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Svitlana Biloshchytska, Aidos Mukhatayev, Oleksandr Kuchanskyi, Saltanat Sharipova, Nayla Murat, Zhan Amangeldiyev

Astana IT University, Astana, Kazakhstan

METHODS OF DETECTION AND REMOVAL OF CONCEALED BORROWINGS IN ACADEMIC WORKS OF STUDENTS IN THE KAZAKH LANGUAGE

Abstract: The article presents a critical review of modern methods of concealing borrowings in academic works of students in the Kazakh language. Three key directions are considered: semantic (paraphrasing, synonymizing, grammatical transformations), technical (hidden characters, substitution of Cyrillic letters with Latin ones, use of Unicode control characters), and structural (tables, schemes, images). Particular attention is paid to the specifics of the Kazakh language as an agglutinative language, which complicates the task of automatic plagiarism detection. Contemporary resources for hiding borrowing are analyzed. The authors propose methods for neutralizing such concealment, covering not only textual data but also tabular materials, as well as visual elements – diagrams and charts.

Keywords: Academic integrity; plagiarism; concealment of borrowings; Kazakh language; agglutinativity; anti-plagiarism; multimodal models.

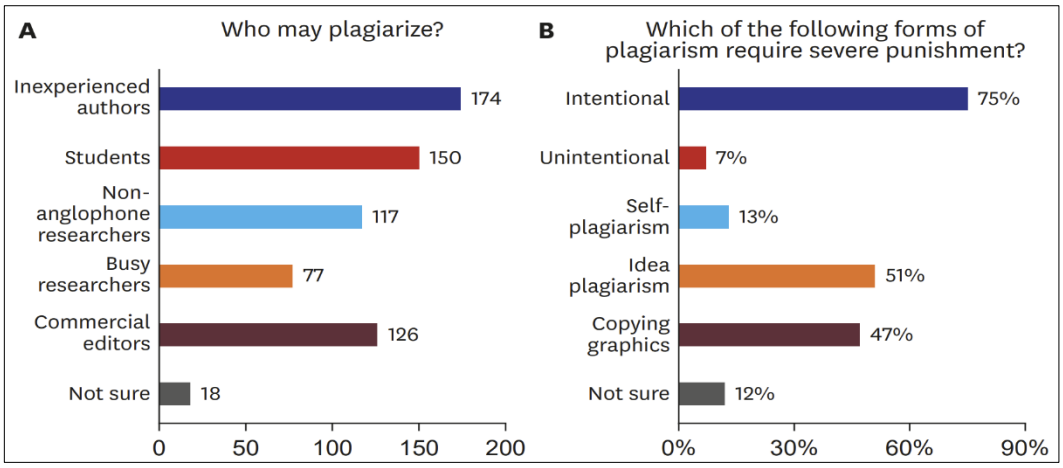
Introduction

In the context of the rapid growth of digital collections and open access to electronic libraries, databases, and various online resources, the issue of academic misconduct has become increasingly relevant. A growing number of students, when writing academic papers, resort to using ready-made materials without citing the source, which leads to a rise in texts with a high level of borrowings (Pudasaini et al., 2024; Boucher & Anderson, 2021). As a result, plagiarism checking of all works has become a mandatory procedure to ensure academic integrity and maintain the quality of education.

Issues of academic misconduct in Kazakhstan have been examinated within the framework of an international online survey devoted to the perception of plagiarism among researchers and journal editors in non-English-speaking countries (Latika Gupta et al., 2021). The results revealed that the most common form of violation is paraphrased plagiarism (69% of cases). Among the risk factors, respondents highlighted students (71%), researchers with limited language proficiency (55%), and representatives of commercial editing agencies (60%) (Fig.1). These data indicate the presence of a systemic problem in Kazakhstan regarding the perception and prevention of plagiarism and emphasize the need to introduce targeted educational courses and modern anti-plagiarism technologies into academic practice.

Figure 1

Physicians and scholars' perception of plagiarism. (Latika Gupta et al., 2021)



Modern anti-plagiarism systems face a serious challenge: students increasingly resort to bypass strategies, including the insertion of hidden characters, the substitution of Cyrillic letters with Latin ones, changes in document structure, or the use of automatic paraphrasing tools (Almuhaideb & Aslam, 2022). Such methods alter the visual appearance of the text, significally complicating its analysis by standard plagiarism detection algorithms. Effective countermeasures include Unicode normalization, removal of hidden characters, and the use of deep learning models trained on Kazakh-language corpora (e.g., KazBERT and Kaz-RoBERTa), which are capable of accounting for morphological complexity and detecting semantic similarities (Togmanov et al., 2022; Toiganbayeva et al., 2021). This intefrated approach helps to substantially reduce the risk of artificially concealed plagiarism and ensures a more objective assessment of the originality of academic texts.

The article by Khaled F. & Sabeeh M. (2021) provides a review of methods and tools for plagiarism detection, including both literal and intellectual forms. The authors present a classification of plagiarism types (textual, source code, mosaic, metaphorical, etc.) and emphasize that intellectual plagiarism – involving paraphrasing, translation, and structural modifications – is significantly more difficult to detect. Both intrinsic and extrinsic detection methods are considered, as well as modern tools ranging from MOSS and Turnitin to newly emerging online services. The authors also discuss datasets used for training and testing systems (WordNet, PAN) and various analysis approaches: n-grams, semantic and stylometric methods, and hybrid models. They conclude that no single method is universal; instead, a balance between accuracy and processing time is required, alongside the comprehensive development of tools to combat the ever-evolving forms of plagiarism.

Traditional methods of text data processing, despite their wide adoption and proven effectiveness in several tasks, demonstrate significant limitations when applied to multimodal documents that include both textual and visual components. Modern electronic documents are often complex structural entities, where information is conveyed not only through linear text but also via diagrams, charts, infographics, and other visual means. This nature of content requires analysis systems to account for the diversity of data representation, which goes beyond the capabilities of traditional text-oriented models.

The aim of this study is to conduct a critical analysis of the methods used to conceal borrowings and approaches to their elimination in academic works of students in the Kazakh language, taking into account the specific features of multimodal documents that include both textual and visual components.

Literature Review

Modern systems for detecting duplicates and near-duplicates are actively applied in various fields - from academic and scientific work to healthcare, electronic document management, and information retrieval.

Over the past decades, many approaches have been developed, relying on different methodological principles. However, in practical applications these solutions reveal significant limitations, especially when the task involves processing multimodal documents in the Kazakh language.

Text processing in Kazakh still faces several specific challenges, particularly in tasks related to the detection of near-duplicates. Unlike English and other languages that are widely represented in corpora, Kazakh is characterized as an agglutinative language, where lexemes change through the sequential addition of affixes to a root. This generates an enormous number of possible word forms, making exact string matching difficult.

Agglutinativity leads to morphological diversity even when expressing the same meaning. For example, the same phrase may appear with different endings depending on case, number, or person. This makes simple methods based on exact or partial token matching ineffective. The lack of high-quality morphological analyzers for the Kazakh language further reduces the accuracy of semantic text comparison.

At present, the number of corpus resources, annotated datasets, and pre-trained language models for the Kazakh language is significantly lower compared to more widely used languages. This hinders the training of effective neural models, including transformers, which rely on large-scale training data. As noted by Bogdanchikov et al. (2022), the lack of high-quality embeddings (word2vec, FastText, BERT-based models) for Kazakh is one of the main reasons for the limited applicability of modern NLP tools. However, in recent years, several specialized resources have been introduced: the KazNERD dataset (Yeshpanov et al., 2022), the KOHTD handwritten corpus (Toiganbayeva et al., 2021), as well as language models such as KazBERT and Kaz-RoBERTa (2023-2025), which have become an important foundation for fine-tuning and adapting plagiarism-detection tasks.

A common issue in Kazakh texts is the mixing of Cyrillic and Latin scripts, especially when words are intentionally distorted to bypass plagiarism detectors. For example, the letters "A", "O", "C", "E", "H", "P", "K" and others can easily be substituted with visually similar Latin counterparts. Without specially designed detection mechanisms, such substitutions often remain unnoticed by duplicate-detection systems. Semantic comparison of Kazakh texts is also complicated due to the insufficient training of models on relevant corpora. Even modern transformers such as multilingual BERT or XLM-RoBERTa demonstrate relatively low accuracy when applied to Kazakh documents, as shown in several recent experiments. At the same time, national Kazakh-specific models, including Kaz-RoBERTa, have demonstrated certain improvements with fine-tuning, though their performance still lags behind larger multilingual systems. This underlines the importance of expanding Kazakh-oriented training corpora and further improving model architectures (Tleubayeva & Shomanov, 2024).

In Bakiyev B. et. al (2022), a method for calculating text similarity in Kazakh is proposed, which incorporates synonyms into an extended TF-IDF model. The author emphasizes that traditional TF-IDF poorly accounts for semantic substitutions of words, which are frequently used in academic writing as a method of concealing plagiarism. Replacing words with synonyms allows borrowings to be hidden while retaining the overall meaning, making it harder for classical algorithms to detect. The proposed approach adds a thesaurus-based processing layer to capture semantic relations between words. This enables the detection of paraphrased text and paraphrase plagiarism. Thus, the study highlights the necessity of accounting for semantic features of the Kazakh language in plagiarism detection.

The article by Rakhimova D. et. al (2021) discusses a hybrid approach to the semantic analysis of Kazakh texts. The authors propose a combination of statistical and neural methods for analyzing the semantic similarity of documents. They note that traditional algorithms are highly sensitive to syntactic modifications (such as word order changes or case substitutions), which are frequently used to conceal borrowings. The hybrid approach mitigates these manipulations by considering not only the surface form but also the deeper semantic content of the text. As a result, the authors demonstrate that combining different analytical methods can improve the effectiveness of detecting hidden plagiarism in Kazakh.

The study by Lizunov, P. et. al (2021) describes a methodology for detecting near-duplicate documents in scientific texts. Particular attention is given to cases where authors alter only minor elements of a document (formatting, sentence reordering, minimal edits) to bypass plagiarism detection. For the Kazakh language, such concealment methods are particularly challenging due to morphological complexity and affixation, which generate a large variety of word forms. The authors propose a combined method that integrates both lexical and structural analysis. This approach makes it possible to identify documents with a high degree of technically disguised similarities. Thus, the study demonstrates an effective strategy for addressing superficial text editing aimed at concealing plagiarism.

The research by Ayazbayev D. et al. (2023) addresses the task of determining semantically similar words in Kazakh using semantic similarity metrics. The authors highlight that the use of synonyms and semantically related words is one of the primary techniques for circumventing anti-plagiarism systems. The proposed methodology enables the automatic detection of such substitutions and the identification of hidden borrowings. The system constructs vector representations of words and compares them to measure semantic similarity. This makes it possible to detect paraphrasing and other intellectual techniques of concealing plagiarism. The work contributes to the development of more accurate systems for analyzing Kazakh texts.

In the article (Prieur M. et al., 2022). The PIKA system for detecting duplicates in the knowledge base is described. Although it does not focus specifically on the Kazakh language, the methods proposed by the authors are also applicable to low-resource languages. PIKA analyzes the structural and semantic characteristics of the text, which makes it possible to identify hidden borrowings even with changes at the level of words or sentences. This is especially important for the Kazakh language, as techniques are often used to change the form of words or replace them with similar terms. The work shows the importance of using more sophisticated duplicate detection algorithms that go beyond a simple lexical match.

A study (Tolegen G. et al., 2020). It is devoted to the recognition of named entities in Kazakh texts using neural networks. At first glance, it is not directly related to plagiarism, but the identification of entities is important for the correct analysis of borrowings. Students and authors often leave borrowed fragments with proper names or terms, which gives away plagiarism, despite the paraphrasing. The NER model allows you to accurately identify such elements and use them as markers to detect plagiarism. The authors show that neural networks are able to adapt to the morphological features of the Kazakh language. This increases the effectiveness of intelligent anti-plagiarism systems.

There are practically no open datasets containing original/incomplete duplicate pairs for the Kazakh language. This limits the possibilities of evaluating models, as well as hinders the reproducibility and comparability of research. Together, these factors require the development of adapted methods of preprocessing, lemmatization, identification of Latin characters in the text, as well as training specialized models on domain names and data in the Kazakh language. Considering all these features will allow us to build a truly effective system for detecting incomplete duplicates in texts in the Kazakh language.

(Togmanov M. et al., 2025) is a benchmark for evaluating language models (Kazakh, Russian, regional knowledge of Kazakhstan), including in relation to text processing tasks.

Although it does not directly focus on plagiarism, it demonstrates that modern models do not do well with the Kazakh language in the tasks of understanding and logic. This indirectly points to a problem: the low resource availability of the Kazakh language makes it difficult to build stable loan detection systems. The authors emphasize the need to expand the cases and tests that will allow models to better identify hidden borrowings. Thus, KazMMLU can be considered as a foundation for future research in the field of plagiarism detection.

Classical methods based on the representation of text in the form of a bag of words, vector spatial models (TF-IDF) and shingling were developed primarily for working with pure texts without visual and structural elements. Their advantage lies in the simplicity of implementation and high interpretability, as well as the ability to quickly process large text corpora (Henzinger, M., 2006, Mohammadi, H. & Khasteh, S. H., 2018). However, even with minimal structural changes, such as rearranging paragraphs, reformulating, using synonyms, or embedding text in images, these methods lose their informative value and become a source of false positive or false negative results. One of the key limitations of these approaches is their inability to consider the context and structure of the document, especially if the text is embedded in an image or accompanied by graphic elements. An example would be technical reports, instructions, or scientific publications where basic information is presented in the form of diagrams, flowcharts, and annotated images. When trying to analyze such materials, text-centric methods ignore the visual component, which leads to the loss of semantically significant fragments. In some cases, the contextual meaning of an inscription in a flowchart cannot be determined without analyzing its position, shape, or relationships with other elements, which is completely excluded when using, for example, TF-IDF or MinHash (Henzinger, M., 2006, Fisichella M. et al., 2011).

Documents with a multimodal structure, including text, images, and tables in a single layout, are particularly difficult. Applying traditional methods to them often requires pre-highlighting the text component, which is implemented through optical character recognition (OCR). However, OCR, especially when working with scanned documents or low-quality diagrams, is prone to recognition errors, structural distortions, and loss of important contextual information (Silcock et al., 2022). Thus, even preprocessing becomes a source of noise and unreliable data, which is subsequently processed using methods not designed for this kind of input.

The article (Cha Y. et al., 2005) is devoted to the study of binary similarity measures and their application in the task of recognizing handwritten characters. The authors consider and compare a wide range of metrics, including the Hamming distance, the Jaccard coefficient, the Dice measure, and several others used to analyze binarized images. Experiments have shown that different similarity measures exhibit different resistance to noise and handwriting variability: some metrics are more sensitive to changes in line thickness, while others remain stable with variations. As a result, the authors conclude that choosing the appropriate metric significantly affects the final accuracy of handwritten character recognition. The work contributes to the optimization of binary image processing methods and emphasizes the importance of correctly selecting similarity measures in computer vision tasks.

A study (Wahle et al., 2022) demonstrates that systems based on pre-embeddings and classifiers can detect texts processed with paraphrasing tools, but the effectiveness depends on the degree of change (how strongly phrases are paraphrased, whether synonyms are used, whether the structure is preserved).

A comparative analysis of the possibilities and limitations of traditional methods in the context of multimodal data is presented in Table 1.

Table 1

Problems of using traditional methods in the analysis of multimodal documents

Method/ approach	Advantages	Limitation in multimodal analysis	Sources
TF-IDF	Simple implementation, high processing speed	Ignores word order and document structure; not applicable to visual information	HenzingerM., 2006, Mohammadi H. & Khasteh S. H., 2018
Shingling	Detecting partial text matches	Sensitive to word reordering; incapable of processing diagrams and graphical objects	Henzinger M., 2006, Fisichella M. et al., 2011
MinHash	Scalability for large data volumes	Loss of semantic context; not applicable to images and charts	Fisichella M. et al., 2011
OCR + TF-IDF	Ability to work with scanned documents	Recognition errors; ignores visual layout; sensitive to noise	Silcock et al., 2022, Zhang M. et al., 2023

As can be seen from the table, even when combining methods such as OCR and TF-IDF, the resulting model remains vulnerable to noise, informal structures, and unobvious visual differences. In particular, approaches based on the separation of text from images often ignore the spatial arrangement of objects, which in the case of diagrams can be crucial for understanding the logic of the document. Attempts to improve the situation through text normalization, proposed, for example, in the RETSim architecture (Zhang M. et al., 2023) can reduce sensitivity to OCR artifacts, but they do not solve the problem of the lack of analysis of the layout structure.

Against the background of these limitations, there is an increasing interest in layout-aware models and multimodal neural networks capable of simultaneously analyzing text, images and their mutual arrangement. The LayoutLMv2 model, which has demonstrated effectiveness in the tasks of visual understanding of documents, allows taking into account both textual and visual features, while preserving structural information about the document (Xu Y. et al., 2021). However, the implementation of such approaches requires significant computing resources and the availability of marked-up multimodal datasets, which is currently difficult, especially in the context of low-resource languages and specific formats such as schemes in Kazakh.

The lack of multimodal datasets and the lack of data reflecting local linguistic and cultural characteristics pose a major problem for loan recognition. For the Kazakh language, despite its status as the state language, there are practically no open document bodies marked for duplication, which would include tables and images. Studies such as Bogdanchikov A. et al. 2022. emphasize the difficulties in applying English-language models to the Kazakh context due to agglutinative morphology, free word order, and spelling variations. Models trained in other Turkic languages do not demonstrate sufficient quality in direct translation, and specialized embedding representations adapted to Kazakh vocabulary are available only to a limited extent (Ayazbayev D. et al., 2023)

Thus, traditional methods, despite their historical significance and convenience, demonstrate serious methodological limitations when applied to the tasks of analyzing documents containing both textual and graphical information. Their inability to take into account the visual context, layout structure, and semantic connections between different modalities makes them unsuitable for solving the problems of identifying incomplete duplicates in modern digital archives. This justifies the need for a transition to integrative, multimodal systems, which will be discussed in the following sections.

In the study (Elkhatat A. et al., 2021). It is shown that systems like PlagScan, StrikePlagiarism, Turnitin, etc. Sometimes they are unable to detect so-called "image-text plagiarism" or borrowings hidden in images, tables, or nonstandard fonts and formats. Students use this by preserving the structure of the document, but changing text fragments using synonyms or hidden characters.

Results and Discussion

To effectively identify borrowings, it is necessary to bring all documents to a single, reference format, eliminating the variability in the presentation of text, tables, diagrams, diagrams and images.

Methods of processing content elements to neutralize methods of concealment of borrowings can be divided into two groups: methods of neutralizing technical (formal) concealment of borrowings (Table. 2) and methods and models for detecting borrowings in semantic (intellectual) content changes (Table 3).

Technical methods include the insertion of invisible characters (zero-width space, soft hyphen), substitution of Cyrillic letters with Latin letters, manipulation of encodings and the introduction of Unicode control characters ("Trojan Source"). These techniques change the appearance of the text for analysis systems, but preserve its readability for humans (Boucher & Anderson, 2021). Unicode normalization (NFC/NFKC), removal of hidden characters, and the use of algorithms for detecting homoglyphs (Almuhaideb & Aslam, 2022) are proposed to combat them.

The developed methods make it possible to minimize the impact of techniques for hiding borrowings, unifying the presentation of content into a reference form. This significantly improves the accuracy of loan detection algorithms and contributes to the objective analysis of electronic documents.

Table 2

Methods of preparing Kazakh-language content to neutralize the concealment of borrowings during technical changes

№	Content preparation method	Tasks of the method	Description
1	Text cleaning from hidden and invisible characters	Removal of hidden characters	Exclusion of characters outside the standard Unicode range (Zero Width Space, Soft Hyphen, Zero Width Joiner, Right-to-Left Override, etc.).
		Normalization of spaces and line breaks	Bringing spaces and line breaks to unifies standard (removing extra spaces, line breaks, tabulations)
		Decoding encoded characters	Converting characters encoded in HTML- or Unicode-formats into standard forms.
2	Conversion of text to a standard alphabet	Replacement of visual analogues	Replacing characters with identical appearance but different encodings (e.g., «а» (U+0430) → «a» (U+0061)).
		Case unification	Converting text to a unified case (e.g., all letters to lowercase)
		Normalization of special characters	Replacing non-standard characters (e.g., non-breaking spaces) with standard ones
		Normalization of diacritical marks	Converting letters with diacritics to a unified standard (e.g., decomposition of composite symbols into NFC form)
3	Document structure adjustment	Structure unification	Removing unnecessary page breaks, unifying paragraphs
		Formatting standardization	Bringing headings, lists, and tables to a unified formatting style
		Metadata normalization	Checking and cleaning hidden data (document properties, comments, bookmarks) that may be used to bypass detection

Semantic techniques include paraphrasing, replacing words with synonyms, grammatical transformations, and translation plagiarism. These methods preserve the general meaning of the text, but change its surface, reducing the effectiveness of shingle and lexical methods. This problem becomes especially serious in the Kazakh language, where agglutinativity creates hundreds of word forms for a single root (Yeshpanov et al.. 2022), In response, the researchers

propose the use of contextual language models (XLM-R, KazBERT, Kaz-RoBERTa) capable of taking into account semantic transformations (Conneau et al., 2020).

Table 3

Methods of preparing Kazakh-language content to neutralize the concealment of borrowings with semantic changes

№	Content processing method	Purpose/ description	Example (in Kazakh)
1	Lemmitization (reducing words to their base form)	Removes grammatical forms (case, number, person) to identify the lexical root	«Оқушылар мектептерінде болды» → «оқушы мектеп бол»
2	Synonym normalization	Converts synonyms into standard or frequently used forms	«Ғылыми зерттеу» = «ілімдік ізденіс» → «ғылыми зерттеу»
3	Stop-word removal	Excludes functional words that do not affect meaning, while preserving semantic structure	«Бұл мақалада біз қарастырамыз...» → «мақала қарастыру»
4	Collocation standardization	Brings non-standard expressions to stable, common phrases	«Сабақ барысында оқушылар білім алады» → «оқушылар білім алады»
5	Syntactic normalization	Reconstructs sentence structure to restore original meaning	«Оқушылар бұл тапсырманы орындап шықты» ↔ «Бұл тапсырманы оқушылар орындады»
6	Морфологический morphological analysis	Extracts root and affixes to identify similarity in hidden borrowed words	«үйренгендер», «үйреніп жатыр», «үйрену» → всё сводится к «үйрен»
7	Semantic analysis	Detects hidden borrowings at the meaning level despite formal changes	«Оқушы білім алады» ↔ «Білім оқушыға беріледі»
8	N-gram ananlysis (words or characters)	Compares text fragments (collocations) to identify recurring structures	«Тәуелсіз Қазақстан – болашағы жарқын ел» → «Қазақстан – жарқын болашағы бар ел»
9	Back-transition	Used to detect borrowings hidden by translation from another language	Рус.: «Он имеет большую значимость» → Каз.: «Оның маңызы зор» → Рус.: «Он важен»
10	Phoenetic normalization	Corrects orthofraphic and phoenetic distortions (transliteration, typos, etc.)	«Қаласақ» → «қаласақ», «әлеуметтік» → «әлеуметтік»

A very common practice of hiding borrowings in academic papers is to convert textual information into tabular form. The authors intentionally replace certain sections of the text with tables, which makes it difficult to detect plagiarism when using traditional text-oriented algorithms. Additionally, when working with tables, various masking methods are used: rearranging rows and columns, changing units of measurement (for example, replacing grams with kilograms), paraphrasing descriptive elements, as well as modifying numbering, encodings, or the format of data representation. Such techniques significantly complicate the automatic comparison of information and require the development of specialized methods for detecting borrowings in tabular structures (Table 4).

Table 4

Methods of preprocessing tables before checking for plagiarism

№	Content processing method	Purpose/ description	Result
1	Extracting text from table cells	Converts table content into linear text (rows → paragraphs); preserves logical structure (header + content); removes hidden characters, extra spaces, and line breaks	The anti-plagiarism system can recognize text from tables, not just a "picture"
2	Formatting unification	Brings fonts, styles, and text cases to a unified form; replaces visually similar characters (Latin/Cyrillic); removes HTML markup and invisible tags	Eliminates masking through different fonts, spaces, or character substitution
3	Table structure normalization	Converts complex tables (with merged cells, nested tables) into a simple matrix; automatically aligns headers and labels; preserves context	Maintains readability and enables correct checking of table content
4	Extraction of numerical and symbolic data	Converts numbers, dates, and formulas into text format; replaces special characters; unifies measurement units and abbreviations	Ensures comparability of numerical data and symbols during verification
5	Segmentation into logical blocks	Splits large tables into subtables; adds "keys" to link headers and values	Increases verification accuracy and preserves the "header–data" relationship
6	Integration into the main text of the document	Incorporates pre-processed tables into the main text body	Provides comprehensive document checking, including tables

The problem of detecting plagiarism in image documents remains one of the least solved problems in anti-plagiarism systems. Unlike texts, where morphological and semantic analysis can be used, images, diagrams and diagrams require special preprocessing methods. To determine whether a visual object is original or borrowed from other sources, it is necessary to transform it into a form suitable for comparison and search through large collections. Such processing includes steps for cleaning, normalizing, and extracting features that will allow images to be compared with existing databases and resources on the Internet (Table 5).

Table 5

Preprocessing images to check for plagiarism

Stage	Description
Extract images from a document	Extract embedded images, diagrams, and charts from DOCX/PDF formats.
Extract text from images	Use OCR (e.g., Tesseract, EasyOCR) for text recognition in diagrams, scans, and charts. The resulting text can be compared with databases for borrowings.
Cleaning and normalization	Convert to standard format (PNG/JPEG), unify size (224×224 px), normalize color palette.
Noise removal	Remove watermarks and artifacts; apply binarization and contrast enhancement for diagrams and charts.
Feature extraction	For photos: CNN embeddings (ResNet, VGG, EfficientNet). For diagrams: OCR text, SIFT/SURF/ORB descriptors, structural features.
Database and Internet search	Compare with local image databases and Internet resources (Google Reverse Image Search, TinEye). Use perceptual hashing methods (pHash).
Comparison and similarity assessment	Calculate similarity (cosine similarity, Euclidean distance) and determine the probability of borrowing.

Despite significant progress in the development of anti-plagiarism systems, the problem of recognizing borrowings in diagrams, images, and drawings remains unresolved. Most modern tools are focused on textual information and demonstrate low efficiency in analyzing visual content. This is especially acute in the case of the Kazakh language: due to the limited corpus resources and the lack of specialized algorithms, verification of multimodal documents is complicated. Thus, the detection of plagiarism in graphic elements and diagrams requires further research and development of methods that consider both the visual and linguistic features of Kazakh content.

In recent years, systems and services have appeared on the market that are directly focused on increasing the uniqueness of the text and hiding borrowings outside the framework of academic standards. They offer functions for paraphrasing, synonymizing, changing style, and replacing text elements in a way that preserves meaning but reduces obvious similarities. A study (Ruben Comas et al., 2023) shows that students actively use online paraphrasing and translation tools to bypass text similarity checking systems and reduce the percentage of overlap with the original text.

Most international solutions are limited to English and Russian, while Kazakh remains a low-resource language. Nevertheless, some services designed to transform a document to conceal borrowings with the Kazakh language are presented in Table 6.

