement has brought about significant changes in languages, as speakers and writers adapt existing vocabularies to describe emergent phenomena. This study investigates the processes and outcomes of semantic shifts in words related to technology in three typologically and culturally distinct languages: English, Uzbek, and Russian. Through a comparative, corpus-based examination, we explore how words associated with communication, computation, and digital tools have undergone meaning changes over the past several decades. We draw on semantic change theories, historical linguistics, and sociolinguistic frameworks, examining the influence of language contact, borrowing, and cultural context in shaping lexical semantics. The analysis uses corpora such as the Corpus of Contemporary American English (COCA), the Uzbek National Corpus, and the Russian National Corpus, along with dictionaries and lexicographic resources. Our results highlight distinct pathways of semantic shift across these three languages, reflecting both global technological influences and local linguistic ecologies. We conclude by emphasizing the need for continuous scholarly attention to semantic evolution, as it offers insights into how speakers conceptualize and navigate the accelerating landscape of digital innovation.

Keywords: semantic shift, lexical semantics, technological vocabulary, English, Uzbek, Russian, language change

Семантические сдвиги в словах, связанных с технологическим прогрессом, в английском, узбекском и русском языках

Сабирова Нигора
Магистрант УзГУМЯ

Аннотация. Стремительное развитие технологий приводит к значительным изменениям в языках, поскольку носители и авторы текстов приспосабливают существующий словарный запас для описания новых явлений. В данном исследовании рассматриваются процессы и результаты семантических сдвигов в лексике, связанной с технологией, на примере трех типологически и культурно различающихся языков: английского, узбекского и русского. На основе сравнительного корпусного анализа мы изучаем, как слова, связанные с коммуникацией, вычислительной техникой и цифровыми инструментами, претерпели изменения в значении за последние несколько десятилетий. Мы опираемся на теории семантических изменений, историческую лингвистику и социолингвистические подходы, анализируя влияние языковых контактов, заимствований и культурных контекстов на формирование лексической семантики. В работе используются корпуса, такие как корпус современного американского английского (COCA), Узбекский национальный корпус и Национальный корпус русского языка, а также словари и лексикографические ресурсы. Полученные результаты демонстрируют различные пути семантических сдвигов в этих трех языках, отражающие как глобальное технологическое воздействие, так и особенности локальных лингвистических экосистем. В заключение мы подчеркиваем важность непрерывного научного внимания к семантической эволюции, поскольку она дает представление о том, как носители языка концептуализируют и осваивают все более ускоряющийся мир цифровых инноваций.

Ключевые слова: семантический сдвиг, лексическая семантика, технологическая лексика, английский язык, узбекский язык, русский язык, языковые изменения.

Texnologik taraqqiyotga oid soʻzlarning semantik siljishlari: ingliz, oʻzbek va rus tillari misolida

Sabirova Nigora
OʻzDJTU magistranti

Annotatsiya. Texnologiyalarning jadal rivojlanishi mavjud lugʻat boyligini yangi hodisalarni ifodalash uchun moslashtirish jarayonida tillarda sezilarli oʻzgarishlarga sabab boʻlmoqda. Ushbu tadqiqot ingliz, oʻzbek va rus kabi tipologik hamda madaniy jihatdan turlicha boʻlgan uch tilda texnologiyaga oid soʻzlarning semantik siljishlari jarayonlarini hamda natijalarini oʻrganadi. Taqqoslashga asoslangan korpus tahlili orqali biz soʻnggi oʻn yilliklarda aloqa, hisoblash texnikasi hamda raqamli vositalar bilan bogʻliq soʻzlar qanday maʼno oʻzgarishlariga uchraganini tadqiq etamiz. Semantik oʻzgarish nazariyalari, tarixiy lingvistika va sotsiolingvistik yondashuvlardan foydalangan holda biz til kontakti, oʻzlashtirishlar (qarz soʻzlar) hamda madaniy kontekstning leksik semantikaga qanday taʼsir koʻrsatishini tahlil qilamiz. Tadqiqotda zamonaviy Amerika ingliz tili korpusi (COCA), Oʻzbek milliy korpusi va Rus milliy korpusi kabi korpuslar, shuningdek, lugʻatlar va leksikografik manbalar qoʻllaniladi. Natijalarimiz ushbu uch tildagi semantik siljish yoʻllarining har xil ekanligini, global texnologik taʼsirlar bilan birga mahalliy lingvistik muhitlarning ham oʻziga xosligini namoyon etadi. Xulosa oʻrnida semantik evolyutsiyani doimiy oʻrganish zarurligi taʼkidlanib, bu orqali soʻzlovchilar raqamli innovatsiyalar tez surʼatda rivojlanayotgan muhitni qanday anglab, idrok qilishi haqida chuqurroq tasavvur hosil qilish mumkinligi qayd etiladi.

