



CHALLENGES IN THE PHONETIC AND GRAPHIC ASSIMILATION OF BORROWED TERMS IN THE KAZAKH LANGUAGE

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ABSTRACT: This study focused on structural and semantic changes in Kazakh borrowed vocabulary adaption. The study examined how imported concepts were absorbed into Kazakh, altered by the national linguistic system, and contributed to current terminology. Various linguistic methodologies were used, including historical and contemporary text analysis, structural and comparative term analysis, and hybrid word classification. The study covered both present and historical English, allowing vocabulary changes to be tracked. The findings showed that complicated historical and cultural processes in active intercultural exchanges caused Kazakh terminology hybridisation. The Greco-Latin, Persian, and Arabic languages enriched Kazakh lexicon with science, religion, culture, and daily life concepts. Phonetic, morphological, and visual changes were made to borrowed terminology to make them useful and conform to Kazakh linguistic norms. The study showed that hybrid terms are crucial to borrowing integration.

KEYWORDS: Adaptation to the grammatical system, interaction of different cultures, vocabulary, morphology, grammar, semantics.

RETOS EN LA ASIMILACIÓN FONÉTICA Y GRÁFICA DE TÉRMINOS PRÉSTADOS EN LA LENGUA KAZAJA

RESUMEN: Este estudio se centró en los cambios estructurales y semánticos en la adaptación del vocabulario prestado del kazajo. El estudio examinó cómo los conceptos importados se

absorbieron en el kazajo, se modificaron por el sistema lingüístico nacional y contribuyeron a la terminología actual. Se emplearon diversas metodologías lingüísticas, incluyendo el análisis de textos histórico y contemporáneo, el análisis estructural y comparativo de términos, y la clasificación de palabras híbridas. El estudio abarcó tanto el inglés actual como el histórico, lo que permitió rastrear los cambios en el vocabulario. Los hallazgos mostraron que los complejos procesos históricos y culturales en los intercambios interculturales activos provocaron la hibridación de la terminología kazaja. Las lenguas grecolatina, persa y árabe enriquecieron el léxico kazajo con conceptos de ciencia, religión, cultura y vida cotidiana. Se realizaron cambios fonéticos, morfológicos y visuales en la terminología prestada para hacerla útil y ajustarla a las normas lingüísticas kazajas. El estudio demostró que los términos híbridos son cruciales para la integración de los préstamos.

PALABRAS CLAVE: Adaptación al sistema gramatical, interacción de diferentes culturas, vocabulario, morfología, gramática, semántica.

DÉFIS DE L'ASSIMILATION PHONÉTIQUE ET GRAPHIQUE DES TERMES EMPRUNTÉS EN LANGUE KAZAKH

RÉSUMÉ : Cette étude s'est concentrée sur les changements structurels et sémantiques dans l'adaptation du vocabulaire emprunté kazakh. Elle a examiné comment les concepts importés ont été absorbés en kazakh, modifiés par le système linguistique national et ont contribué à la terminologie actuelle. Diverses méthodologies linguistiques ont été utilisées, notamment l'analyse de textes historiques et contemporains, l'analyse terminologique structurelle et comparative, et la classification des mots hybrides. L'étude a porté sur l'anglais actuel et historique, permettant ainsi de suivre les changements de vocabulaire. Les résultats ont montré que des processus historiques et culturels complexes, liés aux échanges interculturels actifs, ont mené à une hybridation de la terminologie kazakhe. Le gréco-latin, le persan et l'arabe ont enrichi le lexique kazakh de concepts scientifiques, religieux, culturels et de la vie quotidienne. Des modifications phonétiques, morphologiques et visuelles ont été apportées à la terminologie empruntée afin de la rendre utile et conforme aux normes linguistiques kazakhes. L'étude a démontré que les termes hybrides sont essentiels à l'intégration des emprunts.

MOTS-CLÉS : Adaptation au système grammatical, interaction de différentes cultures, vocabulaire, morphologie, grammaire, sémantique.

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1. Introduction

The phonetic and graphic assimilation of borrowed terms in the Kazakh language is a highly relevant and important area of study, as borrowings play a crucial role in the development of modern languages. They expand vocabulary and facilitate the integration of cultural and scientific advancements. Despite the extensive body of research on borrowings, it remains essential to examine the specific characteristics of Kazakh terminology, its hybridisation, and its impact on the development of the national language. The necessity for such research is driven by contemporary globalisation processes, the active borrowing of terms from Greco-Latin, Persian, Arabic, and other languages, as well as the need to systematise and analyse these borrowings comprehensively.

Many researchers have addressed various aspects of linguistic borrowing. For example, L.F. Jdetawy and M.H. Hamzah (2020) conducted a study on the sociolinguistic dimensions of borrowings, focusing on their classification based on methods of integration into recipient languages. Their research explored how social, cultural, and functional needs influence the adaptation of borrowed words. The findings indicated that the degree and form of integration are determined by the extent of language contact and the status of borrowed terms in the source language. Furthermore, the study highlighted how the social environment and communicative needs influence the selection and subsequent adaptation of borrowed terms. However, while L.F. Jdetawy and M.H. Hamzah (2020) work provides valuable insights into macro-level sociolinguistic factors, it largely overlooks the specific grapho-phonetic changes that occur during the adaptation of borrowed terms in languages such as Kazakh, which possesses a unique phonetic and graphic system.

The adaptation of the phonetic elements of loanwords was analysed by E.J. Munyaya (2022). The author explored how the sounds of loanwords adapt to the phonological systems of recipient languages. The study demonstrated that integration processes adhere to the phonetic laws of the recipient language, allowing borrowed words to fit more precisely into the local sound system. The dual nature of borrowings – as both a factor in enriching the language and a potential threat to its identity – was examined by P.G. Krimpas (2023). The author investigated Latin terminology in modern Greek, highlighting how terminological hybridisation contributes to the creation of new semantic and functional layers within the language. The study underscored the significance of borrowings in shaping a hybrid language structure. The author also studied their classifications, dividing them into: Hybrid terms: Borrowed words that merge features from both the source and recipient languages at the morphological or phonological level; Centaur terms: Words with roots derived from a foreign language, yet their affixes or grammatical endings are native;

Composite terms: Words created by combining elements that originate in other languages or by blending borrowed and native roots; Semi-calques: Borrowings where just part of the original meaning or structure is translated or altered, leading to partial calques.

Phonetic integration of borrowings in bilingual contexts was studied by S. Poplack et al. (2020). Their research demonstrated that the extent to which borrowed words are adapted depends on the intensity of language contact. The authors also noted that borrowings play a key role in language evolution, including influencing changes in the phonetic system. The functional and chronological specificity of professional vocabulary borrowed from Scandinavian languages was the focus of analysis by O. Dobrovolska (2020). The author examined how borrowings reflect the historical-linguistic context and contribute to the development of terminological layers associated with specific historical periods.

Morphological and phonetic similarities between borrowed vocabulary and Kazakh affixes were examined in detail by A.B. Bainiazov et al. (2020). Their study revealed that borrowings are adapted through the incorporation of Kazakh morphological elements, while still retaining aspects of their original structure. Language contact among Turkic languages, along with its impact on linguistic structure and lexical composition, was investigated by L. Johanson et al. (2020). This work describes the changes brought about by borrowings and highlights their role in shaping interlingual relations. The authors emphasise the significance of borrowings in contributing to overall linguistic development. The study of ancient archetype roots and their relationship with modern borrowings is comprehensively addressed in the work of B. Sagyndykuly et al. (2024). This research focuses on the theoretical analysis of historical linguistic elements, such as archetypes, and their influence on the development of modern vocabulary. The authors present an innovative classification of archetype roots, highlighting their role in the evolution of Kazakh vocabulary and their interaction with borrowed terminology. The study also examines the mechanism through which ancient roots adapt by integrating new borrowed words, demonstrating their functional role in preserving the national linguistic identity.

The influence of the phonological zones of Eurasia on the languages of the region was examined in detail by I. Joo (2024). In this work, the author analyses the processes of phonological change that occur under conditions of intensive language contact. Particular attention is given to the impact of geographical, historical, and cultural factors on the sound systems of the region's languages. The study illustrates how borrowings from various languages are transformed under the influence of the dominant phonological norms of the region. Furthermore, the author highlights the significance of interactions between phonetic systems in shaping the unique sound

characteristics of languages, including Kazakh. The research also explores how these changes contribute to the creation of hybrid language structures, which enrich the phonetic and lexical components of the languages of Eurasia.

International diplomatic terminology was analysed by K.A. Ashinova (2020), who investigated the role of borrowings in developing new semantic structures that facilitate the unification and standardisation of professional vocabulary. Despite the wealth of existing studies, there remains a notable gap in the analysis of the phonetic and graphic adaptation of borrowed terms in the Kazakh language, particularly in the context of their hybridisation.

The purpose of the present study was to identify the characteristics of hybridisation in borrowed terminology within the Kazakh language. To achieve this aim, the following tasks were undertaken: to analyse general information about borrowed vocabulary and the processes involved in the hybridisation of Kazakh terminology; to study examples of borrowed terms originating from Greco-Latin, Persian, and Arabic languages; to identify and classify types of hybrid terms, including hybrid terms, centaur terms, composite terms, and semi-calques; and to systematise and synthesise data on borrowings, emphasising their role in the development of modern Kazakh terminology.