Table 6

Comparative table of 10 popular anti-plagiarism bypass systems

System	Languages	Applied modifications	Techniues (methods)
Ref-n-Write Paraphrasing Tool	English	Paraphrasing, synonym substitution, sentence restructuring	Lexico-syntactic analysis, template database of academic texts
Undetectable.ai	English	Paraphrasing, synonym replacement, generation of new formulations	AI model for generating unique text, statistical analysis
Netus AI Bypasser	English (partial support for other languages)	Paraphrasing, rewriting with LLMs, text restructuring	Deep neural networks, generative models for plagiarism evasion
Antiplagius	Russian, Kazakh (limited)	Hidden characters, character substitution, fragment reordering	Technical manipulations with encodings and symbols
Фокусник	Russian, Kazakh	Character substitution, line reordering, use of encodings	Mechanical transformation of text structure, tables, and symbols
Viper Anti Plagiarism	English	Match detection, basic paraphrasing	Database and online resource search, simple paraphrasing
Антиплагиат Киллер	Russian, Kazakh (adapted)	Paraphrasing, technical bypass techniques (Zero-Width characters, Soft Hyphen)	Technical evasion of plagiarism detection, invisible characters, encodings
AntiplagiatKiller	Russian, Kazakh, English	Paraphrasing	Manual rewriting, text paraphrasing with neural networks
Антиплагиат Фокс	Russian, Kazakh	Automatic word substitution, insertion of hidden characters	Mechanical synonymization, hidden characters, manual rewriting
Antiplagiat.org	Russian, English, Kazakh	Text modification, insertion of invisible characters, reordering	Basic bypass methods: reordering, encodings, hidden characters, manual rewriting
Antiplag.kz	Kazakh, Russian	Paraphrasing, synonymization, text restructuring, character substitution	Web-based encoding

Despite the fact that at the moment the number of systems focused on hiding borrowings with support for the Kazakh language remains limited, the dynamics of information technology development suggests a different future. Given the rapid progress in artificial intelligence and natural language processing, it can be predicted that the number of such services will increase in the coming years. This creates additional challenges for the academic community, as the improvement of such tools will inevitably lead to more complex tasks in identifying borrowings and will require the development of more reliable methods of counteraction.

Conclusion

The review showed that the problem of hiding borrowings in academic works in the Kazakh language remains extremely relevant in the context of digitalization and the growing number of electronic documents. The methods used by students cover a wide range – from technical manipulations (inserting hidden characters, replacing Cyrillic letters with Latin analogues, using Unicode control characters) to semantic and structural transformations (synonymization, paraphrasing, changing the structure of tables and diagrams).

The peculiarities of the Kazakh language as an agglutinative language complicate the task of identifying hidden borrowings, since the variety of word forms and syntactic flexibility make it possible to effectively bypass classical algorithms. An analysis of existing approaches has shown that traditional methods based on bag-of-words, TF-IDF and shingling demonstrate low efficiency when working with multimodal documents that include not only text, but also tables, diagrams and images.

In this regard, modern contextual language models, including KazBERT and Kaz-RoBERTa, as well as multimodal architectures such as LayoutLMv2, are of particular importance. Their use makes it possible to take into account the semantic level of the text, as well as the layout and visual structure of the document, which significantly increases the reliability of anti-plagiarism systems.

At the same time, it was revealed that services offering loan concealment tools (for example, Antiplagiat-Killer, Antiplagiat Fox, Netus AI, etc.) are developing in the market in parallel, including those with support for the Kazakh language. This creates new challenges for the academic community, as improving such services will inevitably lead to more difficult plagiarism detection.

Thus, in order to ensure academic integrity, it is necessary:

1. To develop specialized methods of normalization and preprocessing of Kazakh-language content.
2. Create original/duplicate corpus resources and datasets for training and testing models.
3. Implement multimodal neural network architectures that take into account textual and visual data.
4. Strengthen educational initiatives aimed at fostering a culture of academic integrity.

These measures together will improve the effectiveness of anti-plagiarism systems and minimize the impact of methods of hiding borrowings in academic texts in the Kazakh language.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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Author Contributions

Svitlana Biloshchytska: Data curation, Writing – Original draft preparation, Project administration. Aidos Mukhatayev: Methods for neutralizing borrowings in text documents. Oleksandr Kuchanskyi: Methods for neutralizing borrowings in tables, charts and diagrams. Saltanat Sharipova: Analysis of concealment of borrowings in text documents. Nayla Murat: Analysis of hidden borrowings in tables. Zhan Amangeldiyev: Analysis of concealment of borrowings in multimodal documents.

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Information about authors:

Svitlana Biloshchytska **–** Doctor of Technical Sciences, School of Artificial Intelligence and Data Science, Astana IT University, bsv@astanait.edu.kz, ORCID: 0000-0002-0856-5474.

Aidos Mukhatayev **–** Candidate of Pedagogical Sciences, Professor, School of General Education Disciplines, Astana IT University, mukhatayev.aidos@gmail.com, ORCID: 0000-0002-0856-5474.

Oleksandr Kuchanskyi **–** Doctor of Technical Sciences, School of Artificial Intelligence and Data Science, Astana IT University, kuchanskyi.o@gmail.com, ORCID: 0000-0003-1277-8031.

Saltanat Sharipova **–** PhD, Center of Competence and Excellence, Astana IT University, saltanat.sharipova@astanait.edu.kz, ORCID: 0000-0001-7267-3261.

Nayla Murat **–** Master student, School of Artificial Intelligence and Data Science, Astana IT University, 242899@astanait.edu.kz.

Zhan Amangeldiyev **–** Master student, School of Artificial Intelligence and Data Science, Astana IT University, 243014@astanait.edu.kz.

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[1]Gulim Karimova, [1]Saltanat Abylaikhan, [2]Saltanat Kenesbekova, [2]Zhuldyz Alshynbayeva, [1]Aiganym Galym

[1]Astana International University, Astana, Kazakhstan.
[2]E.A. Buketov Karaganda University, Karaganda, Kazakhstan.

DIGITAL APPROACHES FOR IMPLEMENTING GAME-BASED TECHNOLOGIES IN FOREIGN LANGUAGE TEACHING FOR STUDENTS

Abstract. The article examines digital approaches for integrating game-based technologies into foreign language teaching for students in pedagogical specialties. The purpose of the research is to explore both theoretical foundations and practical applications of integrating digital game-based methods, as well as to determine pre-service teachers' readiness for their implementation in the teaching process. The study involved 120 pre-service teachers from Astana International University and assessed three dimensions of preparedness for integrating digital game-based technologies in foreign language teaching: technological literacy, pedagogical awareness, and practical readiness. While participants were familiar with platforms such as Kahoot, Quizizz, Wordwall, and Baamboozle, their practical readiness was limited due to insufficient methodological training and institutional support. To address these challenges, the authors developed a pedagogical manual, The Teacher, providing structured guidance, digital resources, and gamified classroom strategies. A five-month experimental study demonstrated that participants using the manual significantly improved their practical readiness, confidence, and ability to apply game-based tools effectively, whereas the control group showed only modest progress. These findings confirm the hypothesis that insufficient integration of digital and game-based learning limits practical readiness and highlight that targeted methodological support enhances pre-service teachers' competence, creativity, and engagement in modern language instruction.

Keywords: digital gamification, foreign language teaching, pre-service teachers, game-based learning, digital competence, pedagogical technology.

Introduction

Modern education plays a crucial role in preparing specialists capable of adapting to the rapidly evolving conditions of the digital society. The digitalization of education facilities the integration of innovative approaches into foreign language teaching, among which games- based technologies and gamification are gaining increasing prominence. Gamification, viewed as a pedagogical tool, integrates game elements into the learning process, thereby enhancing students' motivation, engagement, and interest. For future foreign language teachers, the ability to apply digital game-based technologies has become an essential component of professional preparation, ensuring the development of communicative, cognitive, and digital competencies required in the 21st-century classroom.

This scientific article is prepared as part of a study addressing the issue of developing professional foreign language competence, a challenge necessitated by several objective contradictions. On the one hand, the modern high-tech society demands that future specialists possess a high level of professional foreign language proficiency and the capacity for lifelong learning in accordance with personal and professional needs. On the other hand, there is a lack of scientifically grounded models for integrating digital game-based technologies into higher education, which could effectively support the formation of these competencies.

It is hypothesized that the relatively low level of professional foreign language competence among students of language-related specializations is linked to the insufficient integration of digital and game-based learning methods. Enhancing this integration within the educational process may significantly improve learners' communicative abilities, digital literacy, and motivation, thereby fostering greater professional readiness.

In this context, the role of pedagogical innovation becomes central. Universities responsible for training future teachers must not only provide theoretical knowledge but also practical tools that prepare students to face real classroom challenges. One of the promising solutions is the development of methodological materials that demonstrate effective ways of using digital game-based tools in foreign language teaching.

The relevance of this study is determined by the growing necessity to implement digital game-based technologies in the process of teaching foreign languages within Kazakhstan's pedagogical universities. The integration of such technologies contributes to improve the quality of education, fostering creativity and critical thinking, and equipping future teachers with the skills required to use digital tools effectively in their professional practice.

Thus, the purpose of this research paper is to explore the pedagogical potential of digital approaches in implementing game-based technologies for foreign language teaching and to identify pre-service teachers' attitudes towards their practical use in the educational process.

To achieve this goal, the following research objectives were defined:

1. To analyze theoretical foundations and recent studies on the integration of digital and game-based technologies in foreign language teaching, with a particular focus on their role in enhancing students' engagement, motivation, and communicative competence;
2. To examine pre-service teachers' readiness and perceptions regarding the integration of digital game-based tools into foreign language teaching, focusing on their competencies and challenges in applying game-based methods effectively.

Theoretical Background

Numerous studies in the field of digital game-based language learning have demonstrated that integrating game mechanics into the educational process enhances learners' engagement, motivation, and cognitive development. According to Y.G. Butler, Y. Someya, and Jabbari and

E. Fukuhara (2014), educationally designed games used for pedagogical purposes can serve as effective tools for improving language proficiency when applied with clear pedagogical goals. These researchers emphasize that games provide structured and purposeful language practice, offering learners an opportunity to apply new vocabulary and grammar in contextually rich scenarios.

Ravyse et al. (2017) highlight the collaborative and social aspects of game-based learning, noting that interaction among learners contributes significantly to engagement and knowledge retention. Similarly, Zou et al. (2021) found that serious digital games improve linguistic outcomes by creating meaningful, task-oriented environments that promote active language use rather that passive memorization.

In addition to serious games, many scholars draw attention to the potential of commercial off-the-shelf games, such as online role-playing games, for language learning. Studies conducted by Hung et al. (2018) show that such games provide authentic language input and real-time communication with other platers, allowing learners to acquire vocabulary and communicative competence through immersion and social interaction. However, as Chen et al. (2021) notes, these open gaming environments also present challenges, such as distraction or exposure to non-educational content, which underscores the importance of teacher guidance and structured learning design.

Additionally, Vygotsky highlights the cognitive and social dimensions of game-based learning. The concept of "flow" explains how learners become fully absorbed in challenging

yet achievable tasks, leading to deeper learning and sustained engagement. Meanwhile, Vygotsky's theory of scaffolding supports the idea that digital games provide an adoptive environment where learners receive appropriate support based on current level of proficiency. Thus, previous research confirms that digital game-based learning contributes to improve communication skills, vocabulary retention, problem-solving, and collaboration. It also supports the formation of digital literacy and learner autonomy which are essential skills for future teachers in the context of Kazakhstan's educational modernization. The findings of these studies provide a theoretical foundation for this research, which explores how digital game-based technologies can be effectively integrated into foreign language teaching to enhance pre-service teachers' professional competence, motivation, and engagement.

Materials and research methods

This research employed a quantitative survey method to examine the readiness and perception of pre-service teachers toward the integration of digital game-based technologies in foreign language teaching. The aim was to determine how well future educators understand the pedagogical potential of digital gamification tools and to identify possible barriers to their implementation in professional practice. The obtained data were intended to serve as a foundation for enhancing the methodological preparation of future English teachers in the digital learning environment.

The study was conducted at Astana International University (AIU) and involved 120 pre-service teachers enrolled in language education programs. Participants represented different academic years, which allowed for a more comprehensive understanding of how experience and exposure to technology influence their attitudes.

The instrument used in this research was a structured questionnaire consisting of 30 items divided into three analytical dimensions: technological literacy, measuring participants' familiarity and confidence in using digital tools such as Kahoot, Quizizz, Wordwall, and Baamboozle; pedagogical awareness, exploring their understanding of how game-based digital technologies can enhance motivation, participation, and learning outcomes in foreign language classrooms; practical readiness, assessing their willingness and perceived ability to implement these tools in their own teaching practice.

Responses were collected using a four-point Likert scale ranging from "strongly disagree" to "strongly agree". Each section had a maximum attainable score of 40 points, reflecting the degree of readiness for integrating digital game-based learning methods. Based on the total scores, participants were classified into three readiness categories:

Low readiness (10-19 points)

Moderate readiness (20-29 points)

High readiness (30-40 points)

The questionnaire was created and distributed via Google Forms to ensure ease of participation and reliability of data collection. Responses were automatically coded and analyzed using descriptive statistics to determine overall trends, mean values, and response distributions. Additionally, qualitative comments provided by participants were examined to identify recurring ideas, challenges, and insight related to the application of gamified tools in English language teaching.

This methodological design enabled the identification of pre-service teachers' levels of digital competence and their attitudes toward using game-based technologies as an innovative pedagogical approach within foreign language education.

Results and discussion

The results of the conducted survey among 120 pre-service teachers at Astana International University provide valuable insights into their awareness, readiness, and experience regarding the use of digital game-based technologies in foreign language teaching. The results of

the survey on pre-service teachers' awareness of digital game-based tools are represented in Table 1. The majority of participants demonstrated a high level of familiarity with widely used educational platforms such as Quizlet (83%) and Kahoot (78%), which are primarily employed for vocabulary practice and formative assessment. Tools such as Quizizz and Wordwall were also relatively well-known among respondents, while Baamboozle appeared less familiar, with only 49% of students reporting awareness. These findings suggest that while digital gamification tools are becoming increasingly popular in Kazakhstani higher education, their usage remains uneven across platforms. This aligns with Zou et al. (2021) noted that vocabulary-oriented applications often dominate the early stages of digital game- based language learning implementation due to their simplicity and accessibility.

Table 1

Awareness of digital games-based tools

Digital tool	Fully aware (%)	Partly aware (%)	Not aware (%)
Kahoot	78	18	4
Quizizz	72	22	6
Wordwall	65	27	8
Baamboozle	49	38	13
Quizlet	83	14	3

The frequency of tool usage, presented in Table 2, reveals that only 31% of respondents regularly (weekly) use these tools in their teaching or learning practice, while 44% do so occasionally. Meanwhile, 18% reported rare use, and 7% had never used any of the listed platforms. Although awareness levels are generally high, these findings highlight a notable gap between knowledge and active implementation. This observation echoes Arnab et al. argued that despite growing recognition of digital games' pedagogical potential, many educators struggle to translate theoretical understanding into sustained classroom application.

Table 2

Frequency of using digital game-based tools in classroom activities

Frequency of use	Percentage of respondents (%)
Regularly (weekly)	31
Occasionally (monthly)	44
Rarely (once per semester)	18
Never used	7

As shown in Table 3, most participants recognized the pedagogical benefits of integrating game-based digital tools. A significant 89% of respondents agreed that gamified learning increases students' motivation, while 82% highlighted its positive effect on engagement and participation. Additionally, 76% observed that such technologies support the development of speaking and vocabulary skills. These results are consistent with Li L et al. emphasized the link between intrinsic motivation and learner autonomy in gamified environments. The perceived role of gamification in promoting collaboration 70% and formative assessment 61% further reinforces its potential to create interactive and student-centered learning environments.

Table 3

Perceived benefits of using game-based technologies in foreign language teaching

Perceived benefit	Percentage of agreement (%)
Increased student motivation	89
Improved engagement and participation	82
Development of speaking and vocabulary skills	76
Promotion of collaboration and communication	70
Support for formative assessment	61

The barriers to implementing digital game-based tools, summarized in Table 4, reflect the most significant challenges faced by pre-service teachers. The most frequency reported issue was lack of methodological training 57%, followed by insufficient digital literacy 43% and limited access to technology 36%. Additional factors included time constraints 28% and unclear assessment methods19%. These findings indicate that while motivation toward innovation is high, institutional and pedagogical support remains limited.

Table 4

Barriers to integrate digital game-based tools in teaching practice

Barrier	Percentage of respondents (%)
Lack of methodological training	57
Insufficient digital literacy	43
Limited access to technology	36
Lack of time for lesson planning	28
Unclear assessment methods	19

To address these challenges in practice, the next stage of the research focused on developing and testing a pedagogical manual designed to enhance teachers' readiness to integrate game-based approaches into English language instruction. Based on the results of the survey, it became evident that pre-service teachers required more practical guidance and methodological support for implementing digital game-based tools. Therefore, the researchers decided to design a comprehensive manual that could serve as a methodological aid for future educators.

Practical implementation

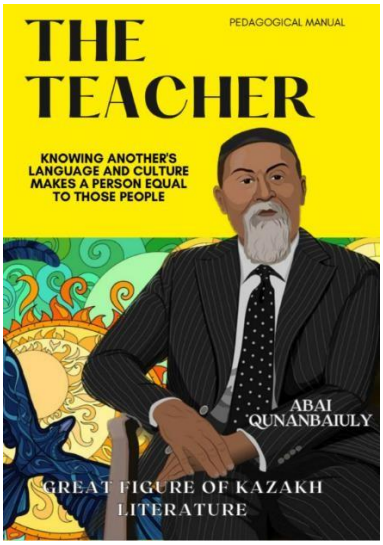
As a practical continuation of this research, the authors developed a pedagogical manual titled "The Teacher: A practical Pedagogical Manual for New Teachers and Aspiring Educators". This manual, officially patented and protected by copyright, was created as part of the authors' innovative approach to supporting pre-service and novice teachers in applying game-based digital tools in language education. It compiles methodological strategies, classroom scenarios, and gamified activities aimed at enhancing language skills, motivation, and engagement in English language learning.

Figure 1 presents the cover of the manual. Figure 2 illustrates a sample page from the manual titled "Digital Platforms for engaging language learning". This section provides an overview of educational platforms such as Kahoot, Quizizz, Nearpod, along with QR codes that enable teachers to directly access and apply these tools in their lessons. These materials demonstrate how theoretical insights from the research have been transformed into practical teaching resources that foster innovation in language education. The development of this manual reflects the study's findings: while pre-service teachers displayed well-developed

technological and pedagogical awareness, their practical readiness for integrating digital game-based tools requires further methodological training and guided practice.

Figures 1,2

Cover of "The Teacher" and a sample page from the manual



As a practical continuation of this research, the authors developed and implemented a pedagogical manual titled "The Teacher: A Practical Pedagogical Manual for New Teachers and Aspiring Educators". This manual, officially patented and protected by copyright, was created to enhance pre-service teachers' methodological readiness to integrate game-based digital tools into English language teaching. It compiles methodological strategies, lesson plans, and gamified classroom scenarios that translate theoretical principles into real pedagogical practice.

Following the identification of gaps in participants' methodological preparedness during the survey phase, the research team conducted a five-month experimental study to evaluate the effectiveness of The Teacher manual. The same 120 pre-service teachers from Astana International University participated and were divided into two groups:

Experimental group (n= 60): received systematic training with The Teacher manual through a series of three workshops, guided micro-teaching sessions, and reflective discussions.

Control group (n=60): continued their regular methodological courses without exposure to the manual.

Both group completed pre-assessment and post-assessment questionnaires identical in structure o the initial survey, measuring three key dimensions: technological literacy, pedagogical awareness, and practical readiness. Each dimension had a maximum of 40 points.

The pre-assessment results (Figure 3) indicated no significant difference between the two groups confirming their comparable initial levels of readiness:

Control group – mean score: 23.6

Experimental group – mean score: 24.1

After the five-month implementation, the post-assessment results (Figure 4) demonstrated a noticeable improvement among participants who had used The Teacher manual:

Control group – mean score: 27.3 Experimental group – mean score: 33.8

Three findings illustrate a substantial increase in the experimental group's overall readiness and confidence in applying digital game-based tools in their teaching practice.

Qualitative reflections collected from the experimental group further reinforced the quantitative findings. Participants noted that The Teacher manual offered clear guidance, accessible digital resources, and step-by-step methodological support for classroom implementation. They emphasized that the manual reduced anxiety associated with technology use and fostered creativity, confidence, and engagement in lesson planning.

Figure 3

Pre-assessment results

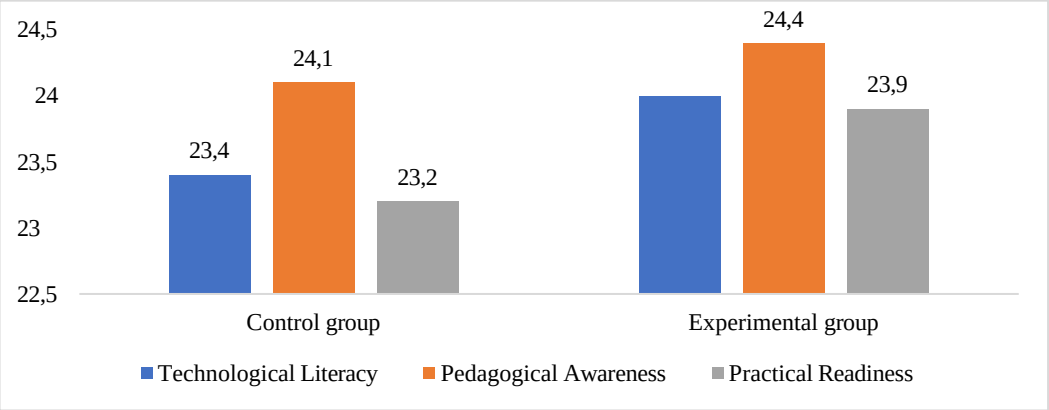
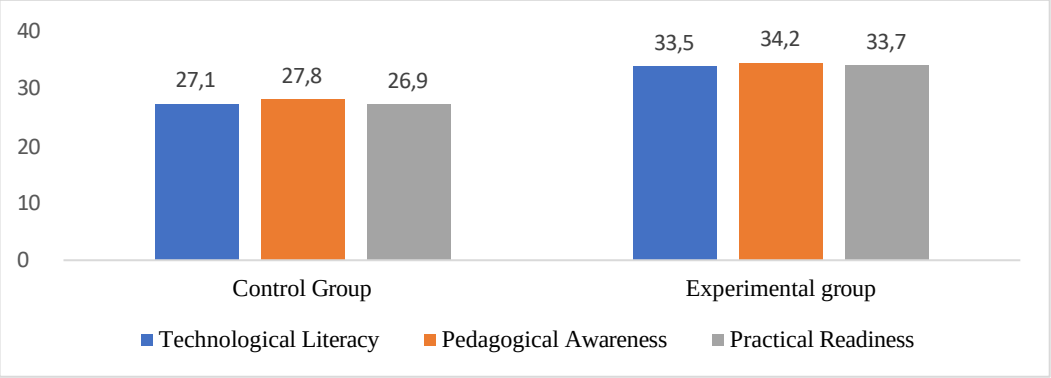


Figure 4

Post-assessment results



To statistically verify the relationship between the use of The Teacher manual and the improvement in pre-service teachers' methodological readiness, a Pearson linear correlation coefficient was applied. This coefficient allowed the research team to determine the degree of association between the variables: the performance indicators of the control group (CG) and the experimental group (EG) after the intervention. The correlation was calculated using the following formula (1):

$$r_{xy} = \frac{\Sigma(x_i - \bar{x})\cdot(y_i - \bar{y})}{\sqrt{\Sigma(x_i-\bar{x})^2}\cdot\sqrt{\Sigma(y_i-\bar{y})^2}} \quad (1)$$

where: r_{xy} – Pearson's linear correlation coefficient;
x_i – indicator of the control group;
y_i – indicator of the experimental group;
$\overline{x}$ – mean value of the control group;
$\overline{y}$ – mean value of the experimental group.

The calculations were conducted using Microsoft Excel tools. As input data, the mean scores of the CG and EG were used to examine the statistical dependence between the implementation of The Teacher manual and the observed improvement in methodological preparedness. Pearson's coefficient was computed for three main dimensions: technological literacy, pedagogical awareness, and practical readiness.

The results revealed the following correlation coefficients:

Technological literacy – r_{xy} = 0.92

Pedagogical awareness – $r_{xy} = 0.93$ Practical

readiness – $r_{xy} = 0.91$

According to Charles Gilbert Chaddock's scale, these values indicate a very high level of positive correlation, confirming a strong statistical relationship between the integration of The Teacher manual and the participants' enhanced performance indicators.

Correlation coefficient	0.1-0.3	0.3-0.5	0.5-0.7	0.7-0.9	0.9-1.0
Strength of correlation	Low	Moderate	Above average	High	Very high

Therefore, the obtained results statistically confirm that The Teacher manual had a significant positive impact on pre-service teachers' ability to effectively integrate digital game-based tools into their teaching practice. The correlation analysis corroborated the quantitative and qualitative findings, providing empirical evidence that The Teacher manual serves as an effective pedagogical instrument that enhances pre-service teachers' methodological competence, fosters digital confidence, and promotes innovation in contemporary language education.

Conclusion

This study conducted an in-depth investigation into pre-service teachers' readiness to implement digital game-based learning (DGBL) in foreign language education, focusing on three core dimensions: technological literacy, pedagogical awareness, and practical classroom readiness. The research was carried out among 120 pre-service teachers enrolled in various foreign language education programs at Astana International University, representing a diverse sample in terms of academic background, digital experience, and teaching aspirations.

The findings revealed a complex, multidimensional readiness landscape. On the one hand, participants demonstrated a solid level of technological familiarity, reporting frequent use of widely recognized educational platforms, gamified applications, and digital tools commonly used in language instruction. Additionally, the majority exhibited strong theoretical and conceptual understanding of the principles of game-based learning, acknowledging its motivational value, its relevance for communicative competence development, and its alignment with contemporary pedagogical trends.

However, the study also uncovered a clear discrepancy between theoretical knowledge and practical competence. The assessment showed that pre-service teachers' practical readiness remained notably limited, primarily due to insufficient methodological preparation, a lack of structured opportunities for hands-on practice, and minimal institutional support for experimenting with innovative digital teaching approaches. Many participants reported

challenges in designing gamified lessons, selecting appropriate digital resources for specific learning outcomes, and managing classroom processes within a game-based environment. These constraints pointed to systemic gaps in teacher education programs, particularly in the integration of digital pedagogy and applied instructional design.

To address these issues, the researchers developed a comprehensive pedagogical manual titled “The Teacher”, specifically designed to strengthen pre-service teachers’ methodological foundations and practical skills. The manual includes step-by-step guidelines for lesson planning, a curated set of digital tools, game-based activity templates, assessment frameworks, and detailed case studies illustrating successful DGBL implementation in language classrooms. Its structured design enables novice teachers to gradually develop confidence, autonomy, and creativity in applying gamified instructional strategies.

To evaluate the effectiveness of the manual, a five-month experimental study was conducted, involving an experimental group that actively used the manual in coursework and practicum activities, and a control group that continued with the standard teacher education curriculum. Quantitative and qualitative analyses demonstrated that the experimental group achieved significant improvements in practical readiness, instructional confidence, and ability to integrate digital game-based tools effectively into foreign language teaching. They also displayed higher levels of creativity, reflective practice, and innovation in designing communicative tasks. In contrast, the control group exhibited only modest, incremental progress, mostly limited to theoretical understanding rather than practical skill development.