Kalit soʻzlar: semantik siljish, leksik semantika, texnologik lugʻat, ingliz tili, oʻzbek tili, rus tili, til oʻzgarishlari.

Introduction

The rapid proliferation of digital technologies over the past half-century has not only transformed societal, economic, and cultural structures worldwide but also significantly reshaped the linguistic landscape. As new concepts and tools emerge, languages adapt by introducing neologisms, borrowing foreign terms, and repurposing existing words. The phenomenon where existing words acquire new meanings, broaden or narrow their semantic ranges, or shift in connotational scope is collectively known as “semantic shift” (Traugott & Dasher, 2002).

This process is particularly notable in the domain of technology-related vocabulary, where innovation regularly outpaces lexicographic codification. Words that once had stable, concrete meanings can acquire more abstract or figurative interpretations as they become associated with digital realities. For instance, in English, the word *cloud*, formerly restricted to meteorological phenomena, has shifted to denote remote data storage servers. Similarly, *mouse*, initially limited to a small rodent, is now strongly connected to computer accessories. These semantic shifts reflect the cultural importance and pervasiveness of technology in contemporary life.

However, the processes and outcomes of semantic shift are not uniform across languages. They are influenced by historical, cultural, and structural factors. English, as a global lingua franca of technology, tends to drive terminological innovation and spread new meanings worldwide. Meanwhile, Uzbek and Russian have their own unique mechanisms, constraints, and historical contexts that shape how they incorporate and adapt technologically linked vocabulary. Uzbek, a Turkic language, has undergone periods of heavy influence from Arabic, Persian, Russian, and now English in the realm of technical vocabulary. Russian, once a dominant language of science and technology in the Soviet Union, must reconcile its substantial legacy of domestic scientific coinages

with the flood of English-based terms in the post-Soviet era (Comrie, Stone, & Polinsky, 1996; Dickey, 2012; Mustaqimova, 2020).

This study aims to investigate how technological advancement influences semantic shifts in English, Uzbek, and Russian. We examine a range of words related to communication technologies, computing devices, and digital platforms. Drawing on a combination of corpus-based analysis, dictionary data, and scholarly literature, we identify patterns of semantic change and their underlying causes. By taking a comparative and cross-linguistic approach, we seek to understand how global forces interact with local linguistic ecologies, and what implications these interactions have for our understanding of language evolution in the digital age.

Literature Review

Semantic shift, also known as semantic change, involves alterations in a word's meaning over time. According to Ullmann (1962), semantic change can be categorized into broadening, narrowing, amelioration, pejoration, and metaphorical or metonymic shifts. Technological advancement often triggers semantic change by introducing new referents or changing how speakers conceptualize existing concepts. Traugott and Dasher (2002) outline mechanisms through which meanings evolve as a result of socio-cultural changes, contact with other languages, and the cognitive processes of metaphor and metonymy.

Within the realm of technology, semantic shifts often follow from metaphorical extensions. For example, words from non-technical domains acquire new, technical senses. Lakoff and Johnson's (1980) theory of conceptual metaphor provides a framework for understanding how abstract technological concepts are grounded in more familiar source domains. The linguistic sign evolves, and speakers gradually conventionalize new meanings.

Technological change introduces novel concepts that demand lexical representation. This can occur through neologisms, borrowings, and polysemy. English has historically been at the forefront of generating technological terminology, as a large number of digital innovations emerged in Anglophone contexts (Crystal, 2001). Words such as *download*, *keyboard*, *surf* (the internet), and *driver* (in computing) are reassignments of existing English terms to technology-specific contexts.

A key driver of semantic shifts is metaphorical extension, where speakers map known concepts onto unfamiliar domains (Lakoff & Johnson, 1980). Over time, these metaphors become entrenched, and the once-novel meaning gains lexical independence. The broadening of *web*, originally referring to a spider's web, to denote a global network of information (the World Wide Web) exemplifies how new technologies reshape linguistic repertoires.

While English is a global driver of technological semantics, languages like Uzbek and Russian have navigated different historical trajectories. Uzbek is spoken in Central Asia, where for decades the language experienced influences from Russian (during the Soviet era) and, more recently, from English (as Uzbekistan embraces modern technologies and the global economy). Many technical terms in Uzbek are loanwords or calques from Russian or English (Mustaqimova, 2020; Mamatov & Nurmatov, 2021). For instance, the Uzbek term *kompyuter* is a loan from English, transmitted through Russian. Semantic shifts in Uzbek technological vocabulary reflect a tension between preserving native roots and adopting international expressions.