2. Materials and methods

The historical foundation of the study was established using texts by prominent Turkic figures, including M.M. Haydar's "Tarikh-i Rashidi" (1969), R. ad-Din's "Collection of Chronicles: Jami At-Tawarikh" (1952), S.T. Hazirlayan's "Dede Korkut Stories" (2017), Z. ad-Din Babur's "Babur-Name" (1992), A. Yasawi's "Divan-i Hikmet" (1904), and J.O. Artykbaev's "Nomads of Eurasia in a Kaleidoscope of Centuries and Millennia" (2005). Additionally, historical articles from the newspapers "Dala Wälayatınıñ Gazeti" and "Kazakh" were examined. In addition to historical texts, the study incorporates contemporary sources, including articles from the newspaper "Egemen Qazaqstan" (Nurtaza, 2024) and the Constitution of the Republic of Kazakhstan (1995), as well as recent scientific articles by Azamatova and Ahmetbekova (2024), McCollum and Chen (2021), and Markhaba et al. (2021), to provide a comprehensive analysis of both historical and modern aspects of Kazakh vocabulary. The analysis of these materials focused on understanding the mechanisms through which foreign words were integrated into the Kazakh language. These sources formed the basis for subsequent research processes, including: examining the overall presence of borrowed terms in the Kazakh vocabulary; analysing examples of borrowings from Greco-Latin, Persian, and Arabic

languages; classifying hybrid terms; and studying the linguistic changes introduced by borrowed terms.

The study on the integration and impact of borrowed vocabulary in the Kazakh language utilized a range of historical and modern texts, selected for their historical significance, linguistic diversity, and frequency of borrowed terms. These sources, spanning from early Turkic texts like "Tarikh-i Rashidi" and "Jami At-Tawarikh" to modern newspapers such as "Egemen Qazaqstan," were chosen to represent different periods and aspects of the Kazakh language, ensuring a comprehensive analysis of its evolution. The texts cover various domains including science, religion, trade, and administration, providing a well-rounded view of borrowed vocabulary. A systematic approach was employed to sample texts, with expert consultation and a pilot study conducted to validate their relevance and representativeness. The methodology included both qualitative and quantitative analysis techniques, aided by software tools and linguistic databases, to identify, categorize, and analyse borrowed terms. Ethical considerations were addressed to ensure cultural sensitivity and respect for the historical context of the texts. This robust methodological foundation enhances the study's credibility and depth, offering valuable insights into the linguistic adaptation and integration of foreign terms in the Kazakh language.

To explore general information about borrowed vocabulary, an analysis of data reflecting linguistic changes throughout Kazakh history was conducted. A significant aspect of the study involved examining the historical conditions that facilitated the introduction of borrowed terms, such as trade, religious, and cultural interactions. Particular emphasis was placed on the role of linguistic adaptation, whereby foreign words underwent changes in their sound and grammatical features to align with the norms of the Kazakh language. During the analysis, key factors influencing the formation of terms were identified.

The study of borrowings from Greco-Latin, Persian, and Arabic languages was undertaken by examining their semantics, as well as their phonetic and morphological structures. For each language that influenced Kazakh, distinct characteristics of the borrowed terms were identified. For instance, terms related to science, religion, trade, and administration were highlighted. An important component of the research involved comparing borrowed words with their counterparts in other regional languages. This comparative approach provided valuable insights into the pathways of their penetration and adaptation. The analysis was conducted with attention to the unique features of each contributing language, illustrating how their elements were integrated into the Kazakh vocabulary.

Structural analysis was employed to classify hybrid terms, enabling the division of borrowings into groups based on their distinctive characteristics. The main

categories identified included hybrids, centaurs, composites, and semi-calques. Each category was examined in terms of its role within the language, the extent of interaction between borrowed and native elements, and its functional significance. This approach allowed for an understanding of how borrowings not only preserve a connection to their source language but also adapt to align with the cultural and linguistic features of Kazakh.

The final aspect of the study focused on the systemic changes brought about by borrowings. The analysis emphasised their role in the development of scientific, professional, and everyday vocabulary. Particular attention was given to identifying common patterns and unique features specific to the Kazakh language in the process of integrating foreign terms. By employing a comparative approach alongside linguistic analysis, the study was able to trace how borrowings have influenced the national vocabulary and contributed to its expansion.

3. Results

3.1. Hybridisation of Kazakh terminology: Historical and cultural aspects

The origins of borrowed terminology in the Kazakh language are deeply rooted in the complex and multifaceted historical processes of development and cultural interaction. As part of the Turkic language family, the Kazakh language has been in continuous contact with neighbouring peoples since ancient times, facilitating the active incorporation of elements from their vocabularies. These interactions encompassed both Eastern and Western civilisations, as well as the Islamic world, resulting in the creation of a unique linguistic and cultural heritage. Borrowings have become an integral component of the Kazakh language's lexical composition, enriching its vocabulary, reflecting historical realities, and enhancing its functional capacity.

The development of the Kazakh language occurred within a framework of intensive intercultural exchanges, enabling it to act as an intermediary for the transfer of knowledge, technology, and cultural achievements across different regions of Eurasia (Doszhan, 2022). Kazakhstan's strategic location at the crossroads of major trade routes, including the Great Silk Road, ensured close interactions with China, Persia, the Middle East, and Europe. These connections not only stimulated trade but also facilitated cultural and scientific exchanges, allowing terminology from various domains – spanning from everyday life to science and art – to be absorbed into the Kazakh language (Table 1).

Table 1. Historical and cultural aspects of the influence of other languages on the terminology in Kazakh language.

Languages	Historical aspects	Cultural aspects
Greco-Latin	Penetration through Arabic and Persian. Use during the spread of ancient science in the Islamic world. Integration through written and scientific traditions.	Formation of scientific, philosophical and medical concepts. Expansion of the conceptual apparatus of science, technology and medicine. Influence on the creation of modern scientific terminology.
Arabic	Spread through Islamization of Central Asia. Use as the main language of theology and science in the region. Direct influence through the use of Arabic script.	Enrichment of religious and philosophical vocabulary. Development of concepts related to ethics, law and ideological categories. Creation of vocabulary for designating scientific and cultural concepts.
Persian	Spread through trade and administrative ties. Long-term cultural contacts with Iran. Active borrowing during the era of increased trade ties. Influence on terms related to cultural and social realities.	Influence on every day and administrative vocabulary. Integration into traditional crafts and everyday life.

Source: created by the authors based on A. Azamatova and A. Ahmetbekova (2024), A. G. McCollum and S. Chen (2021), A. Markhaba et al. (2021)

Historical works, such as M.M. Haydar’s “Tarikh-i Rashidi” (1969), emphasise the critical role of intercultural interactions in shaping languages. M.M. Haydar provides a detailed account of the relationships between the Turkic peoples and the states of Central Asia, highlighting the cultural and linguistic borrowings that arose from trade, diplomatic exchanges, and the spread of Islam. A notable focus of his work is the integration of Persian and Arabic terms into the administrative and scientific domains, which established a tradition of borrowing that not only preserved but also advanced the development of the Kazakh language. An analysis of this work reveals the historical trajectory of borrowing from Greco-Latin languages through the mediation of Arabic and Persian cultures, which served as conduits for transmitting the scientific and philosophical knowledge of the ancient world. For instance, terms related to medicine, astronomy, and public administration illustrate how Greek and

Latin concepts were adapted within the Islamic world before being incorporated into the Kazakh linguistic environment.

The borrowing process intensified during periods of flourishing international trade and strengthened political ties. For example, during the early Middle Ages, the steppe territories became pathways not only for caravans carrying silk and spices but also for the exchange of knowledge, ideas, and cultural traditions. It was during this time that the first Persian and Arabic borrowings related to trade, religion, and governance began to enter the Kazakh language. The expansion of the Islamic world into Central Asia marked a transformative phase that altered both the religious and linguistic landscape of the region (Kushenova et al., 2025b). With the spread of Islam, the Kazakh language was enriched with terms from theology, science, and philosophy (Sheikh, 2019). Numerous Arabic and Persian words, after undergoing adaptation, became firmly integrated into daily usage, forming an essential part of the Kazakh vocabulary. Furthermore, scientific knowledge from the ancient world – particularly in fields such as philosophy, medicine, and astronomy – was transmitted to the region via Arabic and Persian languages, both of which extensively utilised Greco-Latin terminology.

This knowledge was adapted to the realities of local culture and became the foundation for the development of a national scientific and cultural tradition. Latin terms related to governance, medicine, and law also entered the Kazakh language through Persian and Arabic intermediaries, highlighting the complexity and multi-layered nature of the borrowing process. Economic and trade relations played a particularly significant role in this process. Trade not only brought material goods but also facilitated the exchange of terminology related to measurements, weights, calculations, and commodities (Shershova and Chaika, 2024). For example, terms denoting fundamental trade concepts, such as “bazar” (market) and “алтын” (gold), originated from Persian but, over time, were fully integrated into the Kazakh vocabulary, acquiring distinct phonetic and morphological characteristics. Thus, borrowings in the Kazakh language reflect not only linguistic evolution but also a rich history of cultural interaction. Each borrowed word carries the imprint of the era in which it was adopted and serves as evidence of the Kazakh people’s close connections with other civilisations (Navalna et al., 2024; Danylova and Budegay, 2021). This borrowing process was instrumental in shaping the national language, enabling it to preserve its unique identity while enriching it with diverse cultural and linguistic influences (Nessipbay, 2022).

The influence of Greco-Latin terminology on the Kazakh language stems from its transmission through other cultures and languages, particularly Arabic and Persian, which acted as intermediaries in conveying knowledge from the ancient world. These

borrowings played a significant role in integrating scientific, philosophical, and medical concepts originating from ancient Greek and Roman traditions. The Greek language, as the source of numerous terms related to medicine, astronomy, and natural sciences, had a profound impact on the development of medical concepts and practices (Smetaniak, 2024). For instance, medical terminology associated with Hippocrates was widely disseminated through the Arabic language, which served as the primary conduit for this knowledge. Words related to medicine, such as “hippocratia”, entered the Kazakh language in an adapted form, gradually acquiring distinctive Kazakh phonetic characteristics (Kucherenko et al., 2022).