These results empirically confirm the study’s hypothesis that insufficient integration of digital pedagogy and game-based learning methods within teacher education programs directly limits pre-service teachers’ practical readiness for modern language instruction. Furthermore, the outcomes validate the effectiveness of targeted methodological interventions such as the implementation of specialized pedagogical manuals in enhancing the quality of teacher preparation.

Overall, the findings underscore the urgent need for systematic, institutionally supported methodological frameworks within teacher education. They highlight that well-designed pedagogical resources not only expand pre-service teachers’ professional competence but also cultivate creativity, innovation, autonomy, and engagement, which are essential qualities for teaching in contemporary digitally enriched learning environments. The study thus makes a meaningful contribution to the field of digital foreign language pedagogy by demonstrating a practical, scalable approach to strengthening the readiness of future educators to meet the demands of 21st-century language teaching.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author contributions

Gulim Karimova: Conceptualization, Methodology, Data curation, Writing-Original draft preparation. Saltanat Abylaikhan: Reviewing and Editing. Kenesbekova Saltanat, Alshynbayeva Zhuldyz: Data curation. Galym Aiganym: Writing-Original draft, Writing- Reviewing, and Editing.

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Information about authors:

Gulim Karimova - PhD, Deputy Director for Scientific and Educational Work at the Pedagogical Institute of Astana International University, e-mail: gulim_3105@mail.ru, Astana, Kazakhstan ***(corresponding author),*** ORCID: 0000-0002-7113-4159

Saltanat Abylaikhan - Doctor PhD, Senior Lecturer at the Pedagogical Institute of Astana International University, saltok_jan@mail.ru, Astana, Kazakhstan, ORCID: 00000-0001-7182-3686

Saltanat Kenesbekova - PhD, Assistant Professor of the Department of Preschool and Psychological-Pedagogical Training, Non-profit limited company «Karaganda National Research University named after academician Ye.A. Buketov», Saltanat1982kaz@mail.ru, Karaganda, Kazakhstan, ORCID: 0000-0002-9247-8866

Zhuldyz Alshynbayeva - PhD, Associate Professor of the Department of Preschool and Psychological-pedagogical training, Non-profit limited company «Karaganda National Research University named after academician Ye.A. Buketov», alshynbaevasymbat84@gmail.com, Karaganda, Kazakhstan, ORCID: 0000-0002-1760-843X

Aiganym Galym - Second-year Master's degree student at the Pedagogical Institute of Astana International University, e-mail: aigan_03@mail.ru, Astana, Kazakhstan.

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[1]Andrey Shunko, [1]Zhassyn Mukhambet, [1]Daulet Azerbayev

[1]Academy of physical education and mass sports, Astana, Kazakhstan

APPLICATION OF THE OPEN-BOOK EXAM IN THE EDUCATIONAL ENVIRONMENT: ANALYSIS OF THE OPINIONS OF TEACHERS AND STUDENTS

Abstract. The article considers the prospects of using the open-book exam in the educational environment using the example of the Academy of Physical Education and Mass Sports of Astana. The study is aimed at studying the opinions of teachers and students regarding the effectiveness of this form of knowledge assessment. The survey involved 12 teachers of the Department of Physical Education and Coaching, as well as 73 students of the training program "Physical Education Teacher and Sports Coach". The majority of the surveyed teachers (87%) are ready to consider the possibility of using open-book exams, highlighting among the advantages stress reduction (75%), development of critical thinking (50%) and compliance with academic integrity (37%). Students also positively assess the potential of the format: 55% expect a decrease in stress, 66% consider it useful for their future profession. At the same time, 77% of students noted the possibility of maintaining academic integrity when using this format. Particular attention is paid to the analysis of preferred variations of the open- book exam: the majority of teachers (62%) prefer to use their own notes, 37% - educational and scientific literature. The complete refusal to use Internet resources demonstrates a cautious attitude towards digital technologies in the process of knowledge assessment. The data obtained indicate a high potential for the introduction of open-book exams into the educational process of universities of physical education and sports, provided that the methodology and content of examination tasks are carefully developed.

Keywords: open-book exam, academic integrity, student stress, critical thinking, physical education and sports, knowledge assessment, educational process, professional competencies.

Introduction

Modern education is experiencing a period of active changes caused by the rapid development of technologies, globalization and growing demands of the labor market. Today, the emphasis is shifting from mechanical memorization of information to the development of critical thinking, analytical skills and the ability to apply knowledge in practical situations (Mamhusseini, 2020). However, traditional forms of knowledge assessment, such as closed-book exams, often do not meet these new challenges. They focus on memory testing, which creates significant stress for students and does not always reflect their real competencies (Akhtar, 2021).

One alternative approach is to use open-book exams, a format in which participants are allowed to use study materials, notes, or even online resources. This method allows the focus to be on analysis, problem solving, and application of knowledge rather than simply reproducing it (Battaglia, 2019a). Despite the obvious advantages, the introduction of open-book exams raises many questions: how do teachers and students feel about this format.

This format is becoming increasingly popular in global educational practice, but its effectiveness remains a subject of debate. Studying the opinions of participants in the educational process about the role of open-book exams seems to be an important step towards improving modern methods of knowledge assessment.

Methods and materials

To study the topic of using open-book exams, we conducted a survey among teachers and students of the Academy of Physical Education and Mass Sports, Astana, Kazakhstan. A total of 12 teachers of the Department of Physical Education and Coaching, as well as 73 1st and 2nd year students of the 6B01405 Physical Education Teacher and Sports Coach program took part in the survey.

The teachers were surveyed as part of the department's methodological seminar before the start of the third trimester, during which a report on the open-book exam was presented. A similar report was given to students in the first week of training, explaining the course procedure and the syllabus for the discipline being taught. Percentages reflect survey responses without inferential statistical testing.

The familiarization methodology included a historical overview of the development of this format (since 1950) and its use primarily in medical education in the United States. Particular attention was paid to the disclosure of the positive and negative aspects of the format. The advantages included: stress reduction, the ability to create project assignments, and the development of critical thinking. The disadvantages included: the complexity of checking hard skills and the need to carefully study the questions. Two training models were proposed: with limited use of mobile devices and the Internet or with full access to information resources. Potential problems and solutions were described for each model. The methodology concluded with a specific example of an exam question on sports training and a demonstration of possible answers using AI. This clearly demonstrated both the capabilities and limitations of the format.

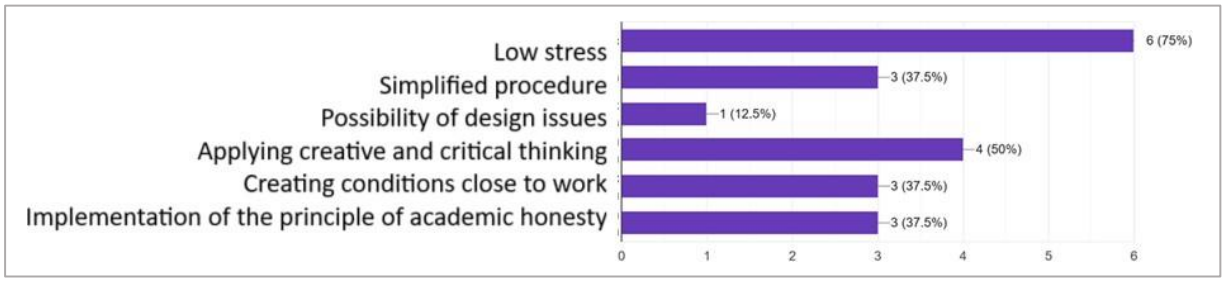
Results and Discussion

Among the teachers of the Academy of Physical Culture and Mass Sports, the majority of respondents (75%) answered that there is a need to improve the forms of conducting examinations, while only one teacher answered that there is no need. In general, the opinion of teachers in an oral conversation showed a desire for something new and a desire to improve the education system. Before the report on the open-book exam form, 37% of teachers knew about the open-book exam form, the remaining 63% learned about it at a methodological seminar.

An important indicator for assessing the need for an open-book exam are the advantages that teachers highlight (Figure 1). Thus, 75% of teachers noted reduced stress as the main advantage of this form of exam. The use of creative and critical thinking was identified as the main advantage by 50% of teachers. 37% of teachers each noted the simplified exam procedure, the creation of conditions close to work, and the implementation of the principles of academic honesty as advantages. And the least advantage of the open-book exam, according to teachers, is the possibility of project questions.

Figure 1

Important advantages of the open-book exam according to teachers.



When identifying the negative aspects of the open-book exam, half of the teachers identified two criteria as the most negative: the lack of testing of one's own knowledge and too lenient assessment conditions (Figure 2). Only 25% of teachers answered that the negative aspect is the contradiction with the principles of traditional exams. Only one teacher noted the complexity of composing exam questions as a negative aspect.

An important indicator is the consent of teachers to use the open-book exam format in their exams (Figure 3). Many teachers (87%) are ready to consider the possibility of using this exam format, while 12% of teachers are not ready to do so. It is interesting that none of the teachers answered unequivocally about their readiness to use the open-book exam format.

Figure 2

Negative aspects of the open-book exam according to teachers

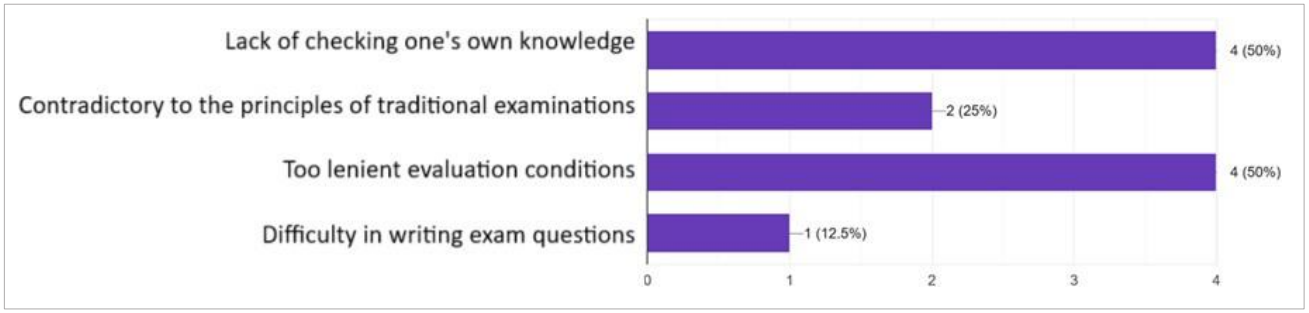
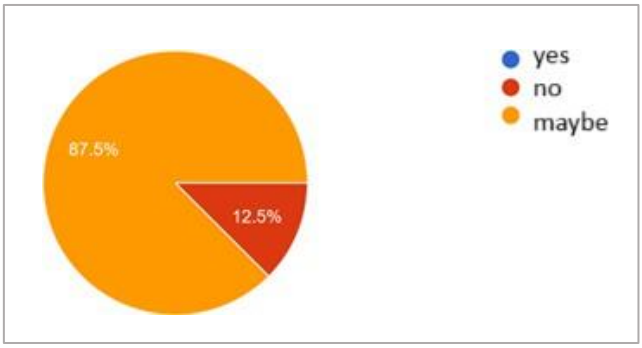


Figure 3

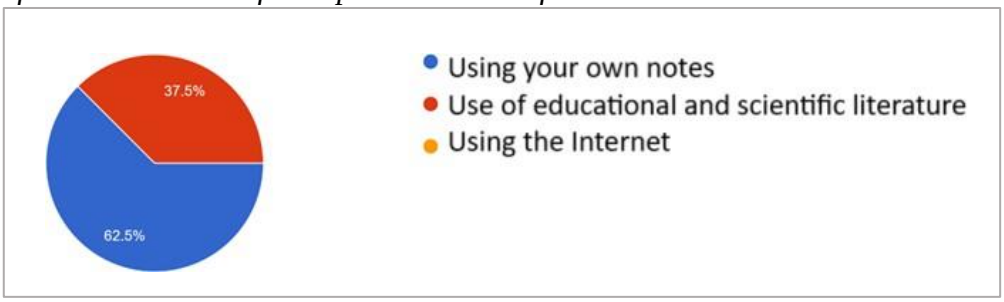
Readiness of teachers to use the open-book exam in their work



When choosing the open-book exam variations, three options were presented: using educational and scientific literature; using one's own notes and using the Internet (Figure 4). Most teachers (62%) chose the exam option using the students' own notes. Using educational and scientific literature in the exam was preferred by 37% of teachers. It is worth noting that not a single teacher accepted the use of the Internet in the exam.

Figure 4

Preferred variations of the open-book exam for teachers

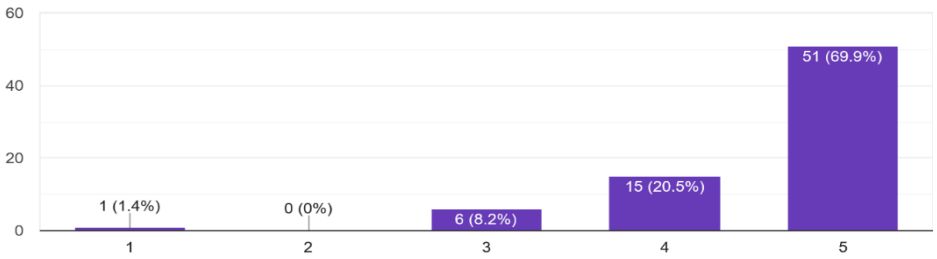


Similar questions were formulated among students of the Academy of Physical Education and Mass Sports, designed to study their opinion about the open-book exam and compare them with the opinion of teachers. After the presentation and explanation of the open- book exam form, 75% of students answered that enough information was provided (5 points). 20% of students rated the report on the exam form at 4 points. Only 8% of students rated the sufficiency of information at 3 points. And only 1 student answered that there was not enough information and rated the report at 1 point.

The question of stress level is key when choosing this form of exam. Students were asked about the expected stress level in the open-book exam (Figure 6). Half of the students (55%) agree with the reduction of stress level.

Figure 5

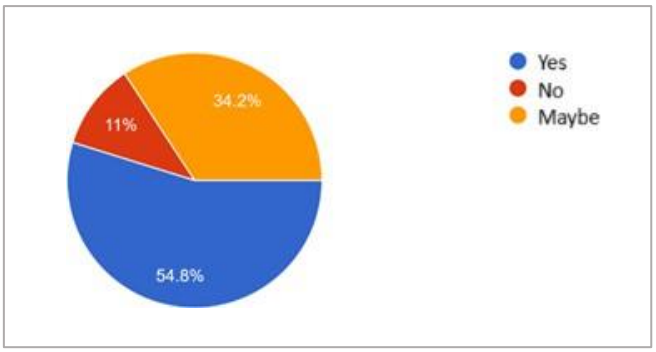
Students'satisfaction with the information provided about the open-book exam format (where 5 is completely satisfied, 1 is completely dissatisfied)



Only 34% of students answered about the possibility of reducing stress. And 11% of students answered that there will be no reduction of stress in the open-book exam form.

Figure 6

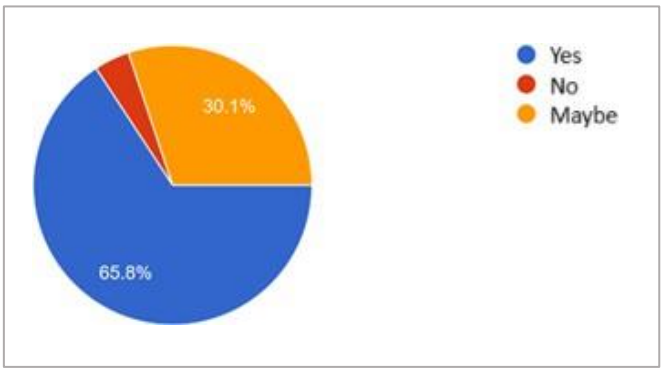
Students' perceived reduction in stress levels during open-book exams



Studying the degree of application of the acquired knowledge and its assessment during the course, we asked students about how much the exam form will help them in their future profession. Most students (66%) believe that the open-book exam form has application in their future profession. 30% of students spoke about the possibility of practical significance of such an exam form. However, 4% of students answered that there is no application of such an exam form in practice.

Figure 7

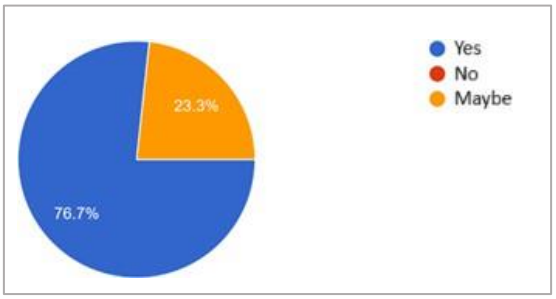
The practical significance of the open-book exam in the future profession



The principle of academic honesty is key when conducting control in universities. Many students (77%) believe that open-book exams allow them to maintain academic honesty, although 23% of students only talk about such a possibility. An important result is the fact that not a single student answered this question negatively.

Figure 8

Students' opinions on compliance with the principles of academic honesty during the open-book exam



During the survey, neither students nor teachers expressed any additional wishes regarding the open-book exam format. No negative opinions were expressed in the oral conversation or additional comments.

The open-book exam has significant benefits for all participants in the educational process. The study showed that 75% of teachers noted stress reduction as a key advantage of the format, and 55% of students confirmed the assumption of less anxiety during such an exam. These data are confirmed by many international studies in various conditions and forms of open-book exams (Davies et al., 2022; Gharib et al., 2012; Ioannidou, 1997).

The development of critical thinking was noted as an important plus by 50% of teachers, which corresponds to modern educational requirements. Students also highly appreciated the practical value of the format - 66% consider it useful for their future profession. It is especially

important that both groups recognized the importance of skills for analyzing and applying knowledge instead of mechanical memorization. This creates a more comfortable and effective educational environment, where the emphasis shifts from memory testing to the development of practical competencies. This opinion is also confirmed by international studies (Battaglia, 2019b; Ioannidou, 1997). In real-life work, physical education and sports specialists are constantly faced with the need to quickly search for and analyze information - from developing training programs to drawing up dietary recommendations. The open-book exam allows you to simulate such professional situations, teaching students to correctly and quickly find the necessary data, critically evaluate their reliability and apply them in specific cases.

When discussing the topic of observing the principles of academic honesty, both groups of participants in the educational process positively assess the possibility of observing academic honesty when using the open-book exam. It is especially indicative that there was not a single negative answer among students on this issue, and teachers included this aspect in the list of advantages of the new format.

The study has a number of limitations associated with the limited sample of participants, which included only 12 teachers and 73 students of one Kazakhstani university, which reduces the representativeness of the results for other areas and specialties. The specifics of the educational field of physical education and sports may affect the peculiarities of the perception of the open-book exam format, which differ from other areas of training. Insufficient information of respondents before the study, their lack of practical experience in using this format and the subjective nature of evaluative judgments could also distort the reliability of the data obtained. In addition, the one-time nature of the study without long-term observation does not allow us to assess the sustainability of the identified trends and their statistical significance. To address these limitations, further research is needed, namely, an experiment with a large sample of students and the presence of control and experimental groups.

Conclusion

The findings of the study indicate a generally positive attitude among both teaching staff and students toward the integration of open-book examinations into the educational process. An overwhelming majority of instructors expressed openness to considering this assessment format as a viable alternative to traditional methods. Participants across both groups consistently identified a key advantage of open-book exams: a marked reduction in examination-related stress compared to conventional forms of assessment.

Furthermore, the open-book format was perceived as conducive to fostering critical thinking and cultivating practical skills in information analysis. A substantial proportion of respondents highlighted its relevance to students' future professional practice, underscoring its applied value. Notably, participants expressed confidence in the feasibility of maintaining academic integrity within this assessment framework. In fact, no student respondents raised concerns regarding breaches of academic honesty in the context of open-book examinations.

With respect to implementation modalities, faculty members demonstrated a clear preference for permitting the use of students' personal notes and prescribed course materials during examinations. In contrast, the inclusion of unrestricted internet resources received limited support among instructors.

The study's results affirm the efficacy of open-book examinations in promoting the development of professional competencies - particularly pertinent for future specialists in physical education and sport. These findings align with international research that associates this assessment format with the enhancement of higher-order cognitive skills and the acquisition of practical competencies.

In light of these outcomes, the adoption of open-book examinations may represent a meaningful advancement in assessment practices, contributing to the modernization of

educational evaluation systems and the overall improvement of educational quality in alignment with contemporary standards for training qualified professionals.

Conflict of Interest Statement

The authors declare no potential conflict interest regarding the research, authorship, or publication of this article.

Author Contributions

Andrey Shunko: Conceptualization, Methodology, Data curation, Writing-Original draft preparation. Zhassyn Mukhambet: Writing-Original draft, Writing-Reviewing and Editing. Daulet Azerbayev: Data Curation.

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Information about authors

Andrey Shunko – candidate of pedagogical sciences, senior lecturer, Academy of physical education and mass sports, Astana, Kazakhstan, e-mail: chastmira@gmail.com, ORCID ID: 0000-0002-3041-5501

Zhassyn Mukhambet - PhD, associate professor, head of the academy of coaching excellence, Academy of physical education and mass sports, Astana, Kazakhstan, e-mail: zhas_ski@mail.ru, ORCID ID: 0000-0001-7435-9022 ***(corresponding author)***

Daulet Azerbayev - master of pedagogical sciences, sport education and coaching department director, Academy of physical education and mass sports, Astana, Kazakhstan, e-mail: daulet.azerbayev@bk.ru, ORCID ID: 0009-0000-2979-1449

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[1]**Yermek Komekbayev**, [1]**Dina Kurmangalieva,** [2]**Khanat Kassenov**

[1]S. Seifullin Kazakh Agro-technical Research University, Astana, Kazakhstan
[2]Kazakh National University of Sport, Astana, Kazakhstan

JOINT DOUBLE DEGREE EDUCATION AS A NEW STANDARD OF EDUCATIONAL PROGRAM QUALITY

Abstract. This article analyzes joint double degree programs as institutional instruments for improving the quality of higher education and strengthening the international competitiveness of Kazakhstan universities. Based on an updated review of international research for 2019-2024, regulatory materials of the European Higher Education Area, and national monitoring data, the article examines joint program models, the conditions for their development and implementation, as well as the limitations and risks inherent in national practice. A model of measurable indicators of the quality of double degree programs is proposed, covering program design, resource provision, learning outcomes, and graduate trajectories. It is shown that the development of double degree programs in the Republic of Kazakhstan requires a transition from the predominance of quantitative indicators to evidence-based quality management, aligned with ESG principles and the European approach. The authors also highlight the challenges faced by such educational programs and provide prospects and recommendations for their successful implementation. The article concludes with a summary of the research findings, supported by an extensive literature review.

Keywords: double degree education, quality assurance, ESG, European approach, internationalization, Kazakhstan.

Introduction

In modern education, there is a growing need for new methods and standards capable of solving the problems of modern society and the labor market. Among the many innovative educational models, joint double degree programs stand out as very promising, providing students with unique opportunities to gain a rich educational experience. Double degree programs (hereinafter referred to as DDP) are understood to be programs based on the comparability and synchronization of educational programs of partner universities and characterized by the acceptance by the parties of common obligations on issues such as defining the goals of the program, preparing the curriculum, organizing the educational process, degrees awarded or qualifications awarded.

Over the past decade, the internationalization of higher education has evolved from forms of entry-level academic mobility to institutional models for the joint development and implementation of educational programs. Within the framework of this concept, double degree programs are considered as integrated technological trajectories that ensure the alignment of learning outcomes, mutual loans and the shared responsibility of partners for the training of highly qualified specialists.

For the development of joint double degree programs in Kazakhstan, both increasing the efficiency of national universities and, to a certain extent, modern quality assurance tools are strategically important. National analytical materials document the growing number of such programs and the expansion of the range of participating universities. However, they also point to an imbalance in the geography of the partnership, as well as the uniform effectiveness of the programs in terms of student enrollment and language of instruction.

The purpose of the study is to substantiate double degree programs as a potential "new quality standard" of educational programs in Kazakhstan and to propose a set of measurable indicators to confirm the claimed effects.

Double degree programs inevitably face numerous difficulties, such as difficulties in developing curricula, organizational and managerial problems, and differences in teaching methods. In this regard, the following tasks have been set:

- to systematize the modern international discourse on the models and types of DDP
- to propose models of quality indicators and guidelines for their verification at the level of organizations of higher and postgraduate education.

Joint double degree programs represent innovative models that embody the pursuit of high educational standards. These models not only develop students' deep knowledge and skills, but also form them into global citizens who are able to function effectively in a diverse social and professional environment.

Methods

The study was developed using a mixed methodology and included three complementary components. First, a systematic review of the literature for the period 2020-2024 on the subject of double-degree programs was conducted using publications indexed in Scopus and Web of Science, as well as analytical materials from international organizations. The sources were selected based on the relevance of the DDP topic, the availability of descriptions of quality models and empirical results.

Secondly, a secondary statistical analysis of the data of the national monitoring on the implementation of DDP for 2020-2024 was carried out with a comparison of the dynamics of the number of programs by education level, the number of students and universities prevailing in the quantitative indicator of DDP. The information component for testing the DDP quality indicator model was formed from analytical reports of the National Center for Higher Education Development of the Republic of Kazakhstan and analyzed on the basis of the Digital Database of the Unified Platform of Higher Education, which includes 182 programs (bachelor's degree - 75, master's degree - 109, doctoral degree - 4).

Thirdly, an expert assessment of the proposed model of quality indicators was carried out. Representatives of international cooperation units, educational and methodological services and quality assurance services of higher educational institutions of Kazakhstan with experience in launching or maintaining DDP were invited to participate in the expert group. The indicators were agreed upon through ranking and discussion until consensus was reached.

The selection of programs for testing the DDP quality indicator model included programs that meet the criteria: the existence of a signed interuniversity agreement on joint training; ongoing or completed academic mobility of students for at least one semester; aligned curricula and discipline matching matrices; availability of data on academic results and completion of studies for 2020-2023.

Programs that were at the stage of preliminary negotiations without an approved curriculum and without a set of students were excluded. To validate the author's model of quality indicators, an expert group has been formed from several universities, including 10 experts (heads and staff of international cooperation services, educational and methodological units and quality assurance systems, teaching staff). The average work experience of experts in the field of education, internationalization and DDP support was 5-7 years; 5 experts had experience in developing or coordinating at least 40 double-degree programs.

The selection of experts was carried out according to the criteria:

1) having practical experience in the development, launch, or internal evaluation of DDP

2) participation in program accreditation and self-assessment or in institutional quality committees

3) representation of various types of universities (national, regional).

In this article, experimental verification refers to the testing of the proposed indicator model based on existing programs in specific higher education institutions, followed by a comparative analysis of management practices and learning outcomes. Under the approbation, the indicator model was applied to 56 existing DDPS at the L.N.Gumilyov Eurasian National University. For each program, the following were analyzed:

- availability of jointly approved learning outcomes and a discipline matching matrix
- allocation of credits and mobility periods
- language and staffing provision
- academic results and completion rates
- financial support of the parties
- demand in the international educational market
- elements of joint quality management and monitoring.

At the same time, the principles of scientific ethics were observed, in particular, maintaining high standards of intellectual honesty and preventing the fabrication of scientific data, falsification, plagiarism, and false co-authorship.