Russian, on the other hand, inherited a rich tradition of domestic coinages in science and technology from the Soviet period (Comrie, Stone, & Polinsky, 1996). With the rise of global digitalization, Russian speakers increasingly rely on English borrowings or reinterpret Russian words to fit new technological contexts. The word *сеть* (*set'*), originally meaning "net" or "network," took on new dimensions as it came to represent everything from social media networks to internet infrastructures. The Russian language's strong morphological and word-formation patterns allow for productivity in creating new terms, but also invite subtle semantic shifts as older words adapt to new contexts (Dickey, 2012).

Cross-linguistic studies of semantic change—like Pagel, Atkinson, and Meade’s (2007) work on linguistic evolution—have shown that cultural and technological factors play pivotal roles in shaping lexical meaning. By comparing English, Uzbek, and Russian, we can highlight how global pressures and local linguistic systems interact, resulting in distinct pathways for semantic adaptation.

3. Methodology

This study draws on several data sources to capture the semantic shifts in technology-related vocabulary:

1. Corpora:

- **English:** The Corpus of Contemporary American English (COCA) (Davies, 2008) provides a large, balanced corpus of American English from 1990 to the present, capturing the rise of the digital era.
- **Uzbek:** The Uzbek National Corpus (preliminary versions accessible through academic partnerships) and digitized Uzbek newspapers and magazines, reflecting post-Soviet modernization and the introduction of digital technologies (Mamatov & Nurmatov, 2021).
- **Russian:** The Russian National Corpus (RNC) (<http://ruscorpora.ru/>), offering textual data from the 18th century to the present, thus encompassing pre-digital, Soviet, and post-Soviet technological contexts.

Dictionaries and Lexicographic Resources:

We consult standard dictionaries such as the Oxford English Dictionary (OED) for English, the Comprehensive Russian Explanatory Dictionary (Большой толковый словарь русского языка), and modern Uzbek lexicographic references (e.g., the Uzbek Dictionary of New Words) to trace documented semantic changes.

A range of scholarly works on semantic change, metaphor, and technological lexis (e.g., Traugott & Dasher, 2002; Mustaqimova, 2020; Dickey, 2012) are used to contextualize and interpret the findings.

We focus on words that have well-documented pre-digital senses and have gained new meanings linked to digital technology. Criteria for selecting terms include:

- **High frequency:** Words that appear frequently in corpora and are widely used in daily communication.
- **Clear semantic shifts:** Terms whose older meanings differ significantly from their newer technological senses.
- **Representing key domains:** Words related to communication (e.g., *mail*, *message*, *post*), computing devices (e.g., *mouse*, *tablet*, *klaviatura* [keyboard in Uzbek/Russian], *monitor*), and digital infrastructure (e.g., *cloud*, *сеть* [Russian for “network”], *dastur* [Uzbek for “program”]).

We identified a set of about 15 representative words per language and tracked their usage over a 30- to 40-year period (1980s–2020s), examining tokens from corpora and dictionary entries to identify semantic changes.

1. Diachronic Corpus Analysis:

Using concordancing tools, we examine word frequencies, collocational patterns, and contextual usage over time. We compare older texts (pre-1990) with recent texts (post-2010) to identify when new meanings emerge and become prevalent.

2. Lexicographic Comparison:

We compare dictionary definitions from older and newer editions, noting additions of new senses, shifts in primary sense order, and changes in usage notes.

3. Metaphor and Metonymy Identification:

Through qualitative analysis, we identify metaphors and metonymies that facilitate semantic shifts. For example, tracing how *cloud* in English is metaphorically extended from a meteorological domain to a digital domain.

4. Cross-linguistic Comparison:

We analyze whether similar concepts undergo parallel semantic shifts in English, Uzbek, and Russian, or if differences in cultural and historical context lead to distinct patterns.

Data and Analysis

English Words and Semantic Shifts in Technology

Originally referring to a small rodent, *mouse* acquired a new meaning as a computer input device in the 1980s. In COCA's 1990s data, *mouse* frequently collocates with words like *click*, *cursor*, *screen*, and *computer*. By the 2000s, the computing sense dominates many technical and popular texts. Lexicographic sources like the OED added the computing sense in the late 1980s, reflecting a rapid semantic shift propelled by the personal computer revolution.