Latin terminology, which spread through Persian and Arabic, also had a profound influence on the development of Kazakh terminology. Notably, terms related to law and governance, such as republic (from the Latin “*res publica*”, meaning “common cause”), entered the Kazakh language as part of the understanding of social and political concepts that originated in antiquity and were subsequently adopted by the Islamic world. Similarly, the term constitution, derived from the Latin “*constitution*”, meaning “structure” or “establishment”, was transmitted through these cultural connections and has become a key element of legal terminology in the modern Kazakh language. Greco-Latin terminology also significantly impacted the fields of medicine, technology, and science. For instance, concepts such as pulse, diagnosis, and anatomy originated in Greek and were transmitted via the Arabic scientific tradition, where they were adapted to the linguistic norms of the Muslim world before being integrated into the Kazakh vocabulary.

These terms subsequently penetrated the Kazakh language, enriching its scientific vocabulary. Moreover, the use of the Latin alphabet in scientific works served as a bridge for the integration of Greco-Latin terms into the Kazakh language, particularly during the linguistic modernisation of the 20th century. The graphic hybridisation of Latin-derived terms marked an important stage in their adaptation. For instance, terms such as “vaccine” and “antibiotic”, widely used in medical practice, were incorporated into the Kazakh vocabulary. While these terms retained their original pronunciation, their spelling was adjusted to align with the phonetic norms of the Kazakh language. This adaptation process played a key role in the creation of new terminology, particularly in fields such as medicine, technology, and natural sciences. As a result, Greco-Latin borrowings became a significant component of the hybridisation process in Kazakh terminology, bridging ancient traditions with the modern linguistic context (Azamatova and Akhmetbekova, 2024).

The Persian language has had a profound and multifaceted influence on the Kazakh language, facilitated by historical interactions with Iran and the close cultural ties maintained through the Muslim world (Kushenova et al., 2025a; Vakulyk, 2020).

Borrowings from Persian entered the Kazakh vocabulary primarily through active trade and cultural exchanges, forming a lexical layer associated with everyday life, economic activities, traditional crafts, and the administrative domain. These terms played a vital role in enriching the language, reflecting not only the influence of Persian culture but also the necessity of describing new realities. One notable example of Persian influence is the word “bazar”, which was adopted into Kazakh as a term for a marketplace. This word became an integral part of everyday life and acquired a stable cultural significance within Kazakh society. Another significant borrowing is “жұмақ”, derived from the Persian jannat, meaning paradise. In the Kazakh language, this term was imbued with a religious connotation, symbolising the concept of the afterlife.

An important element of the borrowed vocabulary is the word “şahar”, derived from the Persian “şaxr”, meaning city. This term was adapted to Kazakh phonetic norms and became part of everyday speech, referring to large settlements. Terms related to the economy and crafts also hold a special place in Persian borrowings. The Persian word “qazan” (pot or cauldron), widely used in the Kazakh language, reflects its significance in culinary and everyday contexts. Similarly, the word “atlas”, referring to a precious fabric, spread through trade connections and became a symbol of luxury in traditional Kazakh culture. Persian borrowings also influenced the administrative sphere and concepts of governance. The word “divan”, which in Persian denotes an assembly or court, took on additional meanings in Kazakh, relating to the organisation of administrative structures. This highlights how borrowed terms were adapted and evolved to meet the cultural and linguistic needs of Kazakh society.

A notable feature of Persian borrowings is their gradual integration into the Kazakh language system. Many words underwent morphological adaptation, acquiring Kazakh endings and becoming fully embedded within the grammatical structure of the language. This process enabled the borrowed terms to preserve their original semantics while aligning with the phonetic characteristics of Kazakh. An example of this phonetic adaptation can be seen in words such as “gül” (flower), derived from the Persian “göl”, and “Jahan” (universe), originating from the Persian “Jahan”. The influence of Persian spans numerous aspects of the Kazakh language, encompassing terms related to everyday life as well as concepts reflecting cultural and administrative realities (McCollum and Chen, 2021).

Arabic borrowings in the Kazakh language represent a significant layer of vocabulary that entered the language through cultural and religious interactions, particularly during the spread of Islam in Central Asia. These borrowings span various domains, from religious and scientific terminology to philosophical and abstract concepts, enriching the Kazakh language and enhancing its semantic and functional scope. Religious terms, which became integral to the daily life and spiritual practices

of the Kazakh people, played a key role in the Arabic influence (Sheikh and Juergensmeyer, 2019; Efremov, 2025). For instance, the word “namaz”, meaning prayer, is derived from the Arabic “salat”, but was adapted to align with the phonetic norms of the Kazakh language. Similarly, the word “жұма”, meaning Friday as the day of collective prayer, originated from the Arabic “jumaa” and became firmly established in the religious vocabulary of Kazakh.

Another example of religious borrowing is the word “халық”, meaning “people”. This term originates from the Arabic word “khalik”, which means “creator” or “maker”. Through reinterpretation within the context of Kazakh culture, it evolved to signify a community of people. Scientific borrowings from Arabic also played a pivotal role in the development of Kazakh scientific terminology. Arabic, as a medium for transmitting Greek and Roman scientific knowledge, introduced terms such as “әлем” (world), derived from the Arabic “alam”, and “ғылым” (science), from the Arabic “ilm”. These terms, rooted in philosophy and natural sciences, not only retained their original meanings but were also adapted to new contexts, reflecting the scientific and cultural realities of Central Asia. Another noteworthy example is the word “қалам”, meaning pen or writing instrument. It originates from the Arabic kalam, which referred to a "reed pen" and symbolised knowledge and education in the Islamic tradition. Additionally, philosophical and abstract concepts from Arabic profoundly influenced Kazakh vocabulary. For instance, the word “мәдение”, meaning culture, is derived from the Arabic “madaniyat”.

This term, adapted to Kazakh realities, acquired a broader meaning, encompassing not only cultural achievements but also notions of civilised behaviour. Similarly, the word “әділет”, derived from the Arabic “adala”, meaning justice, became a fundamental concept in the legal and ethical vocabulary of the Kazakh language. Another notable borrowing is “Тарих”, which in Arabic means history. In Kazakh, it not only signifies the chronicles of the past but is also widely used to describe historical events and processes, reflecting the rich historical traditions of the Kazakh people. The adaptation of Arabic words into the Kazakh language involved significant phonetic changes. Sounds absent in the Kazakh phonetic system were replaced with phonetically similar ones. For instance, the guttural sound “ع” (ayn) was often rendered as “ә” or “а” in Kazakh, making borrowed words more natural for native Kazakh speakers. This process resulted in phonetic forms that preserved a connection to the original Arabic terms while conforming to the characteristics of Kazakh pronunciation. Graphic adaptation of Arabic borrowings also had distinct features. During the period when the Arabic script was used in Kazakhstan, borrowed words retained their original spelling, facilitating their integration into the written tradition. However, with the transition to the Cyrillic alphabet, and later to the Latin

alphabet, many of these words underwent graphical changes to align with the new orthographic norms. For example, the word “күраh”, meaning the holy book of Muslims, retained its pronunciation but was graphically adapted to the Cyrillic script (Markhaba et al., 2021).

Each of these groups of borrowings played a distinct role in shaping Kazakh terminology. Greco-Latin terms enriched the scientific vocabulary, laying the groundwork for the modernisation of the language. Persian borrowings reflected the cultural and everyday realities of their era, becoming integral to daily speech. Arabic borrowings, on the other hand, introduced religious and philosophical concepts into the Kazakh language, thereby expanding its conceptual framework. These borrowings were not only integrated into the Kazakh language but also underwent significant changes to adapt to its phonetic, morphological, and graphic systems. The hybridisation of terminology emerged as a natural outcome of this process, enabling the Kazakh language to maintain its unique identity while simultaneously positioning itself within the broader cultural and scientific context.

3.2. Categories of hybrid terms in Kazakh language

The hybridisation of terminology in the Kazakh language is a complex and multifaceted process through which borrowed words are adapted and transformed to align with the phonetic, grammatical, and semantic characteristics of Kazakh. This process results in the creation of various categories of terms, including hybrids, centaurs, composites, and semi-calques. Each of these categories possesses distinct features and plays a vital role in enriching the Kazakh language while facilitating its adaptation to the modern realities of the global linguistic environment (Figure 1).

Hybrid terms are a unique result of the interaction of borrowed elements and native components of the Kazakh language. They are formed by adding Kazakh affixes, suffixes or roots to borrowed stems, which allows these words to organically fit into the grammatical system of the language. Such terms demonstrate how borrowings adapt to the phonetic and morphological features of the Kazakh language, enriching its lexical composition. One of the characteristic examples is the word “ҒЫЛЫМПАЗ”. The basis is the Arabic word “ҒЫЛЫМ” (science), which, combined with the Kazakh suffix “-паз” (denoting a person who is passionate about or striving for something), is transformed into a term meaning “scientist” or “a person striving for knowledge”. This word not only reflects the connection with Arabic origins, but also becomes a full-fledged part of the Kazakh vocabulary used in scientific and educational contexts. Another example is the term “мәдениеттану”. To further illustrate the different categories of hybrid terms

discussed, the following table provides a classification and systematization of these terms based on their distinctive characteristics.