Literature review and international context

Komekbayev et al. (2023) conducted the research within the framework of double degree education, where modern studies of double degree programs increasingly view them not as private bilateral university initiatives, but as an indicator of the maturity of interinstitutional integration related to quality, mobility, and curricular harmonization. Ospanova et al. (2025) and Skliar et al. (2025) mentioned that double degree programs in the EHEA are one of the most developed forms of institutional cooperation, as they combine mobility, content harmonization, and managed quality mechanisms within the framework of general principles of academic recognition. Shenderova (2023) demonstrated in her study that the European model sets a maturity criterion for international comparison: double degree programs are recognized as effective not by the existence of an agreement, but by the degree of integration into an ecosystem of shared governance and quality. Authors such as Hou et al. (2020), Vellamo et al. (2023) and Kralova et al. (2023) mentioned in their studies that in the EHEA, the development of joint double-degree programs has institutionally accelerated after the launch of the Bologna Process in 1999, the strengthening of the legal framework for academic recognition by the Lisbon Convention 1997 and 1999, and the programmatic support of Erasmus Mundus consortium master's programs since 2004, and the mature requirements for their external quality assurance were unified by the European Approach in 2015.

In Kazakhstan, a systemic framework for the development of credit-based learning programs emerged after joining the Bologna Process in 2010 and institutionalizing the credit-based learning system through Order №152 dated from April 20, 2011 (MES RK, 2011; IQAA, n.d). Currently, all universities develop and implement programs based on their own regulatory documents, such as developed Regulations, which are often interpreted differently and do not have a unified development and implementation model.

Contemporary research on double degree programs is developing in the context of transnational and networked education. Recent analytical frameworks in the field of cross-border higher education emphasize that the sustainability of such forms is ensured not by formal agreements, but by the shared responsibility of partners for quality, the transparency of qualifications, and the presence of built-in quality assurance mechanisms at the program and institutional levels. In the European Higher Education Area, these approaches are further reinforced by the general logic of the ESG as a framework for internal and external quality

assurance in cross-border formats and the specialized European Approach, which views double degree programs as integrated curricula leading to joint or double qualifications with agreed-upon design, recognition, and assessment procedures (EQAR, n.d.).

Comparing double degree education development models, several principles stand out that are particularly relevant to the Kazakhstani context. European experience shows that the highest sustainability of double degree programs is achieved when they are designed as a single double degree program with pre-agreed learning outcomes, assessment procedures, and transparent credit recognition, as enshrined in the requirements of the European Approach and based on ESG standards (European Comission, n.d.).

American practice and related research discourse emphasize the importance of interdisciplinarity and program flexibility focused on developing cross-cutting competencies and responding to labor market demands and scientific and technological development (Bear & Skorton, 2019).

The Singaporean approach offers a useful management idea of reasonable overlap: for double degree pathways, acceptable limits for double credit are formalized, ensuring accelerated learning without formally duplicating requirements; This is reflected in the regulations of leading universities, which specify the proportions and volumes of permissible overlap (NUS, NTU, 2022).

The Malaysian model emphasizes the critical role of qualification transparency and institutionalized distribution of responsibility between partners: MQF requirements and MQS-MQR tools guide universities toward publicly verifiable descriptions of learning outcomes, accreditation status, and program characteristics, including the specifics of joint/double formats (MQA, 2017).

The Chinese experience highlights the importance of long-term, resource-backed partnerships: government regulation of Chinese-Foreign Cooperation in Running Schools is focused on ensuring quality and attracting high-quality foreign educational resources within sustainable institutional cooperation formats (Hou et al., 2020).

As a result, Kazakhstan, compared to leading global models, is at a strategically favorable point of development: political support for internationalization and the expansion of international partnerships create the conditions for a transition from quantitative growth of DDP to their qualitative standardization and methodological maturity. To enhance the effectiveness of this system, key areas remain the deepening integration of curricula, the unification of mechanisms for recognizing learning outcomes, the development of joint quality procedures, and the anchoring of DDP in long-term strategic partnerships with a clear distribution of academic and resource responsibilities, consistent with the logic of international quality frameworks for cross-border education and double degree programs.

Empirical research in recent years has shifted its focus from describing double degree program formats to analyzing the sustainability of partnerships and the factors that determine their institutional success. In particular, it has been shown that the role of internal stakeholders and organizational support critically impacts the viability of collaborative degree programs (Shenderova, 2022). At the same time, research continues to focus on student perceptions of double degrees and on measuring the acquired competencies and mobility effects; such studies emphasize the importance of assessing not only quantitative indicators but also the qualitative outcomes of participation.

International and national literature converge on a common conclusion: the effectiveness of double degree programs is determined not by their quantity, but by the degree of integration of content, governance mechanisms, and evidence-based quality procedures. European research demonstrates that double degree programs become an "advanced outcome" of institutional internationalization only in the presence of agreed-upon standards and sustainable collaborative networks. The experience of Kazakhstan confirms the relevance of this approach

and at the same time indicates the need to develop measurable quality indicators and methods for assessing the effectiveness of the DDP, including scientific and personnel effects (Komekbayev et al. 2025; Kuzhabekova, 2024; Mukhatayev et al., 2024).

Despite the growing number of double degree programmes in national systems, a contradiction persists between the rapid quantitative expansion of programmes and the limited development of sustainable supranational mechanisms and comparable approaches to their quality. The heterogeneity of national external assessment regimes continues to complicate transnational cooperation and hinder the development of joint educational formats, while the implementation of the European Approach remains limited due to differences in national approaches (Europen Comission, 2022). As a result, in some contexts, the quality of double degree programmes continues to be determined primarily through formal agreements and mobility, while more integrated systems strive to harmonize procedures and share responsibility for learning outcomes and internal quality mechanisms.

Results and discussion

The expert evaluation was conducted using a modified questionnaire procedure. In the first round, experts ranked and assessed the significance and relevance of double degree program development and the implementation experience of two universities from the national cities of Astana and Almaty (Kazakh-British Technical University and Astana International University) and one regional university (West Kazakhstan Medical University named after Marat Ospanov). The expert responses from the three universities confirm the existence of systemic challenges in implementing double degree programs. Moreover, the nature of the problems is consistent across organizations, allowing them to be considered typical for national practice.

The most frequently cited challenges include coordinating curricula and formalizing mechanisms for mutual recognition of disciplines. Universities point to the high labor intensity of coordinating course correspondence matrices, as well as the need for additional regulatory guidance on credit-based learning procedures.

The second persistent set of problems relates to the recognition of diplomas and qualifications, including differences in national requirements for program structure and the scope of mandatory training components. These barriers are exacerbated by the lack of detailed methodological recommendations and uniform minimum standards for the design of credit-based programs.

The third significant limitation is the financial model. Experts emphasize that the cost of the program's international component often becomes a critical factor limiting student recruitment and the sustainability of mobility pathways. Additionally, they note a shortage of time and human resources for developing and regularly updating curricula and personalizing student support.

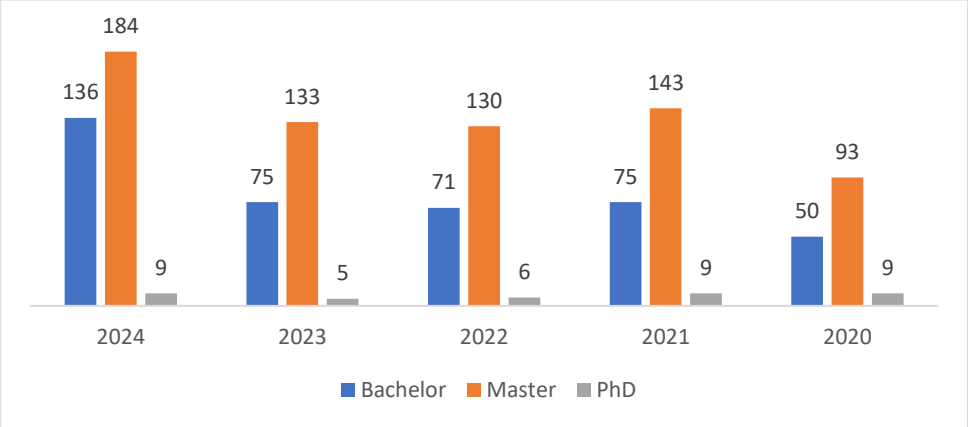
Two out of three universities explicitly point to the need to amend national credit-based education regulations to regulate the development and implementation of credit-based programs, taking into account the practical nuances of managing such programs. Thus, expert assessments indicate the need to update the regulatory framework and expand institutional support mechanisms, including financial instruments and standardized approaches to quality monitoring.

After receiving the data, an assessment of the problematic issues and their solutions was conducted at the country level. After summing up the results, the expert group prepared methodological recommendations for the implementation of the DDP. These recommendations were sent to the universities by the expert group members: L.N. Gumilyov Eurasian National University, Kazakh-British Technical University, and Pavlodar Pedagogical University. In addition, the final methodological recommendations were sent to the Committee for Quality

Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan.

National monitoring data show that in 2024, 56 universities in Kazakhstan implemented 329 double degree programs with foreign partners. Compared to 2020 (152 double degree programs), the number of double degree programs in 2024 increased by approximately 90%, although, according to unofficial data, by over 100% (Figure 1). A general statistical analysis revealed that only a few universities, such as L.N. Gumilyov Eurasian National University, Kozybayev SSU, Aktobe Regional University named after Zhubanov, Maksut Narikbayev University, and Al-Farabi KazNU offer 50% of the programs offered by Kazakhstan universities, and universities from different regions recruit the largest number of students, demonstrating the versatility of the DDP's implementation (Komekbayev, Y.S., Kurmangaliyeva, D.B., 2023).

Figure 1.
Implementation of double-degree programs by levels of education, units

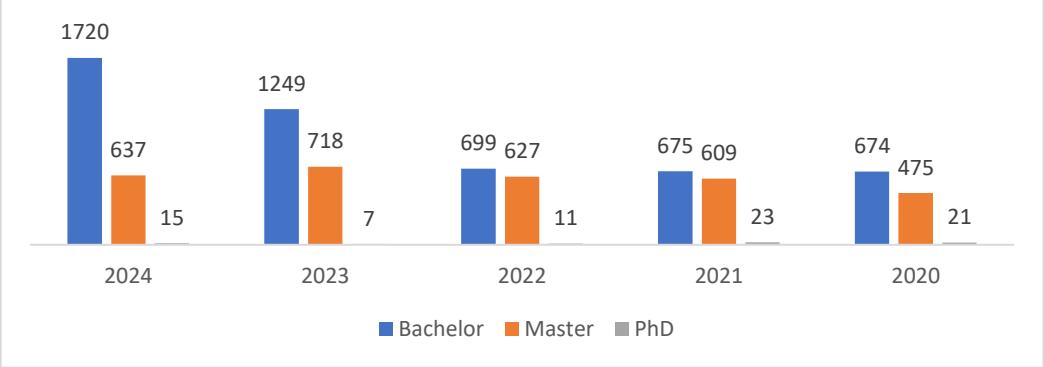


The number of students enrolled in double degree programs in 2024 reached 2372, doubling the 2020 figures (Figure 2). The figure also shows that in 2022, the number was almost flat due to the geopolitical situation, but continued to increase in 2023.

Challenges highlighted include a lack of financial resources (costs for flights and accommodation abroad), visa difficulties, and the need to adapt to other educational systems.

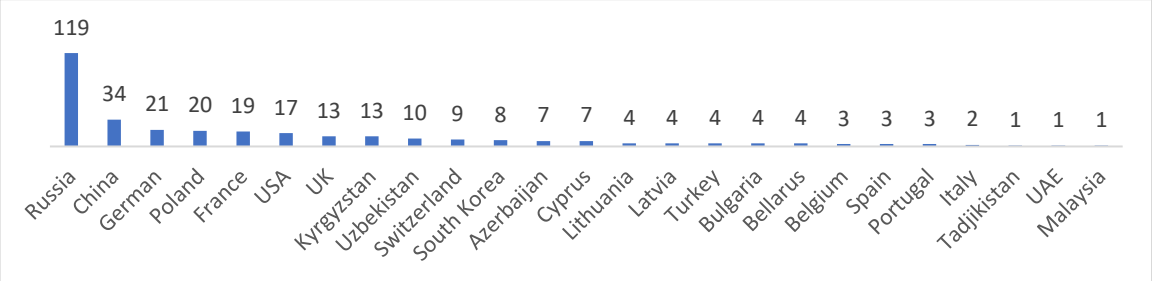
Faculty members report increased workload in coordinating curricula, but note an increase in research activity and publications in international journals.

Figure 2.
The contingent of students in the DDP, by levels of education (number of people)



The structure of the DDP by level of education demonstrates a predominance of master's programs, consistent with international practice, where master's programs often serve as the foundation for intensive joint academic programs. However, national analytical data indicates that the effectiveness of program implementation remains uneven: only a limited number of universities ensure stable student enrollment, and partnerships remain concentrated primarily in the CIS countries. A comparative analysis of data across university groups reveals heterogeneity in the national picture. National and large research universities demonstrate faster rates of expansion of their DDP portfolios, while for some regional and industry-specific universities, development is more targeted. This allows us to interpret the current stage as a transition from extensive growth"to the need for institutional alignment of program quality and managerial maturity (Figure 3).

Figure 3.
Number of DDP by country (units)



A comparison of national practices with the European approach reveals three development areas. The first stage is the formalization of the joint design of learning outcomes and course equivalence matrices. The second stage is the standardization of procedures for the automatic recognition of periods of study and credit transfer. The third stage is the implementation of inter-university quality monitoring mechanisms adopted by all program participants.

The growth rate of the number of DDPs from 2020 to 2023 reflects the institutional expansion of the internationalization tool. However, structural differences across levels of education and languages of delivery indicate the need for a differentiated approach to quality management. The concentration of programs at the master's level allows this level to be considered the most promising for piloting expanded quality indicators related to the measurement of learning outcomes and curricular comparability. Thus, the graphs confirm the conclusion that the national system is transitioning from a stage of quantitative growth to a stage of evidence-based quality mechanisms.

Based on the work of the expert group, statistical data on the participation of Kazakhstani universities in double degree programs was processed and analyzed. The analysis (as of the first half of 2023) shows that:

- Approximately 50-60 Kazakhstani universities systematically participate in v degree programs.

- There are approximately 300 active programs in total, most of which are focused on management, finance, IT, and engineering.

- The share of double degree programs in master's and bachelor's degrees is higher (approximately 70% of the total) compared to doctoral programs, as research components require international collaboration.

A comparative analysis of v degree programs in various regions of Kazakhstan was conducted:

- KIMEP, Al-Farabi Kazakh National University, KBTU (Almaty): high level of internationalization, extensive network of partners in Europe, North America, and Asia. The financial stability of universities (through government procurement, private investment, and endowments) allows for program development.

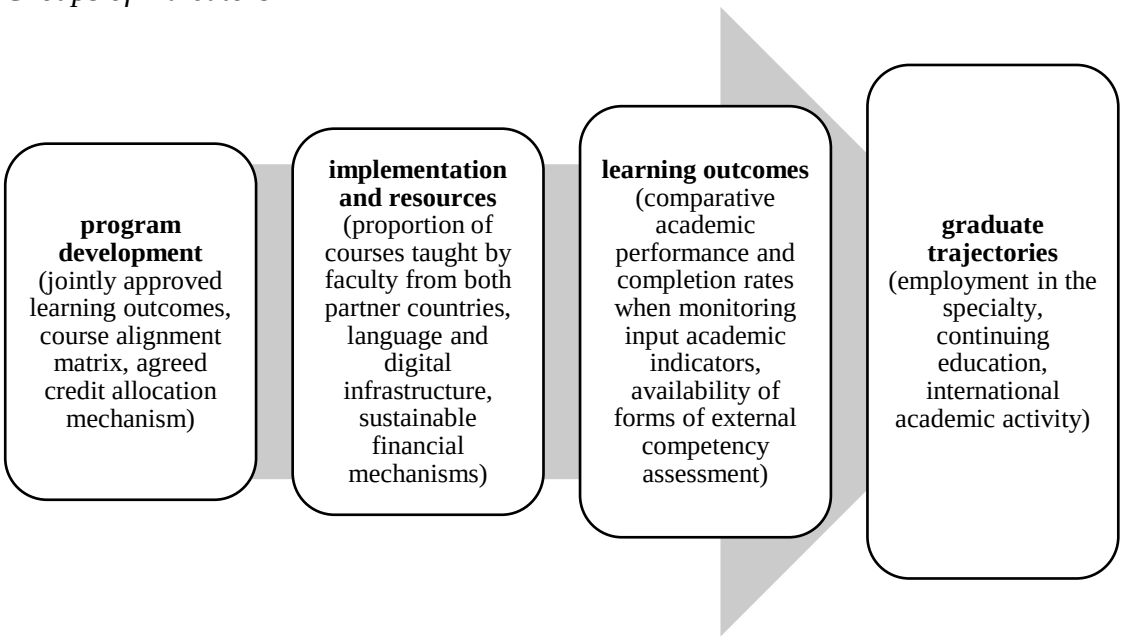
- L.N. Gumilyov Eurasian National University and S. Seifullin Kazakh Agrarian University (Astana) are gradually introducing joint programs, primarily in engineering and the natural sciences.

- Regional universities (Karaganda, Shymkent, Ust-Kamenogorsk, etc.)

Face a lack of funding and a weaker infrastructure. They primarily implement exchange programs (incomplete double degrees) and short internships.

Based on analysis and national data, experts propose a model of measurable indicators for the quality of development programs, including four groups of indicators identified through best practices in developing development programs in Europe, the United States, and Asia (Figure 4).

Figure 4.
Groups of indicators



To operationalize the proposed model of DDP quality, a system of indicators was used, grouped into four blocks: A) program development, B) implementation and resources, C) learning outcomes, and D) graduate trajectories. The indicators were formulated in such a way as to be verifiable against national monitoring data, internal university documents, and performance indicators. The list of indicators was validated by an expert group (n=10) using ranking and discussion until consensus was reached. After approval, the model was tested on 56 existing DDPs of the L.N. Gumilyov Eurasian National University (Table 1).

Table 1.
Model of measurable indicators of the quality of the DDP

Block	Indicator code	Indicator (what is being checked)	How to measure / scale	Data source
Program development	A1	Jointly agreed learning outcomes (LOs)	0 - absent; 1 - approved by one party/partially agreed upon; 2 - jointly approved and set out in appendices to the agreement	Agreement, educational program passport, minutes of joint committees
	A2	Matrix of correspondence of disciplines/modules	0 -absent; 1 - present, but not regularly updated; 2 - present and updated at least once every 2 years	Educational plan, syllabi, conversion matrix
	A3	An agreed mechanism for the distribution of credits and mobility periods	0 - not defined; 1 - defined in general terms; 2 - formalized with indication of mandatory periods/ECTS equivalents	Curricula, appendices to the MoU/agreement
Implementation and resources	B1	The share of courses implemented with the participation of faculty from both organizations	Fact/percentage of the total volume of program disciplines; recommended maturity benchmark: ≥ 20-30%	Teaching staff workload, schedules, and course catalogs
	B2	Language and digital infrastructure for collaborative learning	0 - absent; 1 - partially provided; 2 - provided in all key modules	LMS, regulations, IT/academic services reports
	B3	Sustainable financial mechanisms (mobility, joint modules)	0 -episodic support; 1 - individual sources; 2 - a fixed model of co-financing/grants/benefits and access rules	Program budgets, grant provisions, agreements
Learning outcomes	C1	Comparable academic results when controlling for input indicators	Comparison of GPA/grades and the proportion of outstanding students between streams, taking into account the entry level (language, academic ranking)	Student databases, department/dean's office reports
	C2	Completion rates	Percentage of students completing the program within the standard timeframe; comparison with similar non-joint programs	National monitoring, internal reports
	C3	Availability of forms of external/joint assessment of competencies	0 - none; 1 - occasional; 2 - regular joint/external assessment	Minutes of the State Attestation Commission/joint commissions, QA reports
Graduate trajectories	D1	Employment in your specialty	The proportion of those employed in their field within 6–12 months after graduation	Career center, graduate surveys, government statistics (if available)
	D2	Continuous education	The proportion of graduates admitted to the next level/international programs	Alumni surveys, admissions/academic services databases
	D3	International academic activities of alumni	Participation in international projects, internships, publications or professional associations (share/cases)	Surveys, bibliometric and project data (if available)

The difficulties in aligning curricula and matching matrices identified by the experts correlate with the Block A indicators (A1-A3), which reflect the maturity of the joint program design. Limitations of the financial model and differences in the resource endowment of universities are reflected in the Block B indicators (B1-B3). The observed heterogeneity in completion rates and student retention highlights the need to monitor the Block C indicators (C1-C3), while assessing the long-term effects of internationalization requires the inclusion of Block D (D1-D3) in the internal and external quality assurance system.

The proposed model addresses a key issue identified during the analysis of the original article and national data: the claimed effects of DDP (including improved academic performance) must be confirmed by comparable measurements. The use of standardized indicators will allow for a transition from descriptive interpretation to evidence-based positioning of joint programs as an element of the quality assurance system.

Overall, to strengthen their internal quality assurance systems, Kazakhstan universities are recommended to strengthen the quality of their academic services and departments. Internal documents and regulations governing university academic and research policies must be fundamentally revised. This work must be carried out within the context of the new regulatory framework within the institutional, academic, and managerial autonomy of Kazakhstan universities.

Based on an expert survey conducted among three universities from different regions, it was revealed that higher education institutions of the Republic of Kazakhstan suffer from a lack of experience and a regulatory framework, as it is evident that higher education institutions are making requests regarding the regulatory framework, which has recently been expanded, based on the fact that all universities are aiming to increase the foreign contingent, which was set by the President of the Republic of Kazakhstan at the International Forum of Strategic Partners “Kazakhstan - Territory of Academic Knowledge”, which leads to the provision of better conditions and the preparation of the educational programs themselves (Tokayev, 2025).

This research explores the problem and identifies its scientific novelty, which lies in the development and validation of a model of measurable indicators of joint program quality. This model is adaptable to national monitoring data and simultaneously aligns with the international logic of quality assurance for joint programs. Unlike descriptive approaches, the model structures quality into four blocks: design, resources, learning outcomes, and graduate trajectories, and enables comparison of programs across universities based on a unified framework of indicators.

Validity and reliability are ensured by multi-stage expert validation of the indicators using questionnaires, interviews, and quantitative consensus-building criteria. Additional internal consistency testing of the scales during the questionnaire confirms the reliability of the assessment instruments.

The authors continue their work examining new methodologies for c degree programs, which will establish a new quality standard for Kazakhstan's educational system (Komekbayev & Kurmangaliyeva, 2023).

Conclusions

Joint double degree educational programs in the Republic of Kazakhstan demonstrate their expanding institutional reach and potential to become a tool for systematically improving the quality of educational programs. The international experience of the European Higher Education Area confirms that the sustainability of such programs is ensured by uniform quality standards, transparent procedures for recognizing learning outcomes and joint program management.

National data indicate the need to move from primarily quantitative expansion of programs to strengthening their impact in terms of coverage, language of instruction, geographical coverage of partnerships, and evidence-based quality indicators. The proposed model of indicators can be used by organizations of higher and postgraduate education and the regulator as a basis for internal and external assessment of the quality of joint programs, as well as a methodological basis for further standardization of the practice of developing and implementing double-degree programs.

The study of the article highlights the importance of double-degree education and highlights the need for further research and the development of effective strategies for the implementation of such programs in various educational contexts.

The analysis confirms that DDP in Kazakhstan are moving into the stage of sustainable institutional dissemination and are considered by universities as a tool for internationalization and a potential mechanism for improving the quality of educational programs. At the same time, a key contradiction has been revealed between the quantitative growth of the DDP portfolio and the lack of evidence-based, comparable mechanisms for assessing their quality at the level of the national system and individual universities.

A systematic review of international studies and a comparison of practices from the EHEA, the United States, and Asian countries show that the greatest sustainability and quality of DDP are achieved when they are designed as integrated joint programs with pre-agreed learning outcomes, transparent credit allocation, and formalized procedures for joint management and quality assurance. For the Kazakh context, this means the need to shift the managerial focus from formal indicators of agreement availability and mobility to an analysis of the maturity of educational design, resource model and learning outcomes.

The results of an expert survey of three universities confirm the systemic nature of barriers to national DDP practice. The most significant difficulties remain the coordination of curricula and discipline matching matrices, issues of recognition of qualifications, limitations of financial mechanisms and the increased workload of academic and international services. The fact of the request for clarification and development of regulatory procedures for credit technology training in terms of DDP indicates the need to update the regulatory framework, taking into account practical management nuances.

Based on the identified gaps, a model of measurable quality indicators of DDP has been proposed and tested, structuring the assessment into four blocks. The testing of the model on existing programs has shown its applicability to national monitoring data and the possibility of using it to compare programs between universities, identify risk areas and assess managerial maturity. Thus, the model closes the identified research and practical gap and forms the basis for the transition to evidence-based quality management of DDP.

The practical significance of the research lies in the fact that the proposed indicator system can be used by universities to strengthen internal quality assurance and strategic planning of international programs; recommendations for the formation of unified methodological requirements and the development of national monitoring; accreditation structures as a tool for assessing the maturity of joint programs in the logic of ESG and European Approach.

In general, the development of DDP in the Republic of Kazakhstan requires institutional strengthening of mechanisms for joint curriculum design, standardization of credit recognition procedures and study periods, the development of sustainable financial models and the introduction of joint quality monitoring procedures. The implementation of these areas will make it possible to consolidate the DDP not only as a format of international cooperation, but also as a new evidence-based quality standard for the national higher education system.

The study is based on national monitoring data and open international analytical materials, which limits the depth of analysis of students' individual educational trajectories and long-term effects on their careers. Not all indicators are presented in a uniform format by year, and some key information (such as detailed internal quality assessment results for specific programs) is not publicly available. The expert assessment also depends on the context and requires periodic updating as regulatory conditions and DDP implementation practices change.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author Contributions

Yermek Komekbayev: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing - Original Draft Preparation. Dina Kurmangaliyeva: Supervision, Validation, Writing - Review and Editing. Khanat Kassenov: Formal analysis, Visualization, Writing - Review and Editing.

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Information about authors

Yermek Komekbayev - PhD student at the Department of Standardization, Certification and Metrology, S. Seifullin Kazakh Agro-technical Research University, Astana, Kazakhstan, email: stranger6592@mail.ru, ORCID 0009-0004-4866-855X

Dina Kurmangalieva - Doctor of Technical Sciences, Associate Professor at the Department of Standardization, Certification and Metrology, S. Seifullin Kazakh Agro-technical Research University, Astana, Kazakhstan, email: omimk@mail.ru, ORCID 0000-0002-7583-7919, ***(corresponding author)***

Khanat Kassenov – PhD, Kazakh national University of Sport, Astana, Kazakhstan, email: kh_kassenov@apems.edu.kz, ORCID 0000-0002-7555-4919

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Marta Alieva, Roza Ismailova, Yerkin Mukashev, Dias Kanatuly, Yerzhan Aghleshov, Aliya Asman

Almaty Technological University, Almaty, Kazakhstan

OPTIMIZING PROJECT-BASED LEARNING FOR FOOD INDUSTRY STUDENTS: THE ROLE OF PROJECT COMPLEXITY AND DURATION

Abstract: This article investigates the influence of Project-Based Learning (PBL) parameters on the educational results of students in the discipline 'Technology of Meat and Meat Products'. The relevance of the study is due to the need to improve educational techniques aimed at developing practical skills and increasing student motivation. The research methods included a factor experiment in which the complexity of the project (X_1: basic level (1), medium level (2), high level (3)) and the duration of the project (X_2: 2 weeks (2), 4 weeks (4), 6 weeks (6)) were varied. Performance was evaluated based on the resulting factors: final test (Y_1), average grade during the course (Y_2) and student satisfaction (Y_3). The results of the study showed that optimal performance was achieved at $X_1 = 2$ and $X_2 = 4$, providing the highest academic performance and student engagement. The findings of the study confirm the effectiveness of PBL and emphasise the need to further integrate this approach into the educational process.