Traditionally, *cloud* meant a visible mass of water droplets in the sky. With the advent of the internet and networked storage, *cloud* took on an abstract meaning referring to remote servers and data storage. This shift is metaphorical, mapping a diffuse, formless natural phenomenon onto an invisible network infrastructure (Lakoff & Johnson, 1980). By the mid-2000s, usage in business and tech publications shows *cloud computing* as a dominant collocation, and dictionaries like Merriam-Webster and the OED added the new sense.

Web, once exclusively meaning a spider's silk structure, became primarily associated with the World Wide Web in the 1990s. The corpus data show that in the early 1990s, *web* began appearing in technical articles as shorthand for "the Internet's hyperlinked network of documents." By the 2000s, the non-technical sense was overshadowed in many contexts, and *web* became a default term for the digital environment.

The English examples demonstrate how metaphorical extension and technological innovation drive rapid semantic changes. English, as a primary language of technological invention, fosters the widespread and early adoption of new meanings, quickly integrated into dictionaries and mainstream discourse.

Uzbek Words and Semantic Shift

Uzbek, influenced by Russian and increasingly by English, has integrated technological vocabulary primarily through borrowing and calquing. Semantic shift occurs when borrowed terms or existing Uzbek words are extended to new domains.

Traditionally, *dastur* in Uzbek could mean a "plan" or "program" in a general organizational sense. With the advent of computers, *dastur* gained the specialized sense of "computer program" or "software." Corpus data from the Uzbek National Corpus and online newspapers (post-2000) shows frequent collocations like *kompyuter dasturi* ("computer program"). Dictionaries now list the technological sense as a primary or equally important meaning.

Tarmoq in Uzbek traditionally referred to a "network" in the sense of interconnected branches or systems—agricultural irrigation systems, trading networks, etc. With the growth of the internet, *tarmoq* now also denotes digital networks, including social networks (*ijtimoiy tarmoq*) and computer networks (*kompyuter tarmog'i*). This shift mirrors that in English (*network*) and Russian (*сеть*), showing a common conceptual adaptation.

The Uzbek term *fayl* is a borrowing (through Russian *файл* from English *file*). Initially, it was purely a technical term without a pre-digital Uzbek meaning. Over time, *fayl* has become so entrenched that it can also metaphorically extend to non-digital contexts, though this is less common. The semantic shift here is more about the integration of a borrowed term into the broader lexical system and sometimes applying it metaphorically to collections of information in non-digital formats.

In Uzbek, the interplay of borrowing and semantic extension illustrates how technological concepts are incorporated into local linguistic ecologies. While many key technology terms originate from Russian or English, their adoption into Uzbek triggers subtle shifts. Native words like *dastur* and *tarmoq* broaden their meaning, bridging pre-digital organizational concepts with digital infrastructures.

Russian Words and Semantic Shift

Russian technological vocabulary has a complex legacy: during the Soviet era, Russian coined many scientific terms domestically. However, the post-Soviet influx of English-based technology has influenced semantic shift and borrowing patterns.

Сеть historically meant “net,” “network,” often used in contexts like fishing nets or interconnected systems. With the digital revolution, *сеть* expanded to mean “computer network” or “the internet” itself. Collocations in the Russian National Corpus from the 1990s onwards show an increasing frequency of *сеть* in contexts referring to digital infrastructure. Dictionaries updated definitions to reflect this dual meaning.

Почта originally signified “mail” or “post office.” With the rise of email, *электронная почта* (elektronnaya pochta) became the standard term for “electronic mail.” Over time, *почта* alone, especially in colloquial speech, can imply email rather than traditional mail. Corpus data from the 2000s and onward show *почта* collocating with verbs and adjectives that strongly suggest digital contexts. Some Russian dictionaries now note the shift in meaning, distinguishing traditional and electronic senses.

Meaning “message” in a general sense (oral, written, or printed), *сообщение* now frequently denotes digital messages, such as SMS, instant messages, or social media posts. Pre-internet corpora show *сообщение* mainly referring to official notices, news broadcasts, and printed communications. By the 2010s, *сообщение* often occurs in contexts related to digital communication. The lexical item retains its old meaning but has significantly broadened to encompass new communication technologies.

Russian’s robust lexical formation processes and its historical role as a language of science and technology have made it receptive yet somewhat resistant to direct borrowings. Instead, existing words undergo semantic broadening to embrace new digital realities, aligning conceptually with global trends but retaining a distinctly Russian lexical character.

Discussion

The comparative findings from English, Uzbek, and Russian illustrate both convergence and divergence in patterns of semantic shift related to technology.