An analysis of the publications in the old newspaper “Dala Wälayatınıñ Gazeti” provides valuable historical examples of the use of hybrid terms. In materials from the late 19th to early 20th centuries, numerous hybrid terms can be identified, reflecting the adaptation of borrowings to the Kazakh language system. For instance, terms related to education, administrative activities, and culture often incorporated Kazakh morphological elements, making them more accessible to a broader audience. This demonstrates that the process of hybridisation occurred not only in theoretical contexts but also in practical, everyday use.

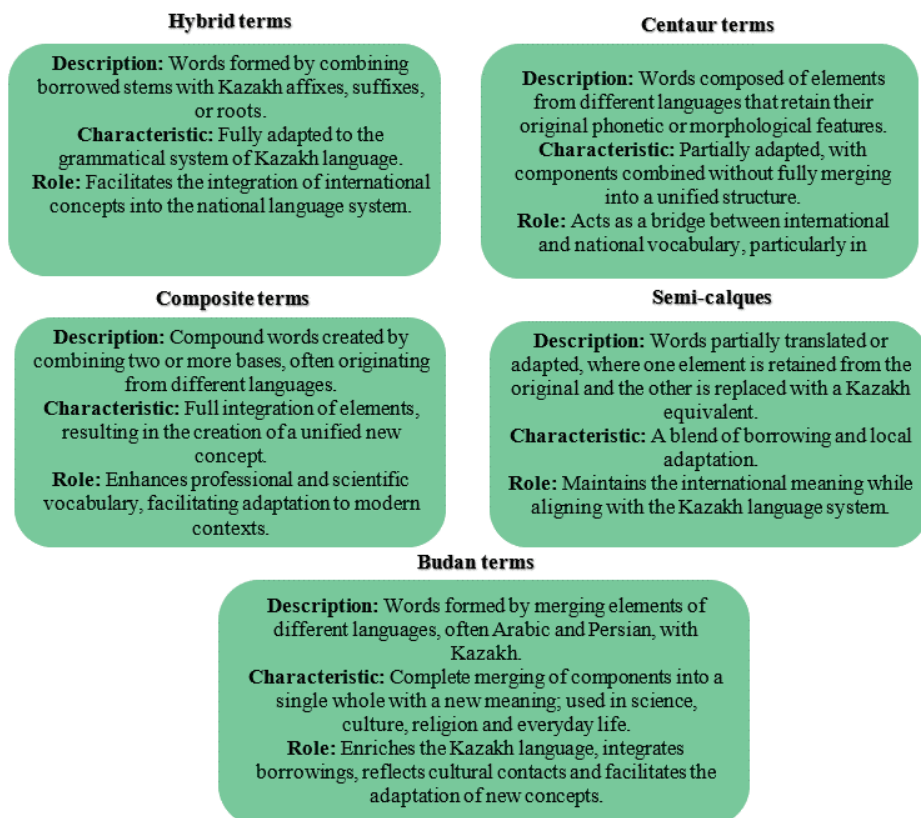


Figure 1. Classification of borrowed terms in Kazakh language. Source: created by the authors based on A. Nessipbay and G. Abikenova (2024), D. Rakhimova et al. (2021), Q.B. Ibragimovna (2022).

Table 2. Classification of hybrid terms in the Kazakh language.

Category	Example source language(s)	Example domains	Functional role in Kazakh terminology
Hybrid	English, Russian	Technology, Science	Facilitates the expression of modern concepts by integrating foreign terminology with native linguistic structures.
Centaur	Arabic, Persian	Religion, Administration	Allows for the adaptation of foreign concepts into the grammatical framework of Kazakh, making them more accessible to native speakers.
Composite	Greco-Latin, Turkic	Medicine, Education	Enables the creation of complex terms that can precisely describe new or specialized concepts.
Semi-Calques	French, German	Law, Philosophy	Helps in the partial assimilation of foreign terms, making them more understandable while retaining some original elements.

Examples can also be found in social and everyday vocabulary. For instance, the word “мектепші”, derived from the Arabic “мектеп” (school) and the Kazakh suffix “-ші”, is used to denote a schoolchild or someone associated with school education. Similarly, the term қоғамтану, formed by combining the Arabic “қоғам” (society) with the Kazakh “тану” (to know), refers to the social sciences (Kucherenko et al., 2022).

Hybrid terms play a crucial role in science and education, enabling the integration of borrowed concepts into the national language system while preserving their functional significance. Examples such as “ғылымтану” (study of science), “құқықтану” (jurisprudence, derived from the Arabic “құқық” meaning law), and “өнерпаз” (creator, derived from the Arabic “өнер” meaning art) illustrate how borrowings serve as tools for creating new concepts. Hybrid terms are a fundamental mechanism in the hybridisation of Kazakh terminology. They not only maintain a connection to source languages, such as Arabic, but also fully adapt to the Kazakh linguistic system, enriching it and enhancing its flexibility for describing both modern and traditional concepts.

In contrast to hybrids, centaur terms consist of components from two or more languages that retain their original phonetic or morphological features without merging into a unified structure. These terms are particularly prevalent in scientific,

technical, and professional vocabulary, where maintaining international comprehension is essential.

The historical development of centaur terms in Kazakh language is evidenced by an analysis of the newspaper “Kazakh”, which featured terms like “геосаясар” in political articles from the early 20th century. Such publications demonstrate that the creation of centaur terms was an integral part of the formation of scientific and social vocabulary during a period of active borrowing of international terms. The newspaper highlighted new terms incorporating elements from Arabic, Persian, and Greco-Latin languages, which were adapted to fit the Kazakh linguistic structure. Additionally, the work of R. ad-Din, “Collection of Chronicles: Jami At-Tawarikh” (1952), provides further evidence of centaur terms being used in historical and administrative contexts. This monumental work describes the processes of cultural and linguistic interaction that led to the emergence of terms comprising mixed linguistic elements, which became integral to scientific and state terminology. For instance, words related to geography and politics combined Arabic, Persian, and Greek components, adapted to the linguistic and functional needs of the time.

The characteristics of centaur terms reflect the process of borrowing and adaptation, where elements from different languages remain recognisable and functional in a new context. For example, the term bioengineering combines the Greek root “βίο-” (life) with the English loanword engineering. This word illustrates how elements from various languages can coexist, forming a new concept that reflects the realities of modern science and technology. A similar process is seen in the term biotechnology, which merges the Greek “βίο-” (life) with the Latin “*technologia*” (art, craftsmanship). Such terms have become integral to the Kazakh language through scientific discourse, showcasing the globalisation of scientific terminology. Another example is the term “кибермәдениет”, which combines the English word cyber (referring to digital technology) with the Kazakh “мәдениет” (culture). This term is used to describe cultural phenomena of the digital age, including virtual interactions and internet culture. Likewise, the term neurotechnology combines the Greek root “νευρο” (nerve) with the Latin “*technologia*”, creating a concept that reflects advancements in technologies related to the study of the brain and nervous system. Centaur terms are also extensively utilised in medical terminology.

For instance, the term immunology combines the Latin “*immunitas*” (protection) with the Greek “λόγος” (study), forming a concept related to the study of the immune system. Similarly, the word oncology, derived from the Greek “όγκος” (tumour) and “logiya” (study), denotes the field of medicine that focuses on the study of neoplasms. In the Kazakh language, these terms have been adapted and are actively used in scientific, educational, and medical contexts. Technical and engineering

terminology is also rich with centaur terms. For example, "nanotechnology" combines the Greek “*νανο-*” (small) with the Latin “*technologia*”, referring to science and technology operating at the molecular and atomic level. The term “*авиақұрылс*” merges the Latin “*avis*” (bird or to fly) with the Kazakh “*құрылс*” (construction), denoting aviation construction. Similarly, the word *автомобилөндіріс* combines the Latin “*αὐτός*” (self) with the Kazakh “*өндіріс*” (production), reflecting the industrial production of automobiles (Nessipbay and Abikenova, 2024).

In the social sciences and education, numerous centaur terms can also be found. For example, the term “*геосаясат*”, where the Greek *γῆ* (earth) is combined with the Turkicised “*саясат*” (politics), represents the concept of geopolitics. In education, the term “*медиатану*”, combining the Latin *media* (mass media) with the Kazakh “*тану*” (study), is used to denote the study of media. The Kazakh language also actively creates centaur terms in the context of new technologies. For instance, the term “*цифрландыру*” combines the Kazakh “*сан*” (number) with the Russified and Latinised “*цифр-*” (digital), forming the concept of digitalisation. Similarly, the term “*ғаламтор*” (Internet) exemplifies a creative approach to terminology creation, merging the Kazakh “*ғалам*” (universe) with “*тор*” (network) to capture the essence of the World Wide Web. Centaur terms in the Kazakh language reflect a complex process of interaction and adaptation involving borrowed elements. They serve as a bridge between international and national vocabularies, connecting source languages with Kazakh culture and linguistic tradition.

Composite terms are complex words formed by combining two or more bases, often derived from different languages. Unlike centaur terms, composites create a unified, indivisible whole in which the elements are fully integrated, resulting in a new term with a unique meaning.

The historical use of composites can be observed in the work “*Divan-i Hikmet*” (Yasawi, 1904). This literary monument features numerous examples of complex terms formed through the interaction of the Kazakh language with Arabic and Persian. In the texts of “*Divan-i Hikmet*”, composites reflecting religious, philosophical, and ethical concepts are adapted to the Turkic lexical system. The use of such terms demonstrates that the integration and adaptation of borrowings were already occurring during the Middle Ages, contributing to the formation of a resilient lexical fund capable of withstanding cultural and linguistic changes.