Keywords: Project-Based Learning, Problem-Based Learning, Factorial experiment, Full Factorial Design, academic performance, student motivation.

Introduction

Modern education aims to develop not only fundamental knowledge but also practical skills essential for professional activities (Chi, 2023). One of the most effective approaches is Project-Based Learning (PBL) or Problem-Based Learning, which actively engages students in solving real or simulated problems. Unlike traditional education, PBL fosters autonomy, critical thinking, and problem-solving skills, making it a highly sought-after method in higher education worldwide (Sari et al., 2023).

Project-based learning enhances student motivation by connecting assignments to real-world issues, making the learning process more meaningful (Al-Kamzari & Alias, 2025). Instead of passively absorbing information, students engage in active inquiry, leading to deeper comprehension and the development of analytical skills. Project work requires students to analyze systems, research information, and make decisions under uncertainty (Bashir et al., 2024). These abilities are particularly valuable in professional settings, where individuals must not only understand theoretical concepts but also adapt to change and develop effective solutions (Peraza & Furumura, 2022).

Additionally, PBL fosters communication and teamwork skills. By working collaboratively, students learn how to coordinate tasks, present and defend their perspectives, and reach compromises (Juratovna, 2024). These qualities are essential for career growth and professional success.

PBL is widely used in higher education, particularly in fields such as engineering, medicine, science, and economics. It can be implemented in various formats. Long-term semester projects allow students to explore topics in depth and conduct extensive research, while short-term projects focus on solving specific problems within a limited timeframe (Yi et al., 2025). Interdisciplinary projects bring together students from different fields, encouraging knowledge integration and flexible thinking (Chanpet, Chomsuwan & Murphy, 2020).

For PBL to be effective, educators must be trained to shift from traditional lecturing to a mentorship role (Lam, Cheng & Choy, 2020). Another key factor is resource availability, including access to laboratories, software, interactive technologies, and digital platforms (Li et al., 2024).

Despite its many advantages, the successful implementation of project-based learning requires a flexible approach to curriculum design and classroom organization.

Methodology

As part of the study on the implementation of project-based learning in the educational process, laboratory classes in the discipline 'Technology of meat and meat products 1' were selected for third-year students of the speciality 'Technology of meat and fish products' (group TMFP 22-11) in Almaty Technological University. Classes were carried out on the basis of the Educational and Scientific Centre of Meat Processing, equipped with the necessary technological equipment, allowing the full cycle of meat processing and production of various types of meat products. The initial educational process of the classes consisted of studying the theory and manufacturing of meat products in practice, and the assessment of students' knowledge was carried out through final testing during the boundary control.

The methodological basis of the study included the introduction of the project method of teaching, the purpose of which was to increase the level of learning of educational material, the development of practical skills of students and the formation of independence in making technological decisions. As a project task, students were offered to develop and produce a meat product based on the theoretical knowledge obtained in the course. At the same time, the whole process of project development and implementation was carried out outside the time of standard laboratory classes, which made it possible to assess the degree of students' independence, their involvement in the process and the level of formed competences.

The experimental part of the research is based on the principle of fractional modification of the full factor experiment. These methods allow systematically studying the influence of controlled factors on the output characteristics of the system and revealing the regularities that determine the effectiveness of project-based learning.

Two independent factors were identified in the study:

X_1 - complexity of the project, including three levels:

- Basic level (1) - making a meat product already presented in the educational process, with students independently carrying out the technological process without making changes.
- Medium level (2) - development of a modified version of the meat product on the basis of the already studied one, including partial change of the technological process or introduction of new ingredients.
- High level (3) - development of a modified variant of a meat product on the basis of the already studied one with the subsequent execution of patent documentation for a utility model that meets the requirements of official patenting. Registration of the patent is not required. This choice was made so that students also learnt to develop documentation for the results of their future research.

X_2 is the duration of the project, which takes three values - 2 weeks, 4 weeks and 6 weeks. The maximum duration was chosen to be 6 weeks as the study is limited by the Midterm (week 7). The minimum possible time is 2 weeks, which includes one week for studying the material and one week for direct production of the product.

The experiment matrix was constructed in accordance with the principles of the full factor experiment, including 9 combinations of factor levels X_1 and X_2, as well as a control group. However, given the limited number of students in the TMFP 22-11 group (20 students), the application of a full factor experiment proved impossible and a fractional modification of the experiment was implemented, allowing to reduce the number of experimental groups while

maintaining the scientific significance of the study. As a result, there were 5 experimental groups of 3 students each and 1 control group of 5 students who were trained according to the traditional methodology without the introduction of project-based learning. The other 3 groups were excluded from the experiment. The groups that were included in the final design of the experiment are highlighted.

Table 1

Matrix of full factorial experiment with distribution of groups by complexity and duration of the project

Group name	X_1 – Project complexity	X_2 – Project duration
Group 1	Basic level (1)	2 weeks
Group 2 (excluded)	Basic level (1)	4 weeks
Group 3	Basic level (1)	6 weeks
Group 4 (excluded)	Medium level (2)	2 weeks
Group 5	Medium level (2)	4 weeks
Group 6 (excluded)	Medium level (2)	6 weeks
Group 7	High level (3)	2 weeks
Group 8 (excluded)	High level (3)	4 weeks
Group 9	High level (3)	6 weeks
Control group	-	-

In order to objectively assess the impact of project-based learning on the educational process, three resultant indicators (Y) reflecting academic performance, student involvement in the learning process and subjective assessment of the effectiveness of the methodology were determined.

Y_1 - Midterm results. All students, regardless of the teaching method, underwent a single final test, similar to the one used before the introduction of the project approach. This indicator allows us to compare the level of learning material assimilation between the control and experimental groups and determine the impact of the project method on the final results.

Y_2 - Average grade during the training. The average grades during the laboratory sessions allowed us to identify the impact of involvement in project activities on the overall level of mastery of the discipline.

Y_3 - Student satisfaction with the learning process. This parameter was assessed through a survey of participants on a five-point scale (from 1 - ‘did not like’ to 5 - ‘very much like’). The survey made it possible to determine students' subjective perception of project-based learning.

The choice of these factors is due to the need for a comprehensive analysis of the impact of the project method not only on students' academic achievements, but also on psychological and behavioural aspects of learning, which will allow us to form objective conclusions about the appropriateness of its application in the educational process.

Regression analysis was carried out in Microsoft Excel and Statistica programmes. Regression analysis was used to build a mathematical model describing predictable changes in students' academic performance and engagement depending on the complexity and duration of project work.

Results and discussion

After obtaining the results of the experiment and the values of the resultant factors, the experiment matrix was constructed with the values of the resultant factors (Table 1).

Table 2

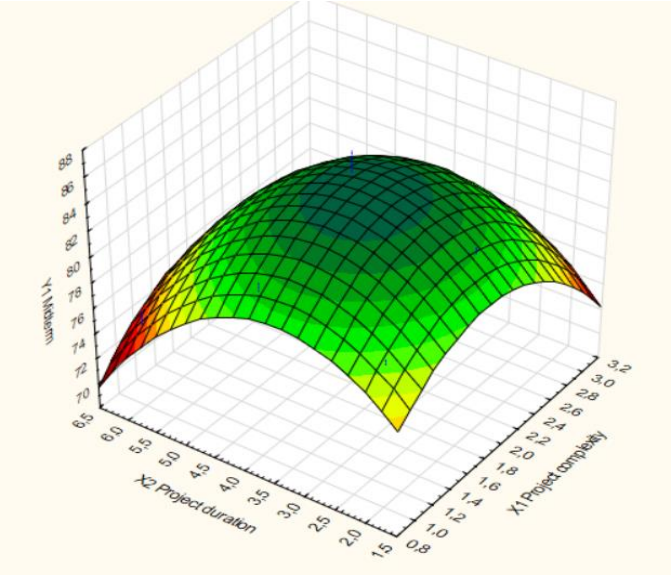
Matrix of fractional factor experiment with values of resultant factors

Group name	X_1 – Project complexity	X_2 – Project duration	Y_1 – Midterm results.	Y_2 – Average grade	Y_3 – Student satisfaction
Group 1	Basic level (1)	2 weeks	79,3	82,6	4,2
Group 3	Basic level (1)	6 weeks	75,5	79,2	3,6
Group 5	Medium level (2)	4 weeks	86,2	88,2	5
Group 7	High level (3)	2 weeks	76,3	80,8	4
Group 9	High level (3)	6 weeks	75,8	75,5	2
Control group	-	-	74,6	79,5	1,8

Surface Plot of Y1 (Midterm) against X1 (Project complexity) and X2 (Project duration) is shown in Figure 1.

Figure 1

Surface Plot of Y_1 (Midterm results) against X_1 (Project complexity) and X_2 (Project duration)



The regression equation for Y_1 (Midterm results) as a function of X_1 (Project Complexity) and X_2 (Project Duration):

Y_1 (Midterm results) = 58,7111 + 13,9X_1 + 7,4833X_2 - 4,0167X_1^2 + 0,2875X_1X_2 - 1,1292X_2^2

As can be seen from Figure 1, the maximum value of Y_1 = 86.2 is observed at the medium level of complexity and duration of 4 weeks, indicating the most favourable combination of complexity and duration of the project. The minimum value of Y_1 = 74.6 was recorded in the control group (X_1 = 0, X_2 = 0), which confirms the significant impact of project-based learning on student performance.

When the complexity of the project (X_1) increases, there is a non-linear effect on Y_1. At the initial and intermediate level of complexity, test scores increase as students become engaged, develop skills in knowledge adaptation and in-depth analysis without being overloaded. However, at high levels of complexity, Y_1 values start to decrease, which is

explained by the shift of students' focus from theoretical material to the fulfilment of complex design tasks.

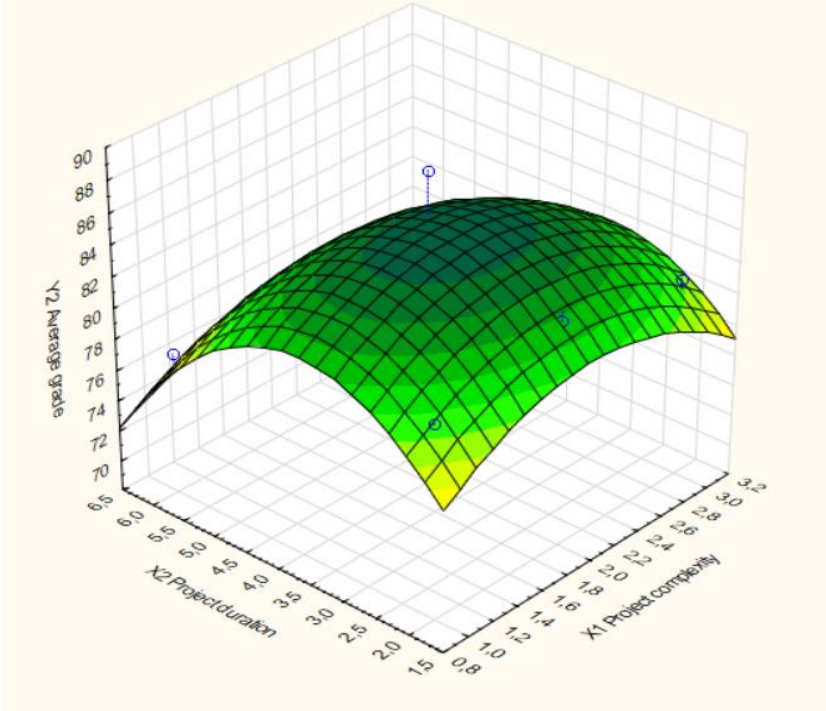
When the project duration (X_2) is increased, a similar pattern is observed. Optimal results (X_2 = 2-4 weeks) are associated with students having enough time to work on the project without reducing their concentration on the discipline. However, at a duration of 6 weeks, a decrease in Y_1 is recorded, indicating a gradual decline in engagement and a weakening of academic focus.

Thus, the findings demonstrate that the best results are achieved at $X_1 = 2$ and $X_2 = 4$, when the project is challenging enough to stimulate cognitive activity but not too labour-intensive, and the duration of the project provides a balance between engagement and motivation to learn.

Surface Plot of Y_2 (Average grade) against X_1 (Project complexity) and X_2 (Project duration) is shown in Figure 2.

Figure 2

Surface Plot of Y_2 (Average grade) against X_1 (Project complexity) and X_2 (Project duration)



The regression equation for Y_2 (Average grade) as a function of X_1 (Project Complexity) and X_2 (Project Duration):

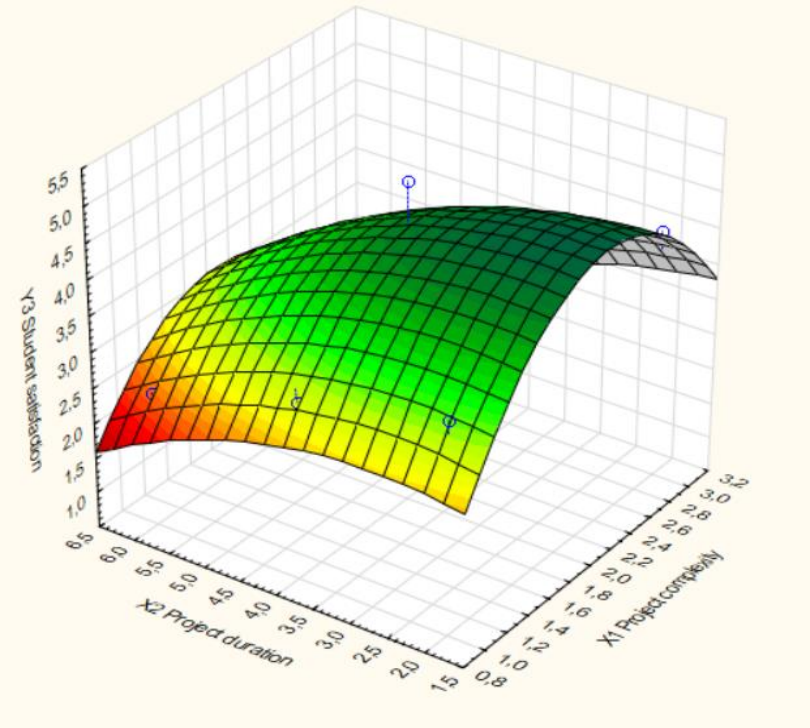
Y_2 (Average grade) = 59,4667 + 11,3333X_1 + 8,9X_2 - 2,75X_1^2 - 0,2375X_1X_2 - 1,2125X_2^2

As can be seen from Figure 2, the maximum value of Y_2 = 88.2 was recorded at the medium level of complexity and duration of 4 weeks, indicating the most favourable conditions for achieving high average student performance. The minimum value of Y_2 = 75.2 was observed in the control group ($X_1 = 0$, $X_2 = 0$), indicating the positive effect of project-based learning on students' current grades during the course. However, at high complexity, average grades decrease as students redistribute their attention in favour of project work, which may lead to a decrease in concentration on the ongoing learning process.

Surface Plot of Y_3 (Student satisfaction) against X_1 (Project complexity) and X_2 (Project duration) is shown in Figure 3.

Figure 3

Surface Plot of Y3 (Student satisfaction) against X1 (Project complexity) and X2 (Project duration)



The regression equation for Y_3 (Student satisfaction) as a function of X_1 (Project Complexity) and X_2 (Project Duration):

Y_3 (Student satisfaction) = 1,4778 + 5,5667X_1 + 0,5417X_2 - 1,2833X_1^2 -0,1125X_1X_2 - 0,0833X_2^2

As can be seen from Figure 3, the maximum value of Y_3 = 5.0 is also observed at the medium level of complexity and duration of 4 weeks, indicating the highest satisfaction of students in performing innovative but feasible tasks. The minimum value of Y_3 = 1.8 was recorded in the control group (X_1 = 0, X_2 = 0), which confirms the low level of engagement in traditional learning. Students with short project duration (X_2 = 2) also show high levels of satisfaction as the project did not become tedious. In turn, the least satisfied students were those with overly complex projects (X_1 = 3), indicating overload and loss of motivation.

The study also highlighted the positive attitude of students toward project-based learning. Participants in the experimental groups expressed a strong interest in continuing with this approach, citing its practical application and the opportunity for deeper understanding of the material. Even students from the control group, who had not engaged in project activities, showed enthusiasm and expressed a desire to work on their own projects.

The course instructor also observed a noticeable increase in student engagement. Many students actively sought guidance on their projects, requested additional reading materials, and made independent efforts to solve problems. This surge in initiative suggests a boost in both motivation and interest in the subject.

Conclusion

The results of the study confirmed the benefits of project-based education over traditional methods of instruction. Analysis of the indicators' results demonstrated that the control group who learned in the absence of project tasks had the lowest results on all indicators, while the members of experimental groups who worked on tasks achieved higher scores.

The highest level of satisfaction was observed among students who worked on innovative but moderately challenging tasks, whereas overly complex projects resulted in a decline in both academic performance and interest in the subject. The best outcomes were achieved by students who completed medium-complexity projects over a four-week period. This training format provided an optimal balance between task complexity and time investment, allowing students to engage deeply and enthusiastically in project activities while also preparing effectively for the final test. The findings suggest that further integration of project-based learning into the educational process could be beneficial.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author Contributions

Marta Alieva: Conceptualization, Project administration, Supervision. Roza Ismailova: Translation, Reviewing and Editing. Yerkin Mukashev: Data analysis, Mathematical modeling, Visualization. Dias Kanatuly, Yerzhan Aghleshov, Aliya Asman: Data collection, Interviewing, Investigation.

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Information about authors

Marta Bakhytzhanovna Alieva – Candidate of Philological Sciences, Assistant Professor, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: marta.ali777@mail.ru

Roza Baizhumanovna Ismailova – Assistant Professor, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: 68roza.i@mail.ru

Yerkin Dieshbekuly Mukashev – Master's Student, Department of Food Technology, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: yerkin.0208@mail.ru ***(corresponding author)***

Dias Kanatuly – Master's Student, Department of Food Safety and Quality, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: qanatulydias@mail.ru

Yerzhan Kuanyshuly Aghleshov – Master's Student, Department of Automation and Robotics, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: aghleshov.kz@gmail.com

Aliya Bauyrzhankyzy Asman – Master's Student, Department of Food Technology, JSC Almaty Technological University, Almaty, Kazakhstan; e-mail: asman.aliya@bk.ru

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Zhenisbek Nakypbek, Larissa Kainbayeva

Korkyt Ata Kyzylorda University, Kyzylorda, Republic of Kazakhstan

THE LEVEL OF ASSESSMENT LITERACY OF PRE-SERVICE MATHEMATICS TEACHERS

Abstract: Assessment literacy is increasingly recognized as a critical element in the preparation of future teachers, especially in subjects where academic achievement is closely measured, such as mathematics. Yet, the extent to which pre-service teachers develop assessment-related understanding remains a subject of ongoing discussion. This article explores the general patterns and tendencies regarding assessment literacy among future mathematics teachers within the context of higher education. Drawing on conceptual frameworks and previous international findings, the study examines the presence and depth of assessment-related knowledge and attitudes among students preparing for teaching careers. Special attention is given to the role of practical teaching experience in shaping these competencies. While various educational programs emphasize assessment in theory, questions persist about its transfer into real teaching contexts. The study contributes to this dialogue by analyzing indicators of assessment literacy and reflecting on the implications for teacher education. The findings underscore the importance of aligning theoretical content with pedagogical practice and offer suggestions for improving training components related to assessment. This research provides insights relevant to teacher educators and curriculum developers who seek to enhance the effectiveness of initial teacher education and ensure that future educators are well-equipped to assess student learning in a meaningful and responsible way.

Keywords: assessment literacy; pre-service teachers; mathematics.

Introduction

In the context of modern education, assessment literacy has become a foundational competency for future teachers, especially in mathematics education. The ability to design, interpret, and use assessment data effectively is critical not only for measuring student performance but also for guiding instruction, enhancing learning, and fostering reflective practice. According to DeLuca and Klinger (2010), assessment literacy involves knowledge of assessment principles, the ability to apply various assessment methods, and the skill to interpret results meaningfully for pedagogical decisions. Despite its recognized importance, numerous studies (Ayalon & Wilkie, 2020; Deneen & Brown, 2016; Koh, 2011) have reported that pre-service teachers often demonstrate limited competence in practical assessment tasks.

There is growing consensus among scholars that pre-service teacher education programs must prioritize assessment literacy through both theoretical instruction and authentic practice (Canty et al., 2023; Oo et al., 2022). Studies have shown that future teachers frequently perceive assessment as a summative grading tool rather than as a formative process to support student learning (Dehqan & Sorkhi, 2020; McMillan, 2001). This misperception can hinder their ability to use assessment in dynamic and learner-centered ways. Moreover, the development of assessment literacy has been closely linked to experiential opportunities such as pedagogical practicum or approximations of practice (Ayalon & Wilkie, 2020).

In the current study, a quantitative approach was employed to explore the assessment literacy levels of pre-service mathematics teachers enrolled at Korkyt Ata university. A validated instrument partially adapted from McMillan (2001) was used to collect data from 119

participants. The study aimed to test several hypotheses based on prior literature: (1) Pre-service mathematics teachers demonstrate insufficient assessment literacy; (2) Those who have completed pedagogical practicum have significantly higher assessment literacy.

The findings of this study are expected to contribute to improving teacher education programs in Kazakhstan by identifying specific areas where assessment literacy training should be strengthened.

Literature Review

Assessment literacy is broadly defined as the knowledge, skills, and understanding required to design, implement, interpret, and use assessments effectively for teaching and learning (DeLuca & Klinger, 2010; Stiggins, 2010). Popham (2009) characterizes it as a critical teacher competence, essential for making valid educational decisions. The evolution of assessment literacy has transitioned from a narrow focus on testing and grading to a more nuanced understanding that includes formative, summative, and authentic assessment strategies (Deneen & Brown, 2016). In contemporary teacher education, assessment literacy is viewed not only as technical knowledge but also as a reflective and contextual practice (Koh, 2011).

The literature identifies several dimensions of assessment literacy, which typically include: understanding of assessment purposes, selection and design of appropriate tools, data interpretation, feedback provision, and ethical application of assessment results (Alonzo & Oo, 2022; DeLuca & Klinger, 2010). These competencies are often grouped into cognitive (what teachers know), practical (what they do), and affective (their beliefs and attitudes) components (Deneen & Brown, 2016).

Moreover, assessment literacy requires teachers to be capable of aligning learning goals with assessment tasks and using results to inform instruction. Inadequate training in this area can lead to reliance on traditional testing approaches and missed opportunities for formative assessment (Ayalon & Wilkie, 2020).

Numerous studies (Canty et al., 2023; Dehqan & Sorkhi, 2020) have identified that pre-service teachers (PSTs) often enter teacher education programs with limited understanding of assessment principles. Many PSTs perceive assessment as primarily summative, used for grading rather than as a tool for student development (McMillan, 2001). This summative orientation may result from their own schooling experiences, where assessments were used mainly for accountability rather than learning support.

McMillan (2001) found that secondary teachers tend to emphasize grading over feedback, often neglecting the potential of formative techniques such as peer assessment, self-assessment, or portfolio-based evaluation. This orientation influences PSTs' own conceptions of assessment and highlights the importance of explicitly addressing assessment literacy in teacher preparation curricula.

Experiential learning particularly through pedagogical practicum has been shown to play a critical role in fostering assessment literacy. Ayalon and Wilkie (2020) demonstrate that when PSTs engage in real-world classroom tasks such as designing rubrics and analyzing student work, they begin to understand assessment as a dynamic and responsive process. Similarly, DeLuca and Johnson (2017) advocate for “approximations of practice” — guided simulations that help PSTs rehearse assessment activities before entering the classroom.

Koh (2011) also stresses the importance of long-term, embedded professional development in contrast to short-term workshops. Pre-service teachers who participate in sustained assessment-focused training tend to show greater growth in assessment-related competencies.

Despite an increasing body of research, gaps remain in understanding how assessment literacy develops among PSTs in specific local contexts, such as Kazakhstan. Many international studies focus on Western or high-resource educational systems, which may not fully reflect the realities of teacher preparation in post-Soviet or Central Asian environments.

Furthermore, there is limited quantitative research directly comparing assessment literacy levels of PSTs with and without practicum experience. The present study addresses this gap by investigating how pedagogical practicum and teaching experience influence assessment literacy among pre-service mathematics teachers at Korkyt Ata university.

Methodology

This study employed a quantitative, non-experimental, cross-sectional design to examine the assessment literacy levels of pre-service mathematics teachers. The research aimed to compare literacy levels between groups based on practicum experience and explore overall proficiency.

The study sample included 119 undergraduate students from Korkyt Ata university majoring in mathematics education. Participants were from all four academic years (Year 1 to Year 4). Grouping was conducted based on their participation in pedagogical practicum (yes/no).

The primary data collection instrument was a structured questionnaire adapted from a validated tool originally developed by the first author of "Pre-service teachers' assessment literacy and its implementation into practice," with several items drawn from McMillan (2001). The original instrument consisted of two sections. For this study, only Section I was used, which included 42 items covering:

- Background and demographic questions (8 items),
- Types of assessment (14 items),
- Evaluation criteria (16 items),

Cognitive levels of assessment (4 items). Nine questions from the "teaching methods" section were excluded, as they were not relevant to the core objective.

To assess the internal consistency of the instrument, Cronbach's alpha coefficient was calculated using SPSS(version 29.0.2.0) software. The result was $\alpha = 0.838$ for 34 items, indicating high reliability.

The survey was distributed in paper format during the 2024–2025 academic year. Participation was voluntary, and students were informed about the purpose and confidentiality of the study. Data were coded and processed using SPSS Statistics 26.

Three statistical procedures were used:

1. Kolmogorov–Smirnov test to assess the normality of data distribution. Results showed that the distribution was not normal ($p < 0.001$).
2. Cronbach's alpha to measure the internal consistency of the questionnaire.
3. Mann-Whitney U test to compare the assessment literacy scores between students who had completed practicum and those who had not.

All participants gave informed consent. Anonymity and confidentiality were ensured, and participation had no effect on academic standing. The research followed ethical guidelines for educational research involving human participants.

Results and discussion

To evaluate the first hypothesis — that pre-service mathematics teachers have low levels of assessment literacy — the mean score of all 119 participants was analyzed. The overall mean score was $M = 1.4706$ ($SD = 0.30953$) on a 4-point Likert scale.

Based on the categorization proposed by the original developers of the instrument (adapted from McMillan, 2001), assessment literacy levels can be interpreted as follows:

0.00–0.80: Traditional
0.81–1.60: Close to Traditional
1.61–2.40: Transitional
2.41–3.20: Close to Constructivist
3.21–4.00: Constructivist

Given that the mean score falls within the "Close to Traditional" range, the findings suggest that pre-service mathematics teachers possess relatively limited assessment literacy. This result supports the first hypothesis and is consistent with previous research emphasizing the underdeveloped assessment skills among pre-service teachers (Canty et al., 2023; Oo et al., 2022; McMillan, 2001).

Table 1 displays the descriptive statistics comparing students who had completed pedagogical practicum with those who had not. Students with practicum experience (n = 60) scored slightly higher (M = 1.5336, SD = 0.30809) than those without practicum (n = 59, M = 1.4065, SD = 0.30014).