All three languages demonstrate the power of metaphor and metonymy in facilitating semantic shifts. Words rooted in pre-digital domains—*mouse* in English, *tarmoq* in Uzbek, *сеть* in Russian—were metaphorically extended to represent technological tools and networks. This supports the claims of Lakoff and Johnson (1980) that metaphors are a fundamental cognitive mechanism for conceptualizing abstract and novel domains.

In all languages, frequent collocations in corpora reflect changes in usage patterns. The introduction of new domains (the internet, computers, software) compels words to shift meaning and accommodate these referents. This parallels global linguistic trends in the digital era, where languages adapt their vocabularies to reflect contemporary realities (Crystal, 2001).

English’s role as a leading language of technological development results in more immediate and widespread semantic shifts. Terms like *cloud* and *web* rapidly acquired new meanings that spread internationally. English lexical innovations have a global reach, as seen in Uzbek and Russian adoptions of English technology terms (e.g., *fayl*, *kompyuter*, *internet*).

Uzbek, historically influenced by Persian, Arabic, and Russian, is now incorporating English-based tech terms. However, rather than replacing native terms entirely, Uzbek often broadens existing words to cover the digital realm. The Uzbek word *dastur* was once a general plan, now integral to the concept of software. This interplay of borrowing and adaptation reveals the language’s flexible approach to lexical expansion.

Russian shows a notable tendency to adapt existing words to new realities. Rather than coining entirely new terms or relying solely on English borrowings, Russian extends the semantic scope of words like *сеть*, *почта*, and *сообщение*. This reflects Russian’s preference for harnessing its

morphological and semantic resources to integrate new meanings, maintaining linguistic continuity even in the face of global pressures.

Sociopolitical history informs how Uzbek and Russian incorporate technological terms. Uzbek's shift from the Cyrillic alphabet to the Latin script and post-Soviet opening to the world economy have accelerated the adoption of global digital terms. Meanwhile, Russia's strong tradition in domestic scientific discourse and relative linguistic purism has led to the preference for broadening native words rather than borrowing extensively.

Cultural attitudes towards language purity, prestige, and normativity also play roles. In Uzbekistan, policymakers and linguists have been concerned with developing Uzbek technical vocabulary to reduce reliance on foreign terms (Mamatov & Nurmatov, 2021). Similarly, in Russia, there is an ongoing dialogue between linguistic conservatism and practical adaptation to global digital trends, leading to controlled semantic expansion of Russian words (Dickey, 2012).

The findings affirm that semantic shift is not purely linguistic but emerges at the intersection of cognitive, social, and cultural dynamics. Technology acts as a powerful catalyst, introducing concepts that are assimilated via existing lexical resources. Cross-linguistic similarities—metaphorical extensions and polysemous accommodations—suggest universal cognitive strategies. Differences in the selection of lexical strategies (borrowing vs. extending native words) highlight the influence of local linguistic traditions, historical legacies, and cultural attitudes.

This research encourages a more nuanced view of global English influence. While English provides much of the raw lexical material, recipient languages actively mold these inputs. The semantic shift is thus a dynamic, bidirectional process: English influences Uzbek and Russian lexis, but Uzbek and Russian reshape these influences according to their internal linguistic principles.

Conclusion

Semantic shifts in technology-related vocabulary provide a valuable lens for understanding language evolution in the modern era. This study's comparative approach, examining English, Uzbek, and Russian, reveals that while all three languages undergo semantic changes prompted by digital innovations, their responses differ based on historical, cultural, and linguistic factors.

Key insights include:

- **Metaphor and Metonymy:** Fundamental cognitive tools for adapting existing words to new technological domains.
- **Borrowing vs. Native Adaptation:** English terms often spread globally, but recipient languages like Uzbek and Russian integrate these influences through existing lexical frameworks, producing unique semantic outcomes.
- **Sociocultural Context:** Historical influences, language policies, and cultural attitudes shape how quickly and extensively words adapt to digital contexts.
- **Ongoing Evolution:** As technology continues to advance, semantic shifts are an ongoing process. Future innovations in artificial intelligence, virtual reality, and quantum computing are likely to spur further changes in lexical semantics.

The results of this study point to the necessity for ongoing interdisciplinary research, combining corpus linguistics, cognitive linguistics, sociolinguistics, and cross-cultural studies. Monitoring evolving corpora, documenting emerging neologisms, and analyzing shifts in dictionary definitions will help scholars better understand how languages continue to mold and remold their lexicons under the persistent pressure of technological change.

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