In the Kazakh language, composite terms play a crucial role in the development of scientific, technical, and professional vocabulary, particularly in the context of globalisation and the need to integrate international concepts. One example is the term telecommunication, which combines the Latin roots “*tele*” (distant) and “*communication*” (communication). This term, introduced into the Kazakh language

through English, has become part of the professional vocabulary describing technologies for transmitting information over long distances. Similarly, the term radiobiology, derived from the Latin “*radio*” (radiation) and the Greek “βιολογία” (science of life), is now an integral part of Kazakh scientific terminology, reflecting the growth of disciplines related to radiation and living organisms. Composite terms are also widely used in the Kazakh language to describe modern technological processes. For instance, the word nanotechnology is formed from the Greek “*νανο*” (small) and the Latin “*technologia*” (art, craftsmanship), referring to the field of science and technology that operates at the molecular level. Likewise, the term biotechnology, which combines the Greek roots “βιο-” (life) and “*τεχνολογία*” (technology), has become an essential concept in the realm of biological research. These terms are actively used in education, scientific publications, and professional settings (Rakhimova et al., 2021).

Composites are widely used in technical and engineering vocabulary. For instance, the term “fluid dynamics” combines the Greek roots “ὕδωρ” (water) and “δυναμική” (motion) to describe the processes of fluid movement. In the aviation industry, the term aerodynamics is commonly used, merging the Greek “ἀήρ” (air) and “δύναμις” (force). These terms are extensively applied in engineering, physics, and other natural sciences, underscoring their versatility and significance. In the field of information technology, composites are equally important. For example, the term “information technology” originates from the Latin “*information*” and the suffix “-tica”, denoting the study of information systems. The word “cyberspace”, which combines the Greek “κυβερ” (management, direction) with the Kazakh “кеңістік” (space), describes the virtual environment of the Internet. Although borrowed, these terms have been fully integrated into the Kazakh vocabulary, reflecting the modern realities of the digital age. Composites also feature prominently in the social sciences. The term “geopolitics”, composed of the Greek “γῆ” (land) and the Latin “*politica*” (government), refers to the study of how geographical factors influence international relations. Similarly, the Kazakh language employs the term “ethnosociology”, which combines the Greek “ethnos” (people) and the Latin “*sociologija*” (science of society), to describe the study of social processes within ethnic groups. In the field of medicine, composites are invaluable for describing complex concepts and processes. For example, the term endocrinology is derived from the Greek roots “ἔνδον” (inside) and “κρῖνω” (secretion), denoting the science of hormonal systems.

Similarly, the term “immunology”, derived from the Latin “*immunitas*” (protection) and the Greek “λόγος” (study), denotes the study of the human immune system. These terms are actively used in Kazakh medical practice, where they have been adapted to fit the national lexical system. Composite terms are also prevalent in

the economic and financial domains of the Kazakh language. For example, the term macroeconomics combines the Greek “μακρός” (large) and the Latin “*oeconomia*” (economic management), referring to the analysis of economic processes on a large-scale level. Another example is “globalisation”, formed from the Latin “*globus*” (earth) and the suffix “-ization”, describing the process of economic, cultural, and political interaction on a global scale. The ability to integrate international concepts makes composite terms key elements in the lexical enrichment and modernisation of the language. These terms not only enable the Kazakh language to remain relevant in the contemporary world but also ensure that it retains its cultural identity.

A distinct category of hybrid terms is composed of semi-calques – terms that partially borrow their structure and meaning from a foreign language but are adapted to the Kazakh linguistic framework. Semi-calques are formed when one component of the term is translated or replaced with a Kazakh equivalent, while the other remains borrowed. This creates a synthesis of borrowing and local adaptation, allowing the term to retain its international meaning while appearing natural and accessible to native Kazakh speakers.

The historical use of semi-calques is explored in J.O. Artykbaev’s “Nomads of Eurasia in a Kaleidoscope of Centuries and Millennia” (2005). J.O. Artykbaev’s study highlights how the interaction between the nomadic cultures of Central Asia and sedentary civilizations, including those of Persia, China, and the Middle East, facilitated not only economic and cultural exchange but also the development of lexical borrowings. According to the author, semi-calques reflect the integration of borrowed terminology into every day, social, and administrative practices, particularly during the dissemination of new concepts related to public administration, crafts, and trade. Texts documenting intercultural interactions between nomads and neighbouring peoples frequently mention terms composed of both local and borrowed elements. These include terms related to natural phenomena, economic relations, and religious concepts, illustrating the dynamic process of linguistic adaptation and synthesis.

A typical example of a semi-calque is “ақпараттық технологиялар”, where “ақпараттық” (informational) originates from the Kazakh word “ақпарат” (information), and “технологиялар” is borrowed from the Latin “*technologia*”. This combination preserves the international meaning of the term while embedding it within the Kazakh linguistic context, making it a key element of professional and educational vocabulary.

A similar example is “ғылыми-зерттеу”, where “ғылыми” (scientific) is derived from the Arabic “ҒЫЛЫМ” (science), and “зерттеу” (research) is an original Kazakh word. This term is widely used in the scientific community to denote research activities. In technical and engineering vocabulary, semi-calques are also prevalent.

For instance, the term “күн батареясы” combines the Kazakh “күн” (sun) with “батареясы” (battery), a loanword, to describe solar panels. Similarly, “энергия көздері” (energy sources) integrates the borrowed “энергия” (energy) with the Kazakh “көздері” (sources), reflecting a balance between international and national terminology (Ibragimovna, 2022).

In medical terminology, semi-calques also play a significant role. For example, “қан айналымы” (blood circulation) combines the Kazakh “қан” (blood) with “айналымы” (circulation), derived from an Arabic root. Another example is “денсаулық сақтау” (health protection), where “денсаулық” (health) is a native Kazakh word, and “сақтау” (preservation) represents the adaptation of the term to Kazakh linguistic norms. In science and technology, semi-calques play a crucial role in integrating complex international concepts. For instance, the term “ғарыш зерттеулері” (space exploration) combines the Kazakh “ғарыш” (space) with the borrowed “зерттеулер” (research). In ecology, the term “қоршаған орта” (environment) merges the Kazakh “қоршаған” (surrounding) with “орта” (environment), a word with Persian origins. Semi-calques are also prevalent in education and culture. For example, the term “әдебиет теориясы” (literary theory) consists of the Kazakh “әдебиет” (literature), borrowed from Arabic, and “теориясы” (theory), derived from the Greek *θεωρία*. Similarly, “madenietaraliq kommunikatsiya” (intercultural communication) combines the Kazakh “madeniet” (culture) with the borrowed communication, denoting cultural interaction. Semi-calques are an essential tool for adapting borrowed terms, facilitating their integration into the Kazakh language. They preserve connections to international terminology while tailoring complex concepts to local cultural and linguistic contexts. These terms play a vital role in developing professional, scientific, and technical vocabulary, ensuring the Kazakh language remains modern and open to new ideas.

Budan terms represent a unique category of loanwords in the Kazakh language, where elements from two or more languages merge to create a new word with a unified meaning. These terms are the result of deep and long-term interactions between the Kazakh language and other languages and cultures, particularly Arabic and Persian. Unlike other hybrid terms, budan terms are characterised by the close integration of their components, which become inseparable, forming a new lexical unity.

Historical evidence of the formation of budan terms can be found in S.T. Hazırlayan’s “Dede Korkut Stories” (2017), which documents the interaction of Turkic peoples with the Arabic and Persian worlds. This collection of epic tales contains numerous examples of lexical elements that illustrate the influence of Islamic culture and the borrowing of concepts related to tradition, religion, and everyday life. Terms describing administrative positions or cultural concepts often demonstrate the

fusion of Arabic and Persian roots with Turkic morphology, a pattern that is also evident in the Kazakh language. Budan terms are frequently encountered in fields such as religion, science, culture, and administration. They reflect historical processes through which the Kazakh language borrowed concepts and terms from other languages, adapting them to its phonetic and morphological systems. One example is the term “мектепхана”, which combines the Arabic “мектеп” (school) with the Persian suffix “хана” (house, place). The resulting word denotes an educational institution or school, highlighting the influence of the Islamic educational tradition on Kazakh culture.

Another example of a budan term is “ҒЫЛЫМПАЗ”, where the Arabic “ҒЫЛЫМ” (science) is combined with the Kazakh suffix “-паз”, which denotes a person who is passionate about or engaged in a specific activity. This term, used to refer to a scientist or someone who seeks knowledge, illustrates how borrowed roots are seamlessly integrated into Kazakh morphology. Similarly, the word “қаламгер” is a budan term formed by merging the Arabic “қалам” (pen) with the Kazakh suffix “-гер” (bearer, master), resulting in a term that means “writer” or “literator”. These processes of linguistic fusion are also evident in the references to Turkic scientific terms in the works of Z. ad-Din Babur (1992). His writings reflect the pivotal role of Arabic and Persian vocabulary in the evolution of educational and scientific concepts within the Turkic cultural sphere.

Budan terms play a crucial role in enriching the Kazakh language, enabling it to express new concepts and ideas while preserving its cultural and linguistic identity. They act as a bridge between borrowed elements and the national vocabulary, facilitating the integration of foreign concepts into the Kazakh linguistic context. These terms often become an integral part of the language, widely used in literature, science, and everyday speech, and they reflect the historical interactions of the Kazakh people with other cultures. An analysis of budan terms reveals that they do not merely connect elements of different languages mechanically; rather, they create new semantic meanings that cater to the needs of Kazakh society. This highlights the dynamism and flexibility of the Kazakh language, showcasing its ability to adapt and develop under external influences without losing its originality. Budan terms are an essential component of the linguistic heritage, reflecting the historical trajectories and cultural connections of the Kazakh people.

The various categories of hybrid terms illustrate the richness and diversity of the hybridisation processes occurring in the Kazakh language. These processes are a fundamental part of its evolution, allowing the language to maintain its uniqueness while becoming increasingly open to global influences, thereby ensuring its relevance in the modern world.