Table 1

Descriptive Statistics for Assessment Literacy

Ped. prac.	Mean	N	Std. Deviation
Yes	1,5336	60	0,30809
No	1,4065	59	0,30014
Total	1,4706	119	0,30953

Although the descriptive statistics show a visible difference in means, statistical testing was required to determine its significance.

To determine whether parametric or non-parametric analysis would be appropriate, the Kolmogorov-Smirnov test was used to assess the normality of the distribution. As shown in Table 2, the test yielded a significant result ($p < .001$), indicating that the assessment literacy scores did not follow a normal distribution.

Table 2

One-Sample Kolmogorov–Smirnov Test

N			119
Normal Distribution Parameters[a,b]	Mean		1,4706
	Standard Deviation		0,30953
Most Extreme Differences	Absolute		0,244
	Positive		0,220
	Negative		-0,244
Test Statistic			0,244
Asymp. Sig. (2-tailed)[c]			<0,001
Monte Carlo Sig. (2-tailed)[d]	Sig.		<0,001
	99% Confidence Interval	Lower Bound	0,000
		Upper Bound	0,000

a. The distribution being tested is normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Lilliefors Method based on 10,000 Monte Carlo samples with starting seed 299883525.

This confirmed the use of non-parametric tests for subsequent analysis.

The second hypothesis — that students who had completed a pedagogical practicum would demonstrate significantly higher assessment literacy — was tested using the Mann–Whitney U test.

Table 3
Mann-Whitney U Test Results

Statistical criteria[a]	
Mann-Whitney U	1665,500
Wilcoxon W	3435,500
Z	-0,556
Asymp. Sig. (2-tailed)	0,578

a. Grouping variable: Pedagogical practice

Table 4
Mean Ranks by Practicum Group

Ped. prac.	N	Mean Rank	Sum of Ranks
Yes	60	61,74	3704,50
No	59	58,23	3435,50
Total	119		

Although students with practicum experience showed higher average ranks and means, the Mann–Whitney U test indicated no statistically significant difference ($p = 0.578$). Therefore, the second hypothesis was not supported by the data.

The purpose of this study was to investigate the assessment literacy levels of pre-service mathematics teachers and examine the potential influence of pedagogical practicum experience. Two hypotheses were formulated and tested. The findings are discussed below in relation to existing literature.

The first hypothesis proposed that pre-service mathematics teachers exhibit low levels of assessment literacy. The average literacy score of 1.4706 falls into the “close to traditional” category based on the classification framework used by the developers of the instrument (adapted from McMillan, 2001). This finding supports the hypothesis and is consistent with previous studies that report underdeveloped assessment competencies among pre-service teachers (Canty et al., 2023; Oo et al., 2022; McMillan, 2001).

The result reflects a persistent challenge in teacher preparation: many candidates continue to view assessment as a grading mechanism rather than as a tool for learning and improvement (Dehqan & Sorkhi, 2020). Such perspectives may be shaped by the teachers' own educational experiences in assessment-driven environments where summative evaluations dominate instructional decisions.

The second hypothesis assumed that students who had completed a pedagogical practicum would demonstrate significantly higher assessment literacy. While descriptive data

showed that practicum-experienced students had higher average scores (M = 1.5336 vs. M = 1.4065), the Mann–Whitney U test indicated that this difference was not statistically significant (p = 0.578).

This contrasts with previous research that links practice-based experiences to improved assessment competencies (Ayalon & Wilkie, 2020; DeLuca & Johnson, 2017). A possible explanation is that the practicum experience provided in the local context may not have emphasized assessment tasks or provided enough structured support. Without guided opportunities to engage in real assessment design, feedback provision, or data analysis, students may fail to develop deeper literacy despite their field experience.

The findings suggest that teacher preparation programs in Kazakhstan may benefit from a more explicit and structured focus on assessment literacy. This includes integrating formative assessment strategies into course content, providing hands-on activities in rubric development, and ensuring that practicum experiences include guided assessment practice.

Reinforcing assessment literacy as a core component of teacher identity and professional competence could enhance instructional decision-making and ultimately improve student learning outcomes.

Conclusion

This study examined the assessment literacy of pre-service mathematics teachers at Korkyt Ata University, Kazakhstan, focusing on two key research questions: (1) What is the general level of assessment literacy among these students? and (2) Does pedagogical practicum experience significantly influence their literacy levels?

The results indicated that the overall level of assessment literacy falls into the “close to traditional” category, confirming the first hypothesis that students possess relatively low assessment literacy. This finding echoes previous international research and underscores the need to strengthen assessment training within teacher education.

Regarding the second hypothesis, although practicum-experienced students demonstrated slightly higher average scores, the difference was not statistically significant. This suggests that current practicum structures may not sufficiently support the development of assessment skills.

Based on these findings, it is recommended that teacher education programs integrate more explicit instruction in assessment literacy, including both theoretical foundations and practical application. Enhancing practicum quality, especially in relation to assessment activities, can further support pre-service teachers in becoming competent, reflective practitioners capable of using assessment to improve student learning.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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Information about authors:

Nakypbek Zhenisbek Yergazyuly – Master of Pedagogical Sciences, PhD student of the educational programs "Physics and mathematics", Korkyt Ata Kyzylorda university, Kyzylorda, Kazakhstan, e-mail: zhenisbek.nakypbek99@gmail.com, ORCID 0009-0009-6655-2194 ***(corresponding author)***

Kainbaeva Larissa Sagizhanovna – Candidate of Pedagogical Sciences, Head of the educational programs "Physics and mathematics", Korkyt Ata Kyzylorda university, Kyzylorda, Kazakhstan, e-mail: kainbaeva_l@korkyt.kz, ORCID 0000-0002-2927-6575

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Marina Skiba[1], Amantay Nurmagambetov[1], Lyailya Ivatova[2], Alibek Madibekov[1], Karlygash Borgekova[1], Aitzhan Kulumzhanova[1]

[1] National Center for Higher Education Development of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan
[2] M. Auezov South Kazakhstan University, Shymkent, Kazakhstan

RISKS OF TRANSNATIONAL EDUCATION IN KAZAKHSTAN: OPENING AND OPERATION OF INTERNATIONAL BRANCH CAMPUSES

Abstract: This article examines the risks of transnational education in Kazakhstan, focusing on the opening and operation of international branch campuses. A literature review is provided with references to recent English-language sources (with at least 20% from Scopus/Web of Science publications in the last 10 years). Various forms of transnational education are considered including foreign branch campuses, franchised programs, joint faculties/institutes, etc. and specific risks for each type are described with examples. An expert risk assessment table is presented, in which types of transnational education are compared against categories of risk (with scores from 0 to 10). The Discussion highlights both traditional risk mitigation strategies and unconventional solutions. International trends are taken into account, such as stricter visa rules for international students in the USA, Canada, and the UK, and the resulting opportunities for Kazakhstan to attract a redistributed share of global student flows. The methodology (conceptual analysis, a case study of Kazakhstan, and secondary analysis of expert opinions and regulatory documents) is briefly outlined. In conclusion, practical recommendations are formulated for universities and educational authorities.

Key words: transnational education; higher education; international branch campuses, Kazakhstan.

Introduction

Cross-border (transnational) education, which enables students to obtain a foreign qualification without leaving their home country, has expanded rapidly in recent years and has become an integral component of the internationalisation of higher education (Wang, 2025; Altbach, 2018). Moreover, higher education itself increasingly serves as a foundation for the formation of cross-border spaces (Leontiev, 2025). Transnational higher education is commonly understood as the transfer of educational programmes or the establishment of branch campuses outside the provider's country of origin, allowing students to obtain a foreign degree in their home country.

A wide range of cross-border (transnational) education models exists, spanning from fully foreign-controlled (independent) arrangements to partnership-based (collaborative) forms. These include international branch campuses, franchised programmes, validated (licensed) courses, joint and double degree programmes, joint colleges or institutes, online learning, and other delivery modes (Wang, 2025). While each of these forms offers specific advantages, they also entail certain risks related to quality assurance, institutional sustainability, and the effectiveness of governance and management (Bamberger & Morris, 2024).

The academic literature increasingly addresses the risks and challenges associated with transnational education. Critics highlight the commercialization of many TNE initiatives and insufficient regulatory oversight, which may result in declining academic standards and reputational damage (Wang, 2025). For example, as noted by P. Altbach (2010), a number of

overseas campuses fail to replicate the academic environment of the home campus and instead represent only a weak approximation of it (Altbach & de Wit, 2020). Well-documented cases of failure include the University of New South Wales campus in Singapore, which closed after just one semester and incurred multimillion-dollar losses (Tee & Tan, 2010), as well as the Michigan State University branch campus in Dubai, which was forced to discontinue its programmes due to financial instability and insufficient student enrolment (Wilkins, 2016). Analyses of the causes of such failures (Bollag, 2024) point to an overestimation of demand, underestimation of costs, and challenges related to accreditation and partnership arrangements (Tee & Tan, 2010; Healey, 2015). Transnational education is often attributed both benefits and shortcomings, many of which take the form of persistent myths. These myths – such as claims of neocolonialism, declining interest in TNE, quality loss at transnational campuses, and a poorer student experience compared to home campuses – are critically examined and challenged by Wilkins and Juusola (2018). The authors emphasize that transnational education is a complex field characterized by both risks and potential benefits.

The empirical study by J. Paniagua et al (2022) examines the development of international branch campuses as a specific form of foreign direct investment and analyses the factors shaping their global diffusion. The authors construct a gravity model based on two dimensions: the "extensive" margin (the number of international branch campuses between a pair of countries) and the "intensive" margin (the number of master's programmes delivered through these campuses). Their findings indicate that the establishment of branch campuses is primarily driven by economic demand in the host country (GDP), transaction costs (distance), and the existence of regional trade and investment agreements. In addition, cultural and institutional linkages such as a common language, religion, colonial ties, and shared borders are found to be significant. Educational determinants mainly operate as "push" factors from donor countries: increasing expenditure on higher education and declining domestic teaching intensity (higher education participation rates) encourage universities to expand abroad. At the same time, scientific output functions as both a "push" and a "pull" factor, facilitating both the export and the import of branch campuses.

Undoubtedly, the successful implementation of TNE projects requires careful risk analysis and risk management at all stages, from planning to day-to-day operations (Odlin et al., 2022). This includes the recruitment of high-quality academic staff who meet the standards of the home university, as well as the preservation of institutional values and organizational culture (Yudkevich et al., 2016). Universities engaged in cross-border activities must have a clear yet flexible risk management framework (Bosire & Amimo, 2017; Wilkins et al., 2024) that encompasses financial issues, reputation, academic standards, safety concerns, human resource relations, and other relevant dimensions (Girdzijauskaite & Radzeviciene, 2014). This study identifies five main types of risk: (1) academic risk, understood as the threat of declining educational quality, misalignment with academic standards, and constraints on academic freedom; (2) financial risk, referring to the possibility of financial losses due to insufficient student enrolment, high operating costs, or changes in market conditions; (3) reputational risk, defined as damage to the university's brand and public image in the event of project failure; (4) regulatory risk, involving non-compliance with accreditation requirements, policy and legislative changes, and bureaucratic barriers; and (5) cultural-organizational risk, encompassing difficulties of integration into the local context, staff management challenges, intercultural misunderstandings, and governance conflicts. This typology resonates with the approach proposed by N. Healey (2015a), who developed a risk-oriented classification of TNE partnerships across six dimensions, reflecting the likelihood of project failure in different spheres of interaction (academic, financial-legal, organizational, and others) (Healey, 2015b).

For Kazakhstan, which is investing substantial resources in the development of international educational partnerships, it is critically important to anticipate and mitigate risks

so that transnational education becomes a driver of quality enhancement rather than a threat to system sustainability. Strategic partnerships with foreign universities are viewed as instruments for improving the quality of teaching, strengthening academic sustainability, and advancing the internationalisation of local institutions. However, intensified global competition for students – including geopolitical rivalry for international learners – means that Kazakhstan needs to develop its own model of sustainable transnational education. The country positions itself as a new regional education hub (Kai, 2025; Haidar, 2025; Packer, 2025) in Central Eurasia (Kuzhabekova, 2024; Amirbekova et al., 2025).

At present, the government is implementing a strategy aimed at attracting leading global universities. Foreign universities are offered various incentives, including free land plots, tax exemptions, scholarships, and other forms of support. As a result, since 2021 there has been an active expansion of international branch campuses: 40 strategic partnerships with foreign universities from Russia, the United Kingdom, Italy, China, the United States, France, South Korea, and other countries are already in operation. In 2025, branch campuses of MSIIR, Coventry University, Woosong University, and Anhalt University were opened. Foreign universities are regarded by Kazakhstan as "strategic partners" in education, contributing to the enhancement of quality in local universities and helping to meet the growing demand for higher education that is not fully satisfied by the national system.

Figure 1

Map of Kazakhstan showing the locations of branch campuses and partnerships of foreign universities (based on data from the Ministry of Science and Higher Education of the Republic of Kazakhstan, 2025). The figure presents the total number of agreements (40) and their distribution by type, including branch campuses, strategic partnerships, consortia, double degree programmes, and others.

The active attraction of foreign campuses has been accompanied by growth in the international student population. The number of international students in Kazakhstan has reached 35,057; in 2024 it stood at 31,500. The government has set a target to increase this figure to 100,000 by 2028 and to 150,000 by 2029. While Russia has traditionally been the main destination for academic mobility for Kazakhstan and neighbouring countries, this

situation is now changing. Against the backdrop of geopolitical tensions and Russia's withdrawal from the Bologna Process which complicates the recognition of Russian degrees in Western countries Kazakhstan is increasingly viewed as an attractive alternative for students from the post-Soviet space. Moreover, Kazakhstan aims to attract students from India, China, Pakistan, and countries across Asia and Africa by offering programmes taught in Russian and, increasingly, in English, lower tuition and living costs compared to Western countries, as well as political stability and cultural proximity. In an increasingly complex global environment, there is a shift toward more hybrid partnership models that require deep strategic alignment and mutual trust. Partnership projects often face intercultural and organizational challenges, requiring substantial efforts to align curricula, assessment standards, and staff management practices across different academic cultures.

The rapid expansion of transnational education entails significant risks for all stakeholders, both for foreign universities, such as financial and reputational risks associated with unsuccessful campus launches, and for the host country, including risks related to educational quality, alignment of branch campuses with national priorities, and competition with local universities. Under these new conditions, several key research questions emerge: What are the main types of risks inherent in different forms of transnational education? What specific risks arise in the establishment and operation of international branch campuses in Kazakhstan? What strategies can be employed to mitigate these risks? And how can global trends be leveraged to the country's advantage without compromising the quality of education?

The aim of this article is to examine and systematize the risks of cross-border education in Kazakhstan, with a particular focus on international branch campuses, drawing on international experience and expertise, and to propose recommendations for risk management for universities and regulatory authorities.

Materials and Methods

To achieve the stated objective, the study employs a research design combining conceptual analysis, case study, and secondary data analysis. At the conceptual analysis stage, a review of contemporary scholarly literature on transnational education and its associated risks was conducted. International journal articles, reports, and analytical reviews, including publications indexed in Scopus and Web of Science from 2015 to 2025 were examined, focusing on the experience of establishing international branch campuses and partnership programmes, classifications of TNE, and risk management strategies in this field. Particular attention was paid to studies identifying risk categories and factors contributing to the success or failure of cross-border education projects.

Within the Kazakhstan case study, information on the current state of cross-border education in the Republic of Kazakhstan was collected and analysed. This included regulatory and policy documents and strategies of the Ministry of Science and Higher Education, statistical data on branch campuses and international students, and news related to the opening of new campuses and partnerships. Official sources (such as maps and press releases of the Ministry of Science and Higher Education) as well as media materials covering the country's efforts to attract foreign universities were used. A series of expert interviews was conducted, along with a survey of representatives from Kazakhstani and foreign universities. In parallel, policy changes in the field of academic mobility in other regions (the United States, Europe, and Asia) and their potential implications for Kazakhstan were examined.

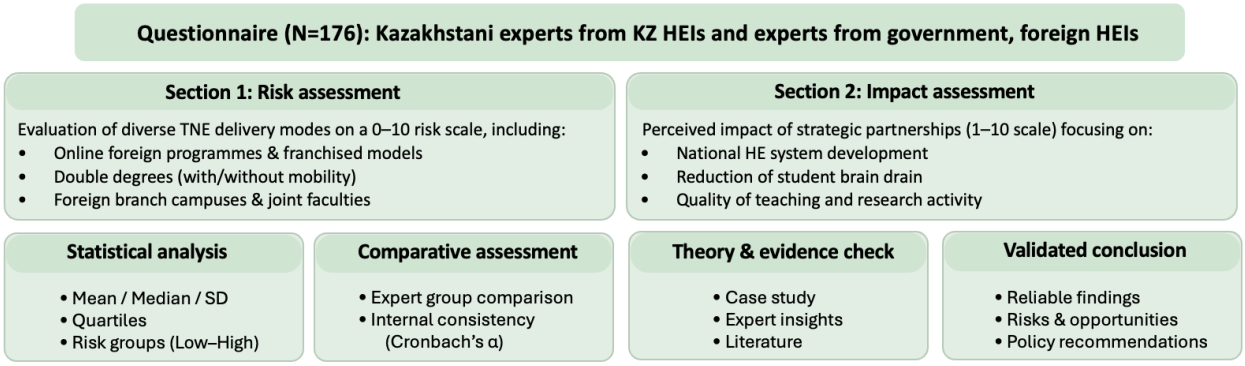
At the stage of secondary analysis of expert and regulatory data, the views of specialists and the requirements of regulatory authorities were synthesised. Conclusions and recommendations of international organisations, such as the British Council, UNESCO, and the OECD (Vincent-Lancrin, 2012), as well as quality assurance agencies (e.g., the QAA) concerning quality assurance and risks in cross-border education were taken into account. In

addition, expert evidence was used to assess risks, including insights from interviews and public statements by university leaders and representatives of the Ministry of Science and Higher Education of the Republic of Kazakhstan regarding the establishment of branch campuses (for example, comments by the Minister of Science and Higher Education, S. Nurbek) (Packer, 2025), as well as data from surveys and studies of key stakeholders (students, academic staff, and managers).

For the quantitative assessment of risk perceptions and the impact of strategic partnerships, a questionnaire survey was conducted among representatives of the academic community. The target group consisted of university managers and experts familiar with internationalisation processes: heads of international offices, vice-rectors and deans for academic affairs, experts from Kazakhstan (working both in national and foreign universities), as well as several representatives of the Ministry and independent analysts. The survey was conducted online in September 2025, yielding a total of 176 completed questionnaires (Figure 2).

Figure 2

Research design



The questionnaire comprised two sections. In the first section, respondents assessed the relative level of risk associated with various forms of cross-border education, including online programmes of foreign universities delivered through Kazakhstani institutions, franchised programmes, double degree programmes (with and without student mobility), fully foreign branch campuses in Kazakhstan, "2+2" models (branch campus with continuation of studies abroad), joint faculties or institutes, and the practice of transferring a Kazakhstani university into trust management by a foreign partner. Assessments were made on a ten-point scale, where 0 indicated the absence of significant risks and 10 indicated the highest possible level of risk.

In the second section, respondents were asked to indicate their degree of agreement with a series of statements regarding the impact of strategic partnerships on the development of the national higher education system (on a 1–10 scale, from minimal to maximal impact). These statements included: "The functioning of strategic partnerships (branch campuses, campuses, double degree programmes, etc.) will have a positive impact on the development of Kazakhstani higher education"; "The opening of branch campuses will reduce the outflow of Kazakhstani students abroad"; "The quality of teaching in Kazakhstani universities in regular programmes will improve"; "The impact on research activities in Kazakhstani universities"; and "The attractiveness of Kazakhstani universities for the employment of foreign academic staff."

The collected data were processed using statistical methods. Mean scores, quartile distributions of responses, and intergroup comparative analyses (by expert category) were calculated to identify differences in perspectives. Statistical processing included the calculation of means, medians, and standard deviations. In addition, the proportions of responses were calculated for low-risk groups (scores from 1 to 3), moderate-risk groups (scores from 4 to 7),

and high-risk groups (scores from 8 to 10). Comparisons were also conducted across aggregated respondent groups, and the internal consistency of the question batteries was assessed. Cronbach's alpha (α) was used to assess internal consistency, with $\alpha \geq 0.70$ considered indicative of acceptable reliability (Doval, 2023).

At the final stage, the survey and case study results were compared with theoretical expectations. The findings were verified through data triangulation, whereby patterns and trends identified in the quantitative survey were cross-checked against qualitative expert comments and published research. This approach enabled a more rigorous interpretation of the results, enhancing the reliability and validity of the conclusions. A limitation of the study is its reliance on available open data and expert judgements; quantitative analysis of student performance or financial indicators of branch campuses was not conducted, as this falls beyond the scope of the article. Nevertheless, the combination of methods provided a comprehensive picture of the risks and opportunities of transnational education in Kazakhstan and allowed for the development of practically oriented recommendations.

Results

Models of transnational education and strategic partnerships

In the literature, transnational higher education (TNE) is described through a variety of cooperation models, ranging from independent foreign branch campuses to joint programmes and online learning (Wang, 2025; Knight, 2025; Knight & McNamara, 2017; Knight & Simpson, 2023). J. Knight (2015) distinguishes between independent forms of TNE, fully controlled by a foreign university, such as international branch campuses, franchising arrangements, and distance programmes, and collaborative forms, including joint institutes and double degree programmes, each of which entails specific advantages and risks (Wilkins, 2016; Tee & Tan, 2010; Beecher & Streitwieser, 2019).

In an increasingly complex global environment, there is a shift toward more hybrid partnership models that require deep strategic alignment and trust between universities from different countries. Strategic educational partnerships can be defined as long-term cooperation between universities across borders, involving joint programme development, knowledge and resource sharing, and co-governance of academic processes. Such partnerships are regarded as a key mechanism for the internationalisation of higher education and for quality enhancement through the attraction of external expertise and increased programme competitiveness (Altbach & Knight, 2007). At the same time, partnership projects often encounter intercultural and organisational challenges, as significant efforts are required to align curricula, assessment standards, and staff management practices within different academic cultures.

In Kazakhstan, cross-border education is implemented in several main formats, each with its own specific features:

International branch campus. A full-fledged campus of a foreign university established in the territory of the Republic of Kazakhstan, with physical infrastructure and staff. As a rule, instruction is delivered according to the curricula and standards of the home university, and graduates receive a degree awarded by the foreign institution. Examples include Nazarbayev University (with a special status, established in partnership with a number of foreign universities), branch campuses of Lomonosov Moscow State University (operating in Astana since the 2000s), as well as the new campuses of Cardiff University and De Montfort University in Kazakhstan, among others.

Franchised educational programme. A local university in Kazakhstan obtains a licence or rights from a foreign university to deliver its educational programme. Teaching is carried out at the local institution (academic staff may be local, while the curriculum and assessment are controlled by the foreign partner). Graduates may receive a degree awarded by the foreign university or a joint certificate. For example, Coventry University Kazakhstan is an overseas

campus of Coventry University (United Kingdom) operating under a franchising model, which was opened in 2024 in the city of Astana.

Joint faculty / institute. A structural unit is established within a Kazakhstani university in partnership with a foreign university. Governance and academic activities are shared: both parties participate in curriculum development, staff exchange, and joint academic management. Students may obtain double degrees (a Kazakhstani and a foreign degree) or a degree from one university with the involvement of the partner institution. For example, cooperation between Abai Kazakh National Pedagogical University and Université Sorbonne Paris Cité, M. Kozybayev North Kazakhstan University and the University of Arizona, and others.

Double degree programme (joint degree). An agreement between a Kazakhstani and a foreign university under which students study part of the programme at each institution (or selected modules are delivered by the partner university). Upon completion, students are awarded either a single degree recognised by both universities or two separate degrees, one from each partner. In Kazakhstan, such programmes are common in formats such as 2+2 (two years of study in Kazakhstan plus two years abroad) or 3+1. Unlike the previous type, no separate organisational unit is established; cooperation is programme-based. For example, as of the end of 2025, double degree programmes are being implemented by 53 Kazakhstani higher education institutions (compared to 56 universities in 2024) across 228 double degree programmes, of which 83 programmes (36%) are delivered in English.

As part of the study, a survey was conducted among the following groups of experts to analyse risks:

– kazakhstani experts working in Kazakhstani universities;

– kazakhstani experts working in foreign universities;

– foreign experts involved in the implementation of strategic partnerships in Kazakhstan;

– representatives of the Ministry of Science and Higher Education of the Republic of Kazakhstan;

– representatives of accreditation agencies;

– independent experts.

Among the 176 valid questionnaires, respondents identifying themselves as Kazakhstani experts working in Kazakhstani universities predominated, accounting for 71.6 per cent of the sample. The remaining responses were distributed among independent experts, representatives of governmental and other organisations, foreign experts, and other categories of university staff.

This distribution indicates that the aggregated assessments primarily reflect perceptions of risk within the Kazakhstani university sector. This is important for interpretation, as universities bear the main operational responsibility in the implementation of cross-border education formats.

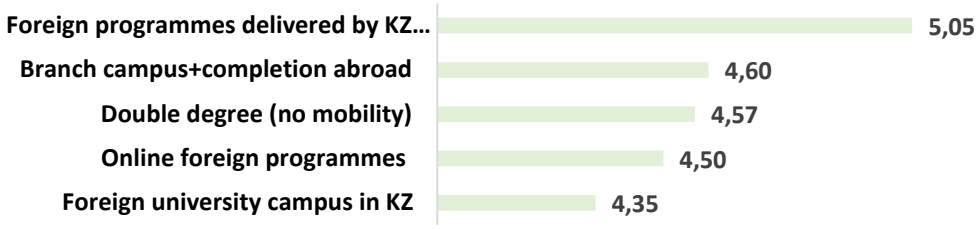
The analysis shows that the majority of respondents represent the Kazakhstani expert community, and that the most attractive forms of partnership are those that offer a full educational programme of a foreign university delivered in Kazakhstan or double degree programmes that do not require student mobility abroad. The impact of partnerships on the development of Kazakhstani higher education is assessed positively, while their potential attractiveness for foreign academic staff raises some doubts.

Respondents perceive all the formats considered as involving a moderate level of risk. Mean scores across all six formats fall within a narrow range from 4.35 to 5.05 points. Median values for each format are equal to 5 (interval 1-10), indicating a stable concentration of responses around the centre of the scale.

Three partnership categories, foreign university campuses in Kazakhstan, joint faculties or schools, and Kazakhstani universities under trust management, exhibit a substantial number

of missing responses, which may indicate either limited expert awareness of these formats or their perceived irrelevance for part of the audience (Figure 3).

Figure 3
Partnership categories assessment



The highest average risk level is recorded for educational programmes of foreign universities delivered entirely by the Kazakhstani side, with a mean score of 5.05. This is the only format exceeding the threshold of 5 points on average, although the exceedance is marginal.

Moderately higher risk perceptions are also associated with study at a branch campus of a foreign higher education institution with programme completion abroad, with a mean score of 4.60. A similar level is observed for double degree programmes without student mobility, which have a mean score of 4.57.

The lowest average risk assessment relates to study at a foreign university campus located in Kazakhstan from entry through graduation, with a mean score of 4.35. Online learning on foreign educational programmes combined with enrolment in a core programme at a Kazakhstani university shows a comparable value of 4.48.

At the same time, international branch campuses and foreign university campuses in Kazakhstan do not stand out as significantly more risky than other forms of transnational education: their scores are in the range of 4.4-4.5, and the distribution of responses is similar to that of other formats (approximately 40 per cent of respondents classify them as low risk, and about half as moderate risk).