The modern use of borrowed terms in the Kazakh language underscores their significance in the context of globalisation and intensive cultural interaction (Doszhan, 2023). Borrowings have become an integral part of everyday speech, official documents, and media, demonstrating the Kazakh language's capacity to adapt international concepts to national realities. Borrowed vocabulary not only maintains a connection to historical roots but is also actively used to describe new phenomena, technologies, and social processes (Panchenko, 2016). An analysis of texts, such as articles in leading Kazakh publications and official legislative acts, provides insights into how borrowings continue to develop and integrate into the language, shaping its contemporary form.

One example is the article “Геосаясат, жол және байлық” (Nurtaza, 2024), published in the newspaper *Egemen Qazaqstan*. This article uses the term “геосаясат”, a centaur that combines the Greek root “γη” (earth) with the Turkicised “саясат” (politics). This illustrates the widespread use of borrowed terms in journalism, particularly in materials related to international relations and economics. The use of such terms in the mass media highlights their adaptation to modern communicative needs and their role in conveying complex concepts to the audience. Official documents, such as the Constitution of the Republic of Kazakhstan (1995), also provide valuable insights into the use of borrowed vocabulary. For instance, the Constitution employs composites and semi-calques, such as “мемлекет” (state) and “тауәлсіздік” (independence). These terms, borrowed from Arabic and Persian, have been adapted to the Kazakh language system, underscoring their significance in the development of political and legal terminology. Their use in legislative acts ensures clarity and universality in articulating key concepts of public administration.

The enrichment of the Kazakh language through borrowings is a multifaceted phenomenon that brings both significant benefits and notable challenges. On one hand, the incorporation of foreign terms has greatly expanded the vocabulary of Kazakh, particularly in fields such as science, technology, and culture. This expansion allows for more precise and nuanced expression, facilitating the integration of new concepts and ideas that are essential in a rapidly evolving global context. The process of borrowing also reflects the rich history of cultural exchange and interaction that the Kazakh people have experienced with various civilizations, thereby fostering a sense of shared heritage and global connectivity. Moreover, the integration of international terms helps modernize the Kazakh language, enabling it to adapt to contemporary advancements and maintain relevance in the modern world.

However, the influx of borrowed terms also poses challenges that warrant careful consideration. One of the primary concerns is the potential loss of native Kazakh terms, which can occur as borrowed words become more prevalent and

traditional vocabulary falls into disuse. This shift raises issues related to language purity, as purists may argue that excessive borrowing can dilute the unique character and identity of the Kazakh language, making it more akin to other languages. Additionally, generational differences in language use and preferences can emerge, with younger generations, who are often more exposed to global influences and digital media, being more inclined to use borrowed terms. This generational gap can create communication barriers and lead to differing language practices between age groups. Furthermore, the phonetic and morphological adaptation of borrowed words, while necessary for integration, can pose challenges in ensuring consistency and ease of pronunciation and usage.

The historical and cultural backdrop of borrowing in the Kazakh language provides valuable insights into the specific linguistic outcomes observed today. For instance, the use of Arabic as a scholarly language during the Islamic Golden Age had a profound impact on the phonetic adaptation of scientific terms in Kazakh. As Kazakh scholars engaged with Arabic texts, they borrowed and adapted numerous terms related to science, medicine, and philosophy. This historical context of scholarly interaction facilitated the phonetic adaptation of Arabic terms to fit the Kazakh sound system, such as the adaptation of the Arabic word "ilm" to "ҒЫЛЫМ" in Kazakh. This process not only involved changes in pronunciation but also the addition of Kazakh suffixes to make the terms more accessible to native speakers. The cultural integration of these adapted terms enriched the Kazakh vocabulary and facilitated the assimilation of scientific knowledge into Kazakh culture, thereby shaping the intellectual and cultural landscape of Kazakhstan. This historical interplay underscores the intricate connection between context and linguistic change, highlighting how cultural and scholarly interactions have profoundly influenced the development of the Kazakh language.

4. Discussion

The results of the study confirmed that the hybridisation of Kazakh terminology is a complex process of borrowing adaptation, balancing the preservation of national linguistic identity with the integration of international concepts. These mechanisms have played a key role in preserving the national identity of the Kazakh language while facilitating its integration into the global linguistic landscape. A comparison with existing studies provided an opportunity to refine the findings and propose new perspectives for their interpretation.

For instance, the study by A. Nabidullin and Ch.K. Ordabaev (2021) examined the influence of English borrowings on the culture and speech of Kazakhstani youth. The authors concluded that Anglicisms, often prevalent in youth slang, reflect the

effects of globalisation and the popularisation of technology. In contrast, the present study covered a broader spectrum of borrowings, focusing not only on contemporary linguistic phenomena but also on historical processes. While A. Nabidullin and Ch.K. Ordabaev's work sheds light on the use of Anglicisms in colloquial speech, it complements this study, which primarily explored the adaptation of terminological borrowings.

The results of the analysis demonstrated that borrowings play a key role in the formation of scientific terminology. R. Kiyakova et al. (2021) explored the literary and linguistic value of borrowings, emphasising their importance in the creation of a figurative system. Their findings, which focused on literary texts, complement the results of this study, which centres on the functional aspects of terms in scientific and professional vocabulary. Together, these approaches highlight how borrowings enrich the language, adapting to its various levels.

The analysis of hybrid terms conducted in this study revealed that semi-calques play a significant role in the adaptation of international concepts. Z. Sarsenbay et al. (2023) examined the norms and usage of the modern Kazakh language, showing that borrowings are actively adapted and integrated into everyday life. While their research focused on contemporary phenomena, this study provided a historical and linguistic perspective, uncovering the evolution of terminology over time.

Latin loanwords, a key focus of this study, were also analysed in the work of G. Shoibekova et al. (2020). The authors noted the particular importance of Latin terminology for scientific vocabulary. Their findings align with this study's results, which examined Latin terms through the lens of their transmission via Arabic and Persian. However, the scope of G. Shoibekova et al.'s work was limited to Latin loanwords, whereas this study encompassed a broader range of sources and influences.

A key aspect of the study involved the influence of cultural borrowings. K. Joong-Kwan (2020) examined the acculturation processes associated with linguistic borrowings, demonstrating that borrowings contribute not only to language enrichment but also to cultural transformation. This study confirmed the importance of this aspect, particularly in the context of semi-calques, which preserve a connection with international terminology while adapting to the Kazakh language.

The analysis of composites revealed their active role in shaping professional vocabulary. S. Zhetpisov (2020) explored language interference, highlighting the emergence of mixed forms. Although his study focused on Russian influence, the concept of interference aligns with the analysis of hybrid terms in this study, providing a framework to understand borrowings in terms of their structural interaction.

The influence of borrowings on professional terminology was further explored in the work of D. Rakhimova et al. (2023), which focused on the features of abbreviations in the Kazakh language. The authors emphasised that borrowings play a significant role in the formation of specialised vocabulary, particularly in high-tech disciplines and modern science. This study supports the notion that composite terms, which combine elements from multiple languages, are critical in the development of professional vocabulary. This is especially evident in scientific and technical disciplines, where the precision and clarity of terms are essential.

The role of modern borrowings in the context of the digital environment was examined in detail in the work of O. Khakimova (2024). The author explored terms actively used in social media, highlighting that digital platform have become key sources for the popularisation of new borrowings. The study emphasises that such borrowings not only enrich the language but also contribute to the development of new vocabulary tied to globalisation and technological advancements. This research complements those findings by demonstrating how borrowed terms, initially emerging in informal communication, can later be formalised and integrated into professional discourse. Semi-calques, as a specific category of terms, play a vital role in this process by maintaining a balance between international and national linguistic contexts.

The historical significance of borrowings in the development of the Kazakh language was addressed by L.K. Meirambekova and G.R. Dautova (2021), who focused on the importance of Arabic and Persian borrowings in shaping the national linguistic heritage. The authors highlighted that these borrowings reinforced the Kazakh language's position as part of the Turkic linguistic world, laying the foundation for its cultural and linguistic identity. This study supports their findings, underscoring the role of hybridisation as a mechanism for integrating borrowings. The analysis confirmed that borrowings from Arabic and Persian, after undergoing adaptation, have become an integral part of Kazakh terminology.

M.A. Balabekova and D. Vesselinov (2023) examined the thematic distribution of borrowings in Kazakhstani newspapers, highlighting their significance in shaping the structure and content of the media space. The authors demonstrated that borrowings are extensively used to report on international news, scientific discoveries, and technological advancements, making them a crucial element of modern information discourse. The findings of this study align with those of M.A. Balabekova and D. Vesselinov (2023), particularly regarding the role of semi-calques in adapting international terms for national use. The analysis revealed that semi-calques strike a balance between preserving the original meaning of terms and integrating them into the Kazakh linguistic system, underscoring the importance of borrowings as tools for creating cultural and informational identity.

Anglicisms, analysed by A. Abdikadyrova and Z. Kuzembekova (2024), were identified as a significant component of scientific and professional communication in Kazakhstan. Their study found that Anglicisms are widely used in academic contexts, especially in fields related to new technologies, science, and education. This prevalence is attributed to the global influence of English as a *lingua franca* in modern science, driving the adoption of specialised English-origin vocabulary. The authors noted that Anglicisms not only enrich scientific discourse but also stimulate the creation of new concepts and terms to describe emerging phenomena. This study complements these findings by demonstrating that borrowings from diverse languages, including Arabic, Persian, and Greco-Latin sources, also play a vital role in shaping Kazakh terminology. While A. Abdikadyrova and Z. Kuzembekova (2024) focused on Anglicisms, this research emphasised the complexity of adapting borrowings from multiple linguistic origins. This broader perspective provides a more comprehensive understanding of the processes shaping the evolution of the Kazakh language.

The methods of transferring borrowings, analysed in detail by Z.M. Bazarbaeva (2018), focused on the graphic and phonetic adaptation of borrowed words in the Kazakh language. The author emphasised that such adaptations are crucial for the integration of borrowings, ensuring their alignment with Kazakh phonetic and orthographic norms. This study highlighted the significance of sound and graphic transformations as mechanisms for preserving linguistic identity while introducing new concepts. The findings of this study confirm these aspects, demonstrating that the transformation of borrowed terms in Kazakh terminology involves a comprehensive approach. This process encompasses not only phonetic changes but also structural and semantic adaptations. Such an approach reinforces the role of graphic and phonetic adaptation as a key mechanism of language hybridisation, enhancing the Kazakh language's resilience to external influences.

A comparison of the results underscores the importance of this study in the broader context of borrowings, revealing their dual role: as a source of new terms and as a tool for preserving the cultural identity of the Kazakh language.

5. Conclusions

The hybridisation of Kazakh terminology is a multi-layered process that encompasses historical, cultural, and linguistic dimensions. This phenomenon is rooted in the long-standing interactions of the Kazakh language with other linguistic and cultural traditions, including ancient, Islamic, and neighbouring Eastern civilisations. These interactions not only enriched the language but also established unique borrowing patterns that were adapted to the Kazakh national system.

Historical analysis revealed that the development of Kazakh terminology was significantly influenced by trade, scientific, and religious connections. Complex intercultural exchanges facilitated the introduction of terms from various fields, including science, philosophy, religion, and everyday life. Borrowings became an integral part of the language, reflecting the growth of social, economic, and cultural domains. This evolution was marked not only by the assimilation of concepts but also by their adaptation to the specific characteristics of Kazakh culture and language.

The study also demonstrated that the Kazakh language has developed unique mechanisms for integrating borrowed elements. Among the most significant are the processes of phonetic and morphological adaptation, which allow borrowed words to retain a connection with their source languages while seamlessly becoming part of the Kazakh linguistic system. These terms often underwent changes in sound, graphic representation, and grammatical structure, making them natural and intuitive for native Kazakh speakers.

A significant role in the hybridisation of Kazakh terminology was played by interactions with Greco-Latin, Persian, and Arabic languages. Each of these linguistic influences contributed to the formation of the terminological foundation of the Kazakh language. Greco-Latin borrowings introduced scientific, philosophical, and medical concepts, which were crucial for the advancement of scientific thought. Persian borrowings enriched the everyday and administrative vocabulary, while Arabic terms formed the basis of religious and philosophical lexicons.

This interplay led to the development of a complex terminological structure that balances international characteristics with national specificity. The results of the analysis revealed that hybridisation led to the emergence of various categories of terms, each reflecting distinct aspects of the Kazakh language's interaction with other cultures. Hybrids are a synthesis of borrowed and native elements, adapted to Kazakh grammatical norms. Centaurs represent a combination of elements from different languages that retain their independence, reflecting the multilingual nature of science and technology. Composites illustrate the language's capacity to integrate international concepts into a unified structure, which is particularly significant in scientific and technical domains. Semi-calques, on the other hand, demonstrate the adaptation of international terms through partial translation and localisation, striking a balance between borrowing and the national linguistic framework. Budan terms result from a deep synthesis of elements from two or more languages, where the components merge into a single lexical whole, forming new meanings that embody the distinctive character of Kazakh cultural and linguistic traditions.

The adaptation of terminology to the Kazakh linguistic system involved not only changes at the lexical level but also the development of new conceptual models.

These changes reflect the process of language modernisation, driven by openness to international influences alongside the need to preserve cultural and linguistic uniqueness. The hybridisation of terms has emerged as a mechanism enabling the Kazakh language to address the demands of globalisation while maintaining its distinct identity. The findings demonstrate that the hybridisation of Kazakh terminology is not merely a by-product of language contact but a fundamental element in shaping a modern linguistic system. The processes of term adaptation, their alignment with national norms, and their role in generating new meanings underline the importance of hybridisation as the foundation for the Kazakh language's development. Borrowings influence both professional and everyday vocabulary, fostering linguistic evolution and promoting cultural exchange. The Kazakh language effectively incorporates borrowed elements, transforming them in accordance with its own traditions and needs, which ensures its resilience and dynamism.

A limitation of the study was its focus on written sources, without addressing oral traditions or contemporary colloquial variants of borrowed terms. A promising avenue for future research would be the exploration of folklore heritage and the modern everyday use of borrowed terms. Such an approach would offer a more comprehensive understanding of the processes underlying their integration into the Kazakh language.

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References

- ABDIKADYROVA, A., and KUZEMBEKOVA, Z. (2024). “Anglicisms in the Works of Scientists of Kazakhstan”. *Eurasian Science Review an International Peer-Reviewed Multidisciplinary Journal*, 2(2), 99-104. <https://doi.org/10.63034/esr-60>
- AD-DIN BABUR, Z. (1992). *Babur-Name*. Tashkent: Main Editorial Office of Encyclopedias. https://n.ziyouz.com/books/uzbeklib_ru/literatury_po_istorii_tjurkskih_narodov/Zahir%20ad-Din%20Babur.%20Babur-name.pdf

- AD-DIN, R. (1952). Collection of Chronicles: Jami At-Tawarikh. https://www.vostlit.info/Texts/rus16/Rasidaddin_2/pred.phtml
- ARTYKBAEV, J.O. (2005). *Nomads of Eurasia in a Kaleidoscope of Centuries and Millennia*. St. Petersburg: Major. <https://slavbibl.ru/data/cbs/projects/iisef/books/7.pdf>
- ASHINOVA, K.A. (2020). "International Terms in Diplomacy". *Bulletin of KazNU. Philological Series*, 180(4), 10-16. <https://doi.org/10.26577/EJPh.2020.v180.i4.ph2>
- AZAMATOVA, A., and AHMETBEKOVA, A. (2024)." Lexicographic Interpretation of Linguistic Terms". *Language and Literature: Theory and Practice*, 3, 9-17. <https://doi.org/10.52301/2957-5567-2024-3-3-9-17>
- BAINIAZOV, A.B., MARETBAYEVA, M.A., ZHALMAKHANOV, S.S., DZHUSUPOV, M. (2020). "Phono-Morpho-Lexical Similarity of Auxiliary Morphemes of the Dictionary "Mukaddimat Al-Adab" (XIII century) Az-Zamakhshari with the Kazakh Language". *Bulletin of the Karaganda University. Series "Philology"*, 3(99), 40-51. <https://doi.org/10.31489/2020ph3/40-51>
- BALABEKOVA, M.A., and VESSELINOV, D. (2023). "Thematic Differentiation of Loanwords in the Newspaper "Kazakhstanskaya Pravda"". *Bulletin of the Karaganda University. Philology Series*, 1(109), 74-86. <https://rep.ksu.kz/handle/data/16068>
- BAZARBAEVA, Z.M. (2018). "Methods of Transmission of Borrowed Words in the Kazakh Language". *Tiltanym*, 1, 12-17. <https://www.tiltanym.kz/jour/article/view/469>
- Constitution of the Republic of Kazakhstan. (1995). https://adilet.zan.kz/eng/docs/K950001000_
- DANYLOVA, T., and BUDEGAY, V. (2021). "Cultural and civilizational interactions in the contemporary world: Hofstede's cultural dimensions theory". *Humanities Studios: Pedagogy, Psychology, Philosophy*, 9(2), 22-28. <https://doi.org/10.31548/hspedagog2021.02.022>
- DOBROVOLSKA, O. (2020). "Middle English Occupational Terms with Scandinavian Word Stems: Functional, Semantic and Chronological Issues". *Topics in Linguistics*, 21(2), 80-108. <https://doi.org/10.2478/topling-2020-0011>
- DOSZHAN, R. (2022). "The question of being in Al-Farabi's legacy and its succession to modern science". *Interdisciplinary Cultural and Humanities Review*, 1(1), 40-

44. <https://interculture.com.ua/journals/vol-1-1-2022/the-question-of-being-in-al-farabi-s-legacy-and-its-sucsession-to-modern-science>
- DOSZHAN, R. (2023). "Multi-vector cultural connection in the conditions of modern globalisation". *Interdisciplinary Cultural and Humanities Review*, 2(1), 27-32. <https://doi.org/10.59214/2786-7110-2023-2-1-27-32>
- EFREMOV, A. (2025). "The Psychology of Faith and Religious Identity: How Theology Shapes Worldview and Self-Perception". *Pharos Journal of Theology*, 106(3), 1-15. <https://doi.org/10.46222/pharosjot.106.3020>
- HAYDAR, M.M. (1969). *Tarikh-i Rashidi*. https://www.vostlit.info/Texts/rus14/Tarich_Rashidi_II/frametext.htm
- HAZIRLAYAN, S.T. (2017). *Dede Korkut Stories*. Ankara: Ministry of National Education of Turkey. https://madenlerilkokulu.meb.k12.tr/meb_iys_dosyalar/48/11/706374/dosyalar/2020_12/16130244_Dede_Korkut_Hikayeleri.pdf
- IBRAGIMOVNA, Q.B. (2022). "Learning of Linguistics Terms (In the Example of Uzbek and Kazakh Languages)". *Journal of Positive School Psychology*, 6(8), 2958-2969. <https://mail.journalppw.com/index.php/jpsp/article/view/10327>
- JDETAWY, L.F., and HAMZAH, M.H. (2020). "Loanwords in the Taxonomy of Borrowing: A Sociolinguistic Analysis". *Language in India*, 20, 98-135. <http://www.languageinindia.com/dec2020/v20i12dec2020.pdf#page=100>
- JOHANSON, L., CSATÓ, É.Á., and KARAKOÇ, B. (2020). *Turkic Language Contacts*. In: R. Hickey (Ed.), *The Handbook of Language Contact*. Hoboken: John Willey & Sons, pp. 551-570. <https://doi.org/10.1002/9781119485094.ch28>
- JOO, I. (2024). *Phonological Areas in Eurasia*. Hong Kong: Hong Kong Polytechnic University. <https://theses.lib.polyu.edu.hk/handle/200/12950>
- JOONG-KWAN, K. (2020). "Analysis of Linguistic Acculturation in the Kazakh". *Slavic Studies*, 36(2), 191-222. <https://kiss.kstudy.com/Detail/Ar?key=3811032>
- KHAKIMOVA, O. (2024). "Usage of Social Media Borrowed Words in Central Asia". In: C. Zonyfar, M. Merrill, D. Pearce, E. Sabzalieva (Eds.), *Scientific Aspects and Trends in the Field of Scientific Research: International Scientific Online Conference*. Warsaw: "CESS", pp. 121-124. https://www.researchgate.net/publication/381376160_Poland_warshaw_conference_part_20
- KIYAKOVA, R., TLEUBERDINA, G., BUKAYEVA, A., ABULKASOV, G., and ISKAKOVA, G. (2021). "Value of Loan Words in the Creation of the Linguistic and Literary World". *Astra Salvensis*, 1, 59-65.