The survey results indicate that university management recognises the presence of risks across all forms of cross-border education but does not tend to regard any particular format as "critically dangerous." The emphasis thus shifts from prohibiting specific models to the need for thoughtful risk management and the selection of formats that best fit the specific goals and institutional context of a university. Risks are perceived as manageable, while strategic partnerships and branch campuses are viewed as having the potential to enhance quality and the international competitiveness of Kazakhstani universities, provided that well-designed policies and systematic governance are in place.

The most polarised distribution is observed for double degree programmes involving student mobility abroad. In this case, a high share of low-risk assessments (42.1 per cent) coexists with a notable share of high-risk assessments (17.6 per cent), while the proportion of moderate assessments declines to 40.3 per cent. This profile points to heterogeneous perceptions, which is typical of formats that combine academic mobility with financial costs and organisational complexity.

Expectations regarding the effects of cross-border education are strongly positive (Figure 4).

Figure 4
Impact assessment

Substantively, a consistent pattern emerges. Higher perceived risk is associated with formats in which the main responsibility for delivery and control lies with the host institution. This is particularly evident in the case of foreign university programmes delivered entirely by the Kazakhstani side. By contrast, somewhat lower risk is attributed to the format of a foreign university campus operating in Kazakhstan, which is intuitively linked to more direct control by the foreign provider and more standardised procedures.

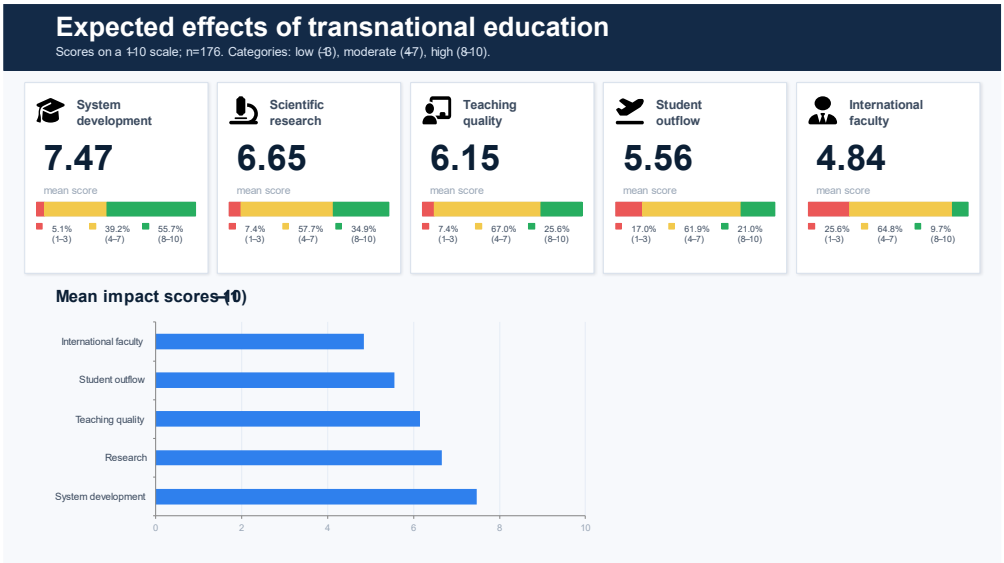
Expectations regarding the effects of cross-border education are strongly positive. The impact of strategic partnerships on the overall development of Kazakhstani higher education is rated most highly, with a mean score of 7.47. More than half of the respondents assigned high ratings in the range of 8 to 10 points, accounting for 55.7 per cent of responses.

The impact on research activity is assessed as stronger than the impact on teaching quality. The mean score for the perceived impact on research is 6.65, while the mean score for the impact on teaching quality in regular programmes is 6.15. For both variables, moderate assessments in the range of 4 to 7 points predominate; however, the share of high ratings is greater for research, reaching 34.9 per cent.

The expected effect (Figure 5) of opening branch campuses on reducing the outflow of Kazakhstani students abroad is assessed as moderate, with a mean value of 5.56. The most frequent category consists of moderate ratings, accounting for 61.9 per cent of responses, while high ratings represent 21.0 per cent. This suggests expectations of a partial redistribution of demand rather than a radical reversal of the existing trend.

Figure 4

Expected effects of transnational education



The weakest expectations concern the attractiveness of Kazakhstani universities for the employment of foreign academic staff. The mean score for this item is 4.84. One quarter of respondents assigned low ratings in the range of 1 to 3 points. High ratings (8–10 points) are

relatively rare, accounting for only 9.7 per cent. This pattern stands out in comparison with other effects and identifies the most problematic area in stakeholders' perceptions.

The internal consistency of the block of impact-related items is acceptable, with a Cronbach's alpha of 0.74. This indicates that respondents' optimism regarding system development is correlated across the items, but the relationships are not perfect and allow for differentiation of expectations across different dimensions.

Discussion

Global experience has produced a range of approaches that help mitigate the risks outlined above in the implementation of cross-border education projects.

Careful partner selection and preliminary due diligence.

Before opening a branch campus or launching a joint programme, a thorough analysis of both the partner institution and the operating environment is required. This includes assessing the financial stability and reputation of the partner university, the alignment of its academic standards with required quality benchmarks, market analysis (student demand), and the legal and regulatory context. Practice shows that weak justification of a branch campus business model significantly increases the likelihood of failure. Therefore, it is recommended to conduct risk analysis already at the planning stage: estimating projected student enrolment under pessimistic scenarios, calculating break-even points, and analysing competitors. In some cases, it is advisable to start with a less capital-intensive format (for example, a joint programme or a small centre) and expand to a full branch campus only if the initial stage proves successful. Such a two-stage approach was applied by the University of Reading in Malaysia, which first established a partnership with a local college and later opened its own campus.

Clear legal structuring and allocation of responsibilities.

Cooperation agreements should specify in as much detail as possible the distribution of responsibilities between partners, including financing, recruitment and remuneration of academic staff, quality assurance, degree awarding, marketing and student recruitment, and infrastructure support. Clarity at the outset helps to prevent conflicts. Contracts should also include dispute resolution mechanisms and an exit strategy in case of early project termination. For example, some universities stipulate procedures for completing the education of currently enrolled students and settling financial obligations in the event of campus closure (Brown, 2024). The presence of such contingency plans reduces reputational damage and demonstrates a responsible approach to risk management.

Quality assurance and unified standards.

To minimise academic risks, an integrated quality assurance system for transnational education is required. Practical measures include the approval of curricula and teaching materials by the foreign university; regular audits and inspections (for example, visits by quality assurance committees from the home campus); dual academic leadership (such as appointing a deputy dean from the foreign partner); certification of branch campus academic staff in accordance with the requirements of the home university; and systematic monitoring of student performance with benchmarking against outcomes at the main campus. Many Western universities establish dedicated offices responsible for overseeing overseas programmes and ensuring academic equivalence. International practice generally assumes that the degree-awarding institution bears full responsibility for quality, regardless of the country in which the programme is delivered.

Staff development and cross-cultural communication.

The human factor is critical to the success of cross-border projects. Reducing cultural and organisational risks is achieved through careful staff selection and training. Branch campus leaders and administrators need training in intercultural communication and management within different institutional systems. Appointing bilingual (or bicultural) managers often

serves as a “bridge” between the headquarters and the local team. There is also experience of recruiting staff who act as carriers of quality assurance policies, share the values of both partners, and are capable of resolving emerging disagreements promptly. Regular face-to-face interactions between teams (delegation visits, joint workshops) help build trust and mutual understanding, which, according to experience, significantly mitigates the risk of conflict.

Financial planning and diversification.

To manage financial risks, universities often adopt income diversification strategies. Alongside enrolling international students at branch campuses, they may offer online courses, short-term certificate programmes, and consultancy services, creating alternative revenue streams and improving project viability. Some institutions establish reserve funds or insurance mechanisms to mitigate the risk of under-enrolment. For example, it is reported that a number of UK universities include a “risk contingency” in branch campus budgets to cover losses during the initial years of operation. Another approach involves attracting co-investors (such as businesses or local authorities) to share the financial burden, or securing support guarantees. In Kazakhstan, the practice of providing state-funded scholarships for study at branch campuses, particularly in priority fields, may serve as a measure to reduce financial risk for both universities and students.

In addition to these traditional approaches, recent years have seen the emergence of new ideas and models that may support the sustainable development of cross-border education.

The creation of education hubs and consortia.

Instead of isolated branch campuses, a number of countries (such as Qatar, the United Arab Emirates, and China) have developed entire educational clusters – zones that host campuses of multiple foreign universities, often supported by the state through infrastructure funding. A prominent example is Education City in Qatar, where the government fully covers the operational costs of campuses of leading US universities. Within such hubs, institutions can share resources (libraries, laboratories), exchange knowledge about the local context, and distribute certain risks. If one university encounters difficulties, others may support initiatives to address them or absorb students. Kazakhstan is also moving in this direction: by concentrating new branch campuses in Astana, Almaty, and regional centres, the Ministry of Science and Higher Education encourages interaction among them and with local universities (for example, through joint research projects and university consortia). This contributes to the collective resilience of the cross-border education ecosystem.

Hybrid learning models (“glocal” approach).

New technologies make it possible to mitigate risks through greater flexibility of delivery formats. Hybrid models combine online instruction provided by a foreign university with on-site support. For example, instead of establishing a full physical campus, a foreign university may open a learning centre where students attend online lectures delivered by overseas professors, while practical sessions are conducted by local tutors. This approach significantly reduces costs (lower infrastructure requirements and fewer expatriate staff) and financial risks, while maintaining academic control. During the COVID-19 pandemic, such models expanded rapidly, and although face-to-face education has largely returned, many programmes are now reconsidering the balance between in-person and online components for optimisation. Virtual exchanges and joint online programmes also enable institutions to reach a broader student market, reducing dependence on a single country. For Kazakhstan, this represents an opportunity to attract international learners to distance programmes offered by Kazakhstani universities in partnership with foreign institutions, effectively exporting online educational services.

Joint risk management at the governmental level.

An innovative approach involves concluding intergovernmental agreements that allocate risks between countries. For example, when two states officially support the

establishment of a joint university, they may agree on mutual recognition of accreditation, tax incentives, and investment protection. Such arrangements are common in the creation of large international universities (for instance, the Kazakh-German University has been supported by the governments of both countries). For Kazakhstan, which seeks to attract foreign universities, concluding cross-border education agreements with key partner countries (such as the United Kingdom, Germany, Russia, and China) could reduce regulatory risks and create a more predictable environment for higher education investors.

Orientation toward new student markets and the internationalisation of Kazakhstani higher education.

In light of global trends, Kazakhstani universities and branch campuses should adopt more innovative approaches to student recruitment. There is currently a noticeable outflow of students from traditional education destinations (the United States, the United Kingdom, and Canada) to alternative countries due to stricter visa policies and high costs in these destinations. This creates an opportunity to attract talented students who previously may not have considered Kazakhstan as a study destination. Non-traditional markets include countries in the Middle East, Africa, and South Asia. Already, increasing numbers of students from India, China, Pakistan, Nigeria, and other countries are enrolling in Kazakhstani universities.

One possible pathway is the development of international programmes taught in Russian, aimed at students who do not have sufficient proficiency in English but wish to study abroad. Given that demand for Russian-language education remains high in several CIS and Eastern European countries, Kazakhstan could attract these students by offering programmes jointly with foreign universities. In this way, Kazakhstan effectively imports international students, reducing the risk of under-enrolment for branch campuses.

Although still rare in higher education, the idea of an analogy with project insurance is also conceivable. For example, a consortium of universities, possibly with state support, could establish a fund to insure branch campus risks (such as under-enrolment or force majeure events like political instability). Universities would pay a modest insurance contribution, and in the event of an insured occurrence (for example, a sudden loss of students due to border closures), the fund would compensate part of the losses. This could encourage participation by new institutions by alleviating some concerns.

Global trends and opportunities for Kazakhstan.

It is also important to consider the impact of broader global processes on the risks and prospects of cross-border education in Kazakhstan. At present, several key trends are shaping international student flows: first, the tightening of immigration rules in a number of traditional destination countries (Adebayo, 2025); second, changes in the geopolitical environment, including sanctions and conflicts; and third, the longer-term consequences of the pandemic, such as the digitalisation of education and the growing emphasis on localisation.

Thus, under the 2025 U.S. administration, a number of measures were introduced that created uncertainty for international students, including temporary suspensions of student visa issuance, stricter background and social media checks for applicants, and cases of visa revocation due to political statements. Although the United States remains the leading destination, hosting a record 1.126 million international students in 2024, such measures generate perceptions of risk and an “unwelcoming” environment among prospective applicants.

Canada faced market overheating in 2023-2024: the inflow of more than 600,000 international students placed pressure on housing and social infrastructure, prompting the government to introduce a cap on new study permits – 10 per cent fewer in 2024 than the previous year. This resulted in a decline in student numbers from India, Nigeria, and the Philippines. The United Kingdom, having reached a peak in international enrolment in 2022, has also tightened its regime: since 2024, international students (with the exception of doctoral

researchers) have been prohibited from bringing family members, which has particularly affected students from countries where studying with family is common (such as Nigeria and Pakistan), leading to reduced inflows. Australia has introduced an annual cap on international enrolments (270,000 students) due to a housing crisis. Taken together, these developments signal that the era of unhindered growth in international student numbers in Western countries has been temporarily paused.

For Kazakhstan, this situation opens a unique window of opportunity. Students who might previously have chosen the United States or Europe are now seeking alternative destinations that are more affordable and welcoming. Interest in universities in Asia and the Middle East is already increasing: for example, Dubai has announced a target to raise the share of international students to 50 per cent by 2033, while universities in Japan and Hong Kong are offering scholarships and simplified admissions for students who were unable to secure places in the United States. Through the active establishment of branch campuses of leading universities, Kazakhstan can position itself as precisely such a "non-traditional market," ready to host international students who face barriers in Western destinations. With well-designed policies, this could not only reduce the risk of under-enrolment for branch campuses themselves but also generate economic and soft-power benefits for the country, including growth in the export of educational services, the formation of internationally oriented alumni networks, and the development of multicultural campus environments.

At the same time, the risks associated with these trends must be acknowledged. A sharp increase in student inflows would require the expansion of infrastructure (student housing, support services), adaptation of educational programmes for linguistically diverse cohorts, and the strengthening of safety and visa support systems. Some steps are already being taken: new dormitories are under construction, and the "Study in Kazakhstan" campaign has been launched, including simplified visa procedures and recruitment fairs in Asian countries. It is important to sustain and deepen these efforts. Moreover, it cannot be ruled out that Western policies may soften again in a few years or that new competitors will emerge (for example, China is actively improving its higher education system and also seeking to attract international students). Kazakhstan therefore needs to capitalise on its current time advantage by strengthening quality. If foreign branch campuses in Kazakhstan can offer an educational and service experience comparable to that of Western institutions, they will remain attractive even when competition intensifies again. Conversely, rapid quantitative expansion without adequate safeguards risks quality erosion or the emergence of questionable "degree mills." Any such incident could seriously undermine international trust in Kazakhstan as an education hub, creating a reputational risk of national scale.

Analysis of the survey results allows the following conclusions regarding trends and patterns to be drawn. The first key conclusion is that the risks of cross-border education are perceived as manageable. This is evidenced by moderate mean scores and by the fact that high-risk assessments remain a minority across all formats.

The second conclusion relates to the profile of the highest perceived risk. Models in which responsibility for implementation rests largely with the Kazakhstani side, or in which the educational trajectory is split between Kazakhstan and a foreign institution, are perceived as more risky. In such cases, respondents likely associate these formats with vulnerabilities in quality control, alignment of standards, and organisational sustainability.

The third conclusion concerns expected effects. Strategic partnerships and branch campuses are perceived as resources for system development and for strengthening the research function of universities. At the same time, expectations regarding a reduction in student outflows abroad remain moderate. Respondents assume that branch campuses will partially capture demand but will not eliminate the motivation to study overseas.

The fourth conclusion highlights a human resource constraint. Kazakhstan's attractiveness as a place of employment for foreign academic staff is perceived as weaker than other expected effects. This leads to a practical policy implication for internationalisation strategies: priority should be given not only to expanding the number of partnership formats, but also to improving conditions for academic employment, research infrastructure, and support services for international staff.

The survey data reveal a combination of caution and optimism. Risks are acknowledged as real but are not interpreted as critical. Expected benefits are viewed as substantial, particularly with regard to systemic development and research capacity. This provides empirical grounds for concluding that further development of cross-border education is advisable, provided that quality assurance mechanisms and academic staff attractiveness are strengthened.

In conclusion, risk management in cross-border education should be comprehensive and proactive. Traditional risk mitigation approaches have been tested over time and remain relevant. At the same time, the new environment calls for innovative thinking, closer cooperation between universities and government, the use of technology, flexibility in educational models, and careful attention to global trends. As Kazakhstan continues along the path of educational internationalisation, it can and should combine both approaches in order to achieve sustainable success.

Conclusion

Cross-border higher education offers significant opportunities for Kazakhstan but is also associated with numerous risks that must be anticipated and effectively managed. The study demonstrates that different models of transnational education exhibit distinct risk profiles. The greatest challenges are linked to the establishment and operation of full-scale international branch campuses, where financial and reputational responsibilities are highest. More flexible forms of cooperation, such as franchising arrangements, joint programmes, and double degree schemes, entail more localised risks and can serve as gradual stages of development. The literature review and Kazakhstan's experience indicate that the key factors behind project failures include underestimation of costs and overestimation of demand, gaps in quality assurance, cultural and managerial fragmentation of teams, and regulatory barriers. Accordingly, an effective strategy must address each of these dimensions.

For Kazakhstan's successful integration into the global higher education space, it is not sufficient merely to open a certain number of foreign campuses; it is crucial to ensure their long-term sustainability and value for the country. International branch campuses and programmes should not replace the national higher education system but rather enrich it by stimulating knowledge transfer and healthy competition, without creating imbalances or conflicts. Comprehensive risk management will help avoid common mistakes experienced by other countries and enable the development of a distinctive Kazakhstani model of cross-border education focused on quality, innovation, and mutual benefit for partners.

Cross-border education in Kazakhstan should evolve as a strategic partnership among the state, local universities, and foreign institutions. Only through coordinated efforts by all stakeholders in managing risks, from financing to quality assurance and integration, can ambitious plans be realised without losses. Kazakhstan has the potential to strengthen its position on the global higher education map by promoting intellect, ideas, and innovation, while simultaneously maximising benefits for its human capital and economy. Timely identification and mitigation of risks will be key to ensuring that cross-border education serves as a catalyst for positive change rather than a source of new challenges.

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Author Contributions

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Information about authors

Marina Skiba, Candidate of Pedagogical Sciences, Associate Professor, Expert, Educational Programme Developer of the Higher Education Development National Center of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: marina.a.skiba7@gmail.com, ORCID: 0000-0002-4155-9957 ***(corresponding author)***

Amantay Nurmagambetov, Doctor of Political Sciences, Professor, Adviser to the Director of the Higher Education Development National Center of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: a.nurmagambetov@n-k.kz, ORCID: 0000-0002-0781-2277

Lyailya Ivatova, Doctor of Political Sciences, Professor of M. Auezov South Kazakhstan University, Shymkent, Kazakhstan, e-mail: livatova2701@mail.ru, ORCID: 0009-0002-0530-1462

Alibek Madibekov, Director of the Higher Education Development National Center of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: a.madibekov@n-k.kz, ORCID: 0000-0001-5510-0381

Karlygash Borgekova, PhD, Chief Expert of the Higher Education Content Management Office of the Higher Education Development National Center of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: k.borgekova@n-k.kz, ORCID: 0000-0002-4230-1333

Aitzhan Kulumzhanova, Head of the Internationalisation Office of of the Higher Education Development National Center of the Ministry of Science and Higher Education of the Republic of Kazakhstan, Astana, Kazakhstan, e-mail: a.kulumzhanova@n-k.kz, ORCID: 0000-0002-7555-7618

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Mira Iskakova, Sandugash Kaldygozova, Maigul Shakenova

Mukhtar Auezov South Kazakhstan Research University, Shymkent, Kazakhstan

THE IMPACT OF INTERNATIONAL UNIVERSITY EDUCATIONAL PROGRAMS ON THE COMPETITIVENESS OF KAZAKHSTANI STUDENTS

Abstract. The educational programs in Kazakhstan are at a transitional stage, and an aspect of this transition is the internationalization of the university education system to ensure students' competitiveness for global recognition. This study contributes to local internationalization by synthesizing literature on the concept and analyzing the flow of Kazakhstani students over the years. Indeed, the country succeeded in attracting students from other countries, though this was insignificant compared to the mobility of Kazakh students abroad. The highlight of the two strategies employed to improve internationalization is the establishment of foreign centers for study and the recruitment of expatriate scholars in Kazakhstan. Lastly, the use of a foreign language as a means of local internationalization was discussed. At the university level, Kazakhstan may have overrated its proficiency in using English as a working language.

Keywords: student migration, globalization, internationalization, Kazakhstan.

Introduction

Upon the Soviet Union’s dissolution, Kazakhstan, along with other countries that emerged after the Soviet Union, faced concurrent requests for economic and political reforms. An identifier of such a transition is evident in the education sector. Therefore, international education programs are perceived as a tool for modernization, enabling Kazakhstan to align with global trends.

The global transition necessitated training professionals across every sphere of life who, upon Kazakhstan's independence, had no option but to work as they had during the Soviet period. It is argued that a hindrance to personnel development and training in Kazakhstan can be traced to the absence of self-sufficiency in the education system (Rustemova et al., 2020).

Hence, internationalization facilitates academic mobility among scholars across countries, promoting knowledge exchange, expertise, and technical know-how. Therefore, an internationalization program through academic mobility introduces many advantages for the nation and institutions of learning.

This forms the basis of this study. Internationalization is a product of globalization, defined as the process of integrating international and intercultural dimensions into the teaching, research, and service of institutions (De Wit, 2020).

The aim of placing education on the international scene is to align with identifiers of efficiency and quality in activities of the University as an institution.

The goals to be achieved determines an institution’s prestige on international scene, this entails; attraction of international students to grow revenue, expanding universities scope outside regular national base, exposure of researchers, students and teachers to global requirements, strategic partnerships with overseas universities, improvement in quality of education through teacher and student rapport in process of exchange/production of ideas and knowledge.

Economic, global, and technological reasons occasion students’ mobility for academic purposes. Over the last decades, it has been observed that a high number of students have moved from the shores of their domiciled countries to study (Weber and Van-Mol, 2023).

At the moment, universities in Kazakhstan are being introduced to the international education services market despite intense international competition among the foremost universities. There is an impending market demand for proficient specialists who drive globalization. It is a duty incumbent upon universities to groom personnel who are highly proficient, qualified, and competitive in skills (Abdimanapov, 2018).

According to Nursultan Nazarbayev, the first president of Kazakhstan, the country's competitiveness must be improved. It was suggested that every Kazakh should be equipped with the skills and qualities necessary for the modern age (Nazarbayev, 2017). As noted by Hanson and Sokhey (2020), from 1999 to 2014, 1.6% of Kazakhstan's GDP was spent on education while 12% of the budget on education is committed to Higher Education, in comparison to other countries in the Central Asian region which only commit 1.3% of GDP to education while devoting 8% of budget on education to University Education.

A notable strategy employed by Kazakhstan to improve university education on the international scene was to join the Bologna Process in 2010. Admission to the Western education space was met with exemplary implementation, with foreign policy aimed at ensuring collaboration with Europe by becoming a member of the Organization for World Trade, often referred to as the WTO, and participating in the global market for educational services.

With Kazakhstan being a member of the Bologna process, the central aim of education policy is to ensure future concentration on delivering education that meets standards. As Sperduti (2017) describes, international educational programs are, in some ways, a form of Westernization. However, Kazakhstan's membership in the Bologna process poses several challenges (Temirtassova, 2019).

Internationalization has been described as a double-edged sword, with both positive and negative aspects. As identified by Akinbode et al. (2023), internationalization creates and fosters global social relationships, expands global orientation, ensures collaboration in academic research and improves economic and social benefits.

This study will assess the impact of academic mobility of university educational programs on the competitiveness of Kazakhstani students.

This study aims to provide answers to the following research questions:

- How do programs of international universities, international recruitment into faculty, initiatives on mobility and foreign campuses influence the development of capabilities and competitive skills among students in Kazakhstan?
- What is the contribution of international and foreign campuses to supporting student competitiveness in the higher education sector of Kazakhstan?
- How does the development and use of English as a language of instruction affect Kazakhstan students' global competitiveness?

The general focus of the study is to examine the impact of university international education programs on the competitiveness of Kazakhstani students studying in Kazakhstan, with a view to inward academic mobility.

However, the specific objectives are to:

Assess how programs of international universities, international recruitment into faculty, initiatives on mobility and foreign campuses influence the development of capabilities and competitive skills among students in Kazakhstan;

Examine the contribution of international and foreign campuses to supporting student competitiveness in the higher education sector of Kazakhstan;

Evaluate how the development and use of English as a language of instruction affects Kazakhstan students' global competitiveness.

Literature review

Policies on international education relate to activities such as developing curriculum exchange between faculty and students, language and culture training, the enrollment of international students, and research collaboration initiatives. According to Akinbode et al. (2023), internationalization entails inculcating globally acceptable standards into education provision, teaching, and research. The internationalization involves the following aspects: mobility of academic staff; collaboration for conferences and research purposes; establish campus presence across the border; setting the curriculum at par with international standards; development of educational programs; ensuring the domestic curriculum is competitive enough.

The influence of a country's international education programs depends on factors such as the resources engaged. Both students and staff, and the inter-relationship within an institution and among institutions of learning, feel the impact. As explained by Alemu (2018), a country's resources, history, and culture are closely linked to specific institutions of higher learning.

Salman (2023) opined that education is internationalized when there is mobility in academia, which is essential to individual development and career growth, as it enhances students' exposure to and respect for other cultures and helps them seize opportunities to become aware of them.

As stated by Hong et al. (2021), mobility is the capacity to move between places of residence. The reasons and forms of mobility are identified as educational, economic, and geographical. In Rodriguez-Pena's (2022) view, an individual's ability to migrate and adapt easily can be referred to as mobility. Hence, mobility is not only geographical but also social, professional, and cultural.

As stated by Schwieter et al. (2021), the majority of students used to the domestic system of a series of examinations welcomed international students to broaden international rapport and become more enlightened. As suggested by Rodriguez-Pena (2022), the constituents of mobility capital are proficiency in language, family or personal history, a history of mobility, and experience in adaptation, which allow assessment of pre- and post-experience mobility.

Given the identified constraints, there is a gap between local and international students at Kazakhstan's institutions of learning. Temirtassova (2019) concluded that Kazakhstan's education system is developing relative to other countries due to a perceived lack of strategic vision and the resources needed to establish the required difference.

At the levels of educational institutions, internationalization of learning is flourishing. It becomes crucial not to overlook or underrate the results of intercultural and international learning, to place these outcomes in context, to support academic sustenance, and to design evaluations and results that are aligned with local internationalization.

Analyzing internationalization, Kazakhstan, Moldashev, and Tleuov (2022) opined that university policies should focus on securing publications in peer-reviewed international journals indexed in the WoS and Scopus databases. As a result of inadequate research and doctoral student training, the publication requirements for the PhD degree led to non-conformance among students.

Also, PhD postgraduate students with government scholarship opportunities are listed as a requirement; completing studies within the three-year timeframe imposes an unwarranted burden on candidates. The enormous pressure of publication requirements and the duration of sponsorship in Kazakhstan led to unethical practices, dependence on predatory journals, and tainted co-authorship arrangements.

Internationalization in Kazakhstan has most often been a movement towards developing intimate relations with Universities in North America and Western Europe. Despite this, relations with China have been cordial. Border opening enabled two-way migration; migrants from China settled in the Central Asia axis, and students from Central Asia, mostly Kazakhs,

left for China. The migrations play an essential role in how China is perceived. Central Asians who travel to China regularly experience aspects of Chinese culture, exceptional business opportunities, and state-of-the-art technology (Su, 2024).

Interestingly, Kazakhstan faces internationalization in a manner that deviates from China's purpose. Internationalization in Kazakhstan is seen as embracing the North American model, while in China, the goal is to develop a model in a Chinese way to achieve world-class universities. Vergnaud and Palisse (2018) pointed out that Universities in China lead and are at the forefront by competing for the best institutions of learning globally. To achieve this, competitive programs are in place to support the pursuit of becoming the best.

The West drives the Kazakhs' dream of internationalization, and they realize that it is challenging. Kuzhabekova et al. (2022) noted that Western universities that host visiting faculty from Kazakhstan appear to be motivated by profit rather than by a desire to serve humanity through mutual engagement and collaboration.

Competitiveness is conceptualized through three related dimensions in modern research: global capabilities and skill, access to quality educational environments of international standard and international mobility and recognition.

According to Hanson and Sokhey (2020) and Tight (2022), competitiveness is proficiency in English, the ability to speak other languages, skills in intercultural communication, adaptability, and analytical and academic skills aligned with global best practices.

In the view of Tight (2022) and Kuzhabekova & Lee (2020), access to a robust quality educational environment of international standard, exposure to an international curriculum, opportunity to learn from international faculty, involvement in globally recognised integrated programmes and research collaboration in line with global principles.

The positions of Weber & Van Mol (2023) and Akinbode et al. (2023) are that competitiveness is embedded in outbound and inbound mobile academic opportunities, academic network involvement, and globally recognised certification or training.

Materials and methods

This study employs a convergent mixed-methods design that combines quantitative analysis of secondary data (2018–2023) with qualitative content analysis of institutional and policy documents and published research. For convergent design, there was a separate collection of qualitative and quantitative components, analyzed after collection and integrated during interpretation, to answer the research question about the effect of programmes at international universities on students' competitiveness.

Quantitative data were sourced from UNESCO-UIS, which includes statistics on country-level mobility for 2018–2023, the institutional factbook, and reports from the Ministry of Education. The selection of the sources is justified by their consistency and the availability of annual comparable data on the flow of outbound/inbound students, government education expenditures, and the number of international faculty and students.

Qualitative data were sourced from official policy documents, such as the Strategy of Academic Mobility 2012–2020, statements of institutional mission, and descriptions of peer-reviewed programmes and studies on internationalization in Kazakh.

The stated sources provide explanations and context for institutional practices that are not captured by quantitative data. The secondary sources enable triangulation (cross-validation) of trends and help connect policy intentions to observable results in language, mobility, and staffing.

The quantitative component of variables is measured by: inbound mobility in absolute counts of international students registering for studies from 2018 to 2023 in Kazakhstan, outbound mobility in absolute counts of students of Kazakhstani studying out of the country

each year from 2018 to 2023, rate of inward mobility which is the ratio of inbound students to aggregate tertiary registered, where applicable or indicators of adjusted population to support comparison of cross-country, share of foreign faculty which is the percentage of faculty identified as foreign or international where data on institution are available and therefore selected, coverage of English medium program by proxy which is the number of absence or presence of programs that is advertised as medium of English in websites or factbooks of institutions, whereas, where the numbers are not available, qualitative coding is used and expenditure on government education, expressed as % GDP and PPP$ of yearly expenditure of government on education.

The procedure of quantitative analysis entails:

- descriptive statistics of percentages, rates and annual counts on rates of inbound student growth and rate of inward mobility which calculations define trends from 2018 to 2023;
- trend analysis of year on year change in percentage and rates of compound annual growth which were calculated to indicate mobility and identify phases of decline/acceleration;
- for performance contextualization, there was comparison between rate of Kazakhstan's inward mobility and selected countries in federation of Russia and Central Asia;
- and associating to competitiveness by mapping indicators of quantitative for operationalization of dimensions of competitiveness, such as increase in inbound mobility (increased exposure internationally), sharing of foreign faculty (transfer of knowledge).

The mappings are clearly reported in the results, with each numeric finding attached to at least one sub-dimension of competitiveness.

The procedure for quantitative analysis entails document selection by purposive sampling of selected 8 to 12 documents on policy and institution that are relevant to policy on language and strategy on internationalization; coding by thematic analysis using a priori codes of policy on language, recruitment of faculty, mobility and foreign campuses, with developing sub-codes of accreditation, retention, and alignment of curriculum.

There was line-by-line coding of each document, and summaries generated for each code. Validation was achieved through independent coding of documents by two co-authors, and disagreements were resolved through improving consistency and discussion.

A convergence matrix approach was employed for integration. For each research question, a table is created to place quantitative indicators (counts of mobility, shares of faculty, and use of English as the medium of coverage) in rows, along with qualitative indicators (aims of policy, practices of an institution, and challenges reported).

Divergent, convergent and complementary results were clearly stated and discussed in the results and discussion section. This method establishes quantitative association trends between devices and competitiveness affected by internationalization.

In recognition of the limitations of secondary data (inconsistent institutional disclosures and lag in reporting), there may be sampling bias. To reduce the risk of bias in institutions' indicators and reports, multiple sources were used, and inconsistencies were documented. Where quantitative data are unavailable, such as the precise number of programs using English as a medium at each institution, conservative qualitative coding is used, with uncertainty reported (high, medium, or low) instead of an actual number.

Results

Effect of international university programs, international faculty recruitment, and initiatives on mobility and foreign campuses on the development of capabilities and competitive skills among students in Kazakhstan. There is a steady increase in inbound mobility to Kazakhstan, especially from Asian countries. Though competitiveness is not determined by competitiveness, there is also a contributory role of exposure through multiculturalism, language development, academic networking, and enhanced adaptation. Of

greater significance is outbound mobility, reflecting the growing demand for international exposure among students in Kazakhstan.

For this study, inward movement and outward movement will be referred to as inbound and outbound, respectively. The launch of the Bolashak scholarship program encouraged increased student mobility over the years (Perna, et al., 2015).

It is worth noting that students' migration in Kazakhstan is underdeveloped compared to outbound mobility. There is a low level of recorded student movement, mainly from Central Asia. The Academic Mobility strategy developed in the Republic of Kazakhstan for the period 2012 through 2020 highlighted the importance of balancing outbound and inbound mobility.

Currently, the number of international candidates who came to Kazakhstan to study is 9,078, compared with 48,876 Kazakhstani students studying abroad. Jumakulov and Ashirbekov (2016) gathered that the majority of the students are from Afghanistan, Pakistan, India, and China.

During the period 2013 through 2019, a total of 4,005 inbound students migrated to study in Kazakhstan. A factor to consider is the affordability of education fees and the cost of living in Kazakhstan relative to European countries (Rustemova et al., 2020).

Table 1 shows a systematic increase in the mobility of inbound students from 2018 to 2023. The majority of international students who arrive in Kazakhstan originate from Asia, with a progression from 2018 through 2023.

Table 1

Trend of inbound student mobility based on geography in Kazakhstan

Year/Region	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Europe	1,261	1,357	1,222	1,258	1,348	1,698
Asia	9,691	8,611	11,286	15,547	12,962	20,970
North America	3	4	11	11	3	10
Africa	3	3	9	30	14	37
Total Number of Students	10,958	9,975	12,528	16,846	14,327	22,715

Source: UIS (2024)

This answers research question 1 and the objective 1 statement regarding the progression of international students in Kazakhstan. Mobility of inbound students is considered a crucial source of diversity and revenue on campus.

The idea of promoting private and public educational institutions in Kazakhstan is attractive to international students (Bayetova, 2019 and Smolentseva, 2020).

In Table 2, inbound mobility is lower than in Kyrgyzstan and Russia. In contrast, the inbound mobility rate is higher in Kazakhstan than in other Central Asian countries, as shown in the table. There is a possibility that the Ukraine war will increase the number of international students in Kazakhstan.

Table 2

Inward rate of mobility in Russia and Central Asia

Indicators	**Inward rate of mobility**					
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Uzbekistan	0.26262	0.29043	0.27251	0.21425	0.23362	-
Tajikistan	0.55362	0.8302	0.63215	0.84317	-	-
Turkmenistan	0.1959	-	-	-	-	0.26559
Russian Federation	3.04967	3.43472	3.94274	4.25808	4.54407	-
Kazakhstan	1.50921	1.51531	2.00999	2.21043	2.26755	3.31774
Kyrgyzstan	4.50545	4.79422	5.99593	6.3999	7.5951	8.97558

Source: UIS (2024)

International and foreign campuses have integrated curricula and teaching models. This allows domestic students to learn in line with international academic best practices, in a contemporary research environment, with qualifications recognized globally, thereby strengthening competitiveness.

Internalization of educational programs in Kazakhstan entails developing proactive policies that require in-depth examination. First, establishing foreign institutions and campuses as they are linked to private entities and overseas universities. Secondly, diverse mechanisms enable international academic personnel to work at universities in Kazakhstan. Also, many institutions in Kazakhstan use English as the language of instruction to sustain internationalization.

The third section of this study analyzes the progression of internationalizing education through devised strategies: the establishment of new universities with an international orientation, the recruitment of foreign academic staff, and the gradual adoption of English in education.

The genesis of many universities, as revealed in Table 3, highlights participants' intent to shape internationalized policy through private and public education.

The aim is to ensure an international legacy is laid through improvement in the quality of education.

Table 3

Recent international universities founded in Kazakhstan between 1992 and 2013

Institution	Establishment Year	Dimension Internationally	Geography
Sorbonne-Kazakhstan Institute	2013	Partner: HEI, language (French)	Almaty
Nazarbayev University	2010	Faculty, partners: HEI, programs, language (English)	Astana
International Business School	2008	Partners: HEIs	Almaty
Kazakh British Technical University	2001	Partner: UK Faculty, programs, language (English)	Almaty
Ahmet Yesevi University	1993	Partner: Turkey	Turkestan
Suleyman Demirel University	1996	Partner: Turkey Faculty, programs, language (Turkish)	Almaty
Kazakh American University	1997	Faculty, partners (HEIs), and language (English)	Ust-Kamenogorsk
Lomonosov Moscow State University	2001	Partner: HEI	Astana
University of Central Asia	2000	Partners: Aga Khan Development Network, Tajikistan, Kyrgyzstan, language (English)	Tekili
German Kazakh University	1999	Partner: Germany Faculty, programs, language (German)	Almaty C
Nazarbayev University	2010	Faculty, partners: HEI, programs, language (English)	Astana
KIMEP	1992	Faculty, programs, language (English)	Almaty

Source: Lee & Kuzhabekova (2018).

In 1992, a private international university, the Management Institute of Strategic Research and Economics, was founded in Kazakhstan, inspired by North American educational models, with faculty members recruited mainly from Kazakhstan.

As an illustration, the University of McGill, Canada, assisted the International Executive Center at Kimep in 1998. At Kimep, English is the language of instruction. Upon the creation of Kimep, the governments of Kazakhstan and Turkey worked closely to establish the Universities of Ahmet Yesevi and Suleyman Demirel.

The institutions established are a testament to the cultural and historical relationship that subsists between the two countries. Thereafter, the University of Central Asia was created as the foremost international university formed under the auspices of the Aga Khan Development Network.

A close relationship between the government of the United Kingdom and the University of Kazakh Technical and British was established in 2001 (Lee and Kuzhabekova, 2018).

The demonstration of Table 3 reveals that Kazakhstan is a testing ground for internationalizing educational institutions. Universities established are by-products of the diplomatic wits of some countries (France, Turkey, the United Kingdom, and Germany, among others) seeking to build connections with Kazakhstan, as well as of private actors (foreign universities and foundations).

In 2010, the University of Nazarbayev was established in Kazakhstan as a significant investment in an international university that represents the country's image. The University of Nazarbayev is a representation of modern Kazakhstan, where English is taught, academics are recruited globally, and it continues to expand after the admission of its first cohort of students in 2010.

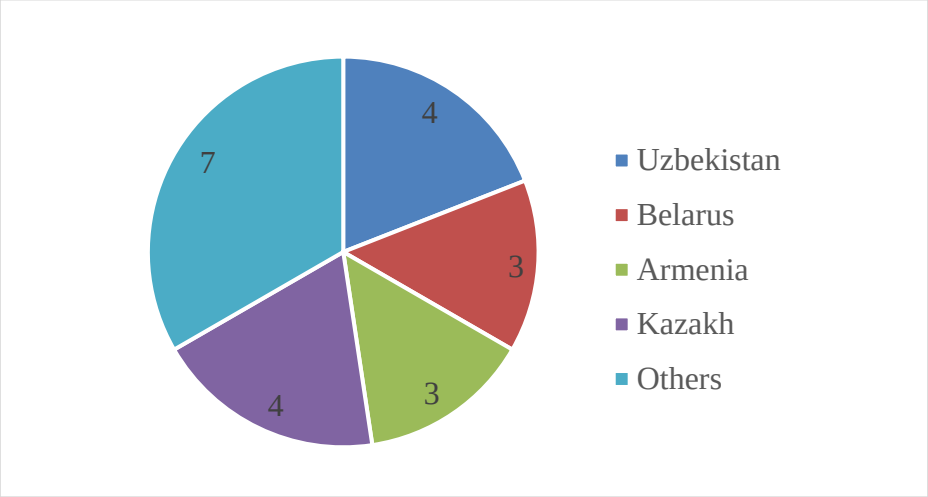
It becomes essential at this level to have an understanding and do an analysis on the impact of international education programs on stages of state formation after the Socialist space- that is, states that are regrouping under severe international pressures which other countries created in the mid-twentieth century or before do not experience. The university almost instantly took the lead among other universities in Kazakhstan. At the same time, the internationalization process has been ongoing since inception, with about 84% of faculty members being foreign professionals invited to Kazakhstan; the medium of instruction is English, and the university collaborates with top-ranked universities around the world (Rustemova et al., 2020).

In the meantime, universities with offshore campuses in Kazakhstan have been making progress in using English and Russian. Undeniably, the Kazakh education system reflects the country's shift from the model of the Russo-Soviet to the globalized Anglo-Saxon world.

With the country's integration into the global economy, operations remain within Russia's sphere of influence in education, politics, and culture.

Figure 1 displays the establishment of foreign and international campuses in Kazakhstan. This is expected to ensure competitiveness among students of Kazakhstan in assessing the impact of international university programs. This answers research question two and achieves the objective of statement two.

Figure 1
Destinations of Russian offshore campuses



Source: Kleibert et al. (2020)

As stated by Dushinski (2017), visiting lecturers reduce program implementation costs and are economically efficient. The visiting professionals possess a broad, modern, and international body of knowledge gathered over time from high-quality, high-pedigree universities. There is also knowledge sharing, which helps improve research quality at host universities. Indeed, both private and public educational institutions benefit from internationalization. International students and faculty also influence the academic environments of the host university.

The investigation by Lee and Kuzhabekova (2018) reveals Kazakhstan as a marginal state that is actively pursuing internationalization. Motivations of academics on the international scene who migrate to Kazakhstan for employment on a full-time basis, though this is a reversal of talent flow in contradiction of the extant empirical review. Notably, about 41% of respondents in this research resided in two or more countries before migrating to Kazakhstan. Although frenzied mobility was not a criterion for selecting participants, its occurrence among respondents indicates an attraction to international work and the realities of the academic job market. Without being surprised, people emigrate from a country when there are few or no employment opportunities. In academia, the job market has become highly competitive due to the excess number of doctoral holders in Europe and the United States.

In total, the three issues are representations as push-factors which motivate participants to leave former places of abode: labor market, unpleasant working conditions, and marital status and age. The categorization shows that push factors are complex, similar to differences in agency in relocation decisions.

It is interesting to note that, years after the study's data collection, about half of the participants concerned had already left Kazakhstan. The reasons participants left are not within the scope of this study; this result raises concerns about the sustainability of recruiting international personnel in Kazakhstan despite favorable expectations. In implementing the recruitment of international faculty members, Kazakhstan could place greater emphasis on attracting talent among scholars. Also, development of retention strategies is germane to addressing international faculty members' needs in seeking appreciable work.

Assuredly, empirical study reveals that foreign staff were motivated to migrate to Kazakhstan out of curiosity and a desire to be employed in an environment where they could advance their careers. According to Mowbray (2022), the University of Nazarbayev has been

interesting and hence attractive, which provides an advantage for human capital development in positioning for global, local, and regional influence.

As Mowbray (2022) notes, staying at Nazarbayev University has been interesting because it offers an avenue for systemic human capital development to achieve global, local, and regional impact. Moreover, it can be a realization of a long-time career dream and a way to make a helpful impact.

Identified challenges in taking up a teaching post internationally include acquiring explicit knowledge rather than just implicit knowledge. Across 59 countries worldwide, the University of Nazarbayev has nearly 500 faculty members with broad exposure to a blueprint for university administration (Mowbray, 2022).

Kuzhabekova and Lee (2020) state that policymakers are expected to implement policies that promote internationalization of research programs by international faculty members, thereby strengthening the capacity of domestic research in Kazakhstan. Analysis of social and bibliometric networks revealed contributions to areas of research prioritized by government policies and by collaborations linking universities in Kazakhstan to networks outside the country, through research that provides opportunities for apprenticeships for upcoming.

Following Sabzalieva (2017), Kazakhstan's education policies are influenced by many external actors, including Anglo-American universities, the World Bank, the European Union, and other nations such as Singapore, China, and Russia. It is outside the state's vision that the government has decided to align with international best practices, not under coercion or external influence. Yet, it cannot be concluded based on a test of time that the University of Nazarbayev model is sustainable and has enduring benefits.

Four different types of foreign academics were identified by Charlene et al. (2022): those who seek to explore diverse cultures and countries, those who seek the opportunity to stay away from unpleasant situations, those who are motivated by higher remuneration and those who seek to gather experience by working in an international space to achieve progression in their career. Possibly, the four academic categories are an attraction to Kazakhstan. Hence, it is challenging to predict the influence of this mode of internationalization on Kazakhstan's education system.

A strategic way to ensure the competitiveness of Kazakhstani students is to promote the use of English as a step towards globalization and internationalization. The policy instituted is the result of several factors, including the lack of competitiveness among universities in Kazakhstan in the international market, minimal technical support, inadequate accommodation facilities, and limited courses taught in English as the medium (Rustemova et al., 2020). To increase the number of students admitted, the number of courses universities teach, and the number of available programs. This becomes possible as a result of a trilingual (English, Kazakh, and Russian) agenda at all education levels, as decided by the government. The extant literature posits inbound mobility as beneficial, for example, by enabling an international context in the learning environment (Jumakulov and Ashirbekov, 2016).

Teaching students in global languages contributes to the competitiveness of Kazakhstani students internationally. Hence, Kazakh stands as the lingua franca, Russian for communication among inter-ethnic groups, and English for integration into the international community. Therefore, it is the decision that citizens should adopt the three languages, even as Kazakhstan adapts to the realities of the contemporary world, with trilingualism as an indicator of the country's competitiveness.

Experts believe that investing in the national language should be consistent and better than before to sustain Russian as a language. The role of the Russian language is well understood by everyone as enabling cooperation among ethnic groups and serving as an integrating bridge language. Russian, as a language, plays an essential role in professional and cultural settings in Kazakhstan, with knowledge of its future competitiveness. The last

component relates to the essence of learning English as a language needed in the global world, with an abundance of innovation and information. Most professionals view language as a design to improve competitiveness in Kazakhstan. Students of Kazakh are interested in learning English, but notable changes within the academic program cannot be overridden (Polatova et al., 2020). Despite all, the application of three languages to the entire education system in Kazakhstan is very much under debate. In plain terms, the skills and resources required to develop quality skills using the three languages among the students are not available. This thus provides answers to research question three and the achievement of statement of objective three.

Discussion

Kazakhstan's education policies aim to develop an education system aligned with international standards, enhancing quality and integrating the country into communities of science and education. Regarding universities in the post-Soviet period, Chankseliani (2022) identified their operation amid political, social, and economic revolutions following the collapse of the Soviet Union. The revolutions took different paths in their respective countries, and currently, there is diversity in each nation's position across political, human, and economic development, as assessed by conventional global indicators.

Analysis reveals that Kazakhstan's pathway to internationalization is unique among Central Asian countries, which face inadequate resources, and even among Russia and China. It is recent that authoritarian regimes aggregate available resources to develop policies for the internationalization of educational programs; as discussed by Hanson and Sokhey (2020), an essential and relevant evaluation of education policies in countries with a similar position to Kazakhstan is needed.

In Kazakhstan, the economy's growth is linked to oil, and there has been subsequent investment in education to enhance domestic and internationalization. However, economic growth has stagnated, with a corresponding reduction in spending on educational activities (Hanson and Sokhey, 2020). The majority of universities are self-reliant as they depend on private education financing. Although some students from Kazakhstan are on scholarship to study at government universities, the majority must pay tuition fees.

As displayed in Table 4, government expenditure on education falls by 1% of GDP from 2016 to 2023, and there is a reduction in financing for students in tertiary institutions from 2344.0 to 2304.5 PPP$ (in comparison with the US$) during the period under review. As a result, there is no assurance of state funding to implement internationalization policies in the near future. Government spending on education is influenced by the global economic crisis, security or political unrest in Kazakhstan, and the War in Ukraine.

Table 4

Kazakhstan's spending on Education

	2016	2017	2018	2019	2020	2021	2022	2023
Expenditure of the Government as % of GDP	3.8	3.3	3.4	2.7	2	2.7	2.5	2.8
Basic funding of a student (PPP$)	-	2344.0	2281.6	2631.5	2356.1	2078.4	1855.2	2304.5

Source: https://uis.unesco.org/en/country/kz (2024)

Table 4 reveals government expenditure as a percentage of GDP, in line with the basic funding of a student. This reveals the government of Kazakhstan's commitment to education in 2016 and 2023.

Looking at history, universities in Kazakhstan are familiar with centralized control. It is premature to assess decentralization as an achievement and allowance of autonomy to institutions. There is an observable belief that the idea of institutional autonomy is about transferring educational practices across nations. It is interesting to note that policy formulation documents refer to autonomy as the world's best practice, despite little being known about its importance in social settings.

This study has analyzed the impact of international educational programs on the competitiveness of Kazakhstani students. It can be concluded that the result is not skewed, with improvement over the last three decades (Rimantas et al., 2021), yet not fully achieved and facing difficulties (Tight, 2022). Universities in Kazakhstan are currently involved in a diverse range of international networks. Universities signify a component of a nation's branding (Eggeling, 2020). Several universities established in the country, influenced by foreign teaching models, are associated with productivity research (Kuzhabekova and Lee, 2020). The number of international students emigrating to Kazakhstan for their studies is increasing.

Chanseliani et al. (2020) and Bayetova (2019) state that, despite the foregoing, privatization and inequalities in access to education are on the increase. The model of educational management and governance in Kazakhstan remains lagging (Dengelbaeva et al., 2020). An instance is the use of the English language for instruction purposes, which depicts an existing gap between institutional and political will to internationalize.

Conclusion

In conclusion, internationalizing education programs to foster competitiveness generates opportunities, supports knowledge acquisition, accelerates innovative work methods in educational systems, enhances cultural agreement, and contributes to the sourcing of work for the new generation in the labor market.

As stated earlier, the challenge of internationalization in education is the shortage of qualified, knowledgeable personnel in foreign languages. In this context, it relates to English as a language, given that there are students who studied across the shore under the Bolashak Programs, coupled with a centralized management system to achieve effective results. To address this, it is essential to achieve decentralization in managing the education system, enhance the quality of management systems, and develop multilingual, competitive, and highly potential specialists.

Analysis reveals the difficulty of transitioning from institutional and political will to globalization and internationalization to solidify research, teaching, and implementation. Therefore, for a country such as Kazakhstan, which is undergoing a long-term transition, proactive policies must be developed to encourage internationalization: improved use of foreign languages, foreign staff and students' recruitment, outbound and inbound mobility of staff and students, and involvement in global research projects.

These are made possible by revenue generated from Kazakhstan's natural resources to finance international collaborations and openings. Yet it is observed that the process of internationalization is affected by inadequate structural facilities and the inability of university actors to operate above board internationally. The attraction of foreign post-graduates, faculty, and graduates enables system improvement while taking cognizance of international and national labor market demands.

As stated earlier, on average, four categories of researchers visit Kazakhstan annually, believing they will have a long-term stay to contribute to internationalization in the education system. Another critical concern is that if the attraction of expatriate lecturers continues in Kazakhstan in significant numbers, this may lead to the loss of indigenous staff, resulting in unemployment and brain drain in the long run. Hence, in consideration of ensuring the

competitiveness of Kazakhstani students through international education programs, the expected and desired ratio of local to foreign staff in teaching and research must be considered.

An avenue for future research is exploring potential local hurdles that may hinder efficient internationalization in international education programs. It is crucial to address possible inequalities in Kazakh students' access to international Education.

Conflict of Interest Statement

The authors declare no potential conflicts of interests regarding the research, authorship, or publication of this article.

Author Contributions

Mira Iskakova: Conceptualization, Methodology, Supervision, Proofreading. Sandugash Kaldygozova: Data Collection and Curation, Resources, Validation, Writing – Review and Editing. Maigul Shakenova: Literature Review, Data Analysis, Visualization, Writing – Original Draft, Final Editing.

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Information about authors

Mira Iskakova – Doctor of Psychology Sciences, Professor, Department of Psychology and Pedagogy, Mukhtar Auezov South Kazakhstan Research University, Shymkent, Kazakhstan, e-mail: miraisk@mail.ru, ORCID: 0000-0002-0046-8899 ***(corresponding author).***

Sandugash Kaldygozova – Candidate of Pedagogical Sciences, Associate Professor, Department of Russian Language and Literature, Mukhtar Auezov South Kazakhstan Research University, Shymkent, Kazakhstan, e-mail: sandugash.73@mail.ru, ORCID: 0000-0002-5551-6624.

Maigul Shakenova – Candidate of Philological Sciences, Associate Professor, Department of Russian Language and Literature, Mukhtar Auezov South Kazakhstan Research University, Shymkent, Kazakhstan, e-mail: maigul1379@mail.ru, ORCID: 0000-0002-1329-4939.

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Ainagul Bekebaeva

L.N. Gumilyov Eurasian National University, Astana, Kazakhstan

GENDER EQUALITY IN HIGHER EDUCATION: INTERNATIONAL EXPERIENCE AND THE KAZAKHSTANI PRACTICE

Abstract: Gender equality in higher education is widely recognized as a key condition for sustainable development and social justice; however, formal parity in access does not necessarily translate into equality of opportunities and outcomes. This article examines international experience in promoting gender equality in higher education and analyzes the specific features of the Kazakhstani context. The study employs a mixed-methods review design combining policy analysis and secondary analysis of quantitative data from international and national open sources for the period 2020–2025. Comparative analysis of selected European countries participating in the Bologna Process and Kazakhstan reveals common patterns of horizontal and vertical gender segregation, particularly the underrepresentation of women in STEM fields and senior academic positions. While Kazakhstan demonstrates high female participation in higher education and comparatively strong representation of women in academic leadership, structural barriers persist at advanced career stages. The findings highlight the importance of