https://www.researchgate.net/publication/356106550_VALUE_OF_LOAN_WORDS_IN_THE_CREATION_OF_THE_LINGUISTIC_AND_LITERARY_WORLD

- KRIMPAS, P.G. (2023). “Latinat Terminology in Modern Greek: An “Intruder” or an “Asset”?” *Open Linguistics*, 9(1), 20220233. <https://doi.org/10.1515/opli-2022-0233>
- KUCHERENKO, O.F., KUANYSHEVA, A.B., and KELLER-DEDITSKAYA, E.R. (2022). “The Corpus of Borrowings and Their Functioning in the Medical Terminology of Kazakhstan (On the Material of Professional Periodicals).” *Bulletin of the Karaganda University. Philology Series*, 1(105), 54-61. <https://doi.org/10.31489/2022ph1/54-61>
- KUSHENOVA, G., AUANASOVA, A., MAXUTOVA, A., and KAIRULLINA, A. (2025a). “Kazakh History in British Periodicals: Interpretations and Historical Accuracy”. *Bylye Gody*, 20(1), 129-137. <https://doi.org/10.13187/bg.2025.1.129>
- KUSHENOVA, G.I., AUANASOVA, A.M., and DROZD, R. (2025b). “Islamist movement in the Kazakh steppe: a historical analysis in global context”. *European Journal of Science and Theology*, 21(2), 63-78.
- MARKHABA, A., ZHEMENEY, I., RAKHMETULLIN, A.K., BOLATOVA, K.B., and ADILBAYEVA, A.S. (2021). “Medieval Kazakh History in Arab and Persian Sources”. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 13(4). <https://doi.org/10.21659/rupkatha.v13n4.70>
- MCCOLLUM, A.G., and CHEN, S. (2021). “Kazakh”. *Journal of the International Phonetic Association*. 51(2), 276-298. <https://doi.org/10.1017/S0025100319000185>
- MEIRAMBEKOVA, L.K., and DAUTOVA, G.R. (2021). “Historical Role of the Kazakh Language in the System of Turkic languages”. *Bulletin of KazNU. Philological Series*, 181(1), 119-226. <https://doi.org/10.26577/EJPh.2021.v181.i1.ph13>
- MUNYAYA, E.J. (2022). “Kigiryama Phonology”. *International Journal of Research and Innovation in Social Science*, 6(1), 76-83. <https://elibrary.pu.ac.ke/bitstream/handle/123456789/1120/Munyaya-Kigiryama%20Phonology.pdf>
- NABIDULLIN, A., and ORDABAEV, Ch.K. (2021). “Influence of English Borrowings on the Culture and Speech of Kazakhstani Youth”. *Bulletin of Abai KazNPU. Series of Philological Sciences*, 2(76), 29-37. <https://doi.org/10.51889/2021-2.1728-7804.04>

- NAVALNA, M., ZLENKO, A., and KALUZHYNSKA, YU. (2024). “Revealing lexical means of expressiveness in mass media discourse”. *Society. Document. Communication*, 9(2), 43-51. <https://doi.org/10.69587/sdc/2.2024.42>
- NESSIPBAY, A., and ABIKENOVA, G. (2024). “Penetration of Borrowed Hybrids into the Kazakh Language”. *Bulletin of Toraighyrov University. Philological Series*, 1, 284-295. https://vestnik-philological.tou.edu.kz/storage/articles/d163dbe9a8756e1308ea8283faad1862/Nessipbay_A.,_Abikenova_G.,_%D0%92%D0%B5%D1%81%D1%82%D0%BD%D0%B8%D0%BA_%D0%A4%D0%B8%D0%BB%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%8F_1-2024.pdf
- NESSIPBAY, A.Sh. (2022). “Linguistic Features of Terms in Modern Kazakh Languages”. *Bulletin. Series: Philological Sciences*, 65(2). <https://doi.org/10.48371/PHILS.2022.65.2.011>
- NURTAZA, S. (2024). Geopolitics, Road and Wealth. <https://egemen.kz/article/357837-geosayasat-dgol-dgane-baylyq>
- PANCHENKO, T. (2016). “Lexical-semantic potential of the literary words in journalistic texts”. *Society. Document. Communication*, 1(2), 125-135. <https://sdc-journal.com.ua/en/journals/vipusk-2/leksiko-semanticny-potensial-knizhnikh-sliv-u-publitsistichnikh-tekstakh>
- POPLACK, S., ROBILLARD, S., DION, N., and PAOLILLO, J.C. (2020). “Revisiting Phonetic Integration in Bilingual Borrowing”. *Language*, 96(1), 126-159. <https://doi.org/10.1353/lan.2020.0004>
- RAKHIMOVA, D., SULEIMENOV, Y., and MAKULBEK, D. (2023). “Analysis of Kazakh Language Abbreviations Based on Machine Learning Approach”. In: T. Hakkı (Ed.), *8th International Conference on Computer Science and Engineering*. Burdur: Institute of Electrical and Electronics Engineers, pp. 532-537. <https://doi.org/10.1109/UBMK59864.2023.10286751>
- RAKHIMOVA, D., TURARBEK, A., and KOPBOSYN, L. (2021). “Hybrid Approach for the Semantic Analysis of Texts in the Kazakh Language”. In: T.-P. Hong, K. Wojtkiewicz, R. Chawuthai, P. Sitek (Eds.), *13th Asian Conference: Recent Challenges in Intelligent Information and Database Systems*. Singapore: Springer, pp. 134-145. https://doi.org/10.1007/978-981-16-1685-3_12
- SAGYNDYKULY, B., and KULZHANOVA, B. (2024). “Basic Theory of Arch Roots”. *Journal of Eurasian Turkic Studies*, 11, 54-84.

https://www.researchgate.net/publication/382086463_Saadat_Karimi_JETS_VOL11_e-book

- SARSENBAY, Z., SALKYNBAY, A., RAMAZANOVA, S., ASHIROVA, A., IGILIKOVA, S., ALIMTAYEVA, L., and KASPIKHAN, B. (2023). "Modern Kazakh Language Trends: Norms and Usus Features". *International Journal of Society, Culture & Language*, 11(3), 188-201. <https://doi.org/10.22034/ijscsl.2023.2006970.3096>
- SHEIKH, M.K. (2019). "The Significance of Worldview Analysis for Social Sciences". In: M.K. Sheikh, M. Juergensmeyer (Eds.), *Entering Religious Minds: The Social Study of Worldviews*. New York: Routledge, pp. 111-121. <https://doi.org/10.4324/9780429468810-11>
- SHEIKH, M.K., and JUERGENSMEYER, M. (2019). *Entering Religious Minds: The Social Study of Worldviews*. New York: Routledge. <https://doi.org/10.4324/9780429468810>
- SHERSHOVA, T., and CHAIKA, V. (2024). "Cultural memory and memory culture". *Humanities Studios: Pedagogy, Psychology, Philosophy*, 12(1), 188-195. [https://doi.org/10.31548/hspedagog15\(1\).2024.188-195](https://doi.org/10.31548/hspedagog15(1).2024.188-195)
- SHOIBEKOVA, G., YERMEKOVA, T., SATBEKOVA, A.A., ODANOVA, S., and MALIK, M. (2020). "Latin Borrowings as a Linguistic Problem: Approaches, Reasons, Typology". *XLinguae*, 13(2), 149-156. <https://doi.org/10.18355/XL.2020.13.02.12>
- SMETANIAK, M. (2024). "Literary genres in classical Greek and Latin literature". *International Journal of Philology*, 28(3), 22-40. <https://doi.org/10.31548/philolog/3.2024.22>
- VAKULYK, I. (2020). "Lexical borrowings in unrelated languages". *International Journal of Philology*, 24(3), 91-95. <https://doi.org/10.31548/philolog2020.03.015>
- YASAWI, A. (1904). *Divan-i Hikmet*. <https://darul-kutub.com/books/841/>
- ZHETPISOV, S. (2020). "Interference of Languages in Kazakhstan". *Bulletin of Abai KazNPU. Series of Philological Sciences*, 4(74), 69-74. <https://doi.org/10.51889/2020-4.1728-7804.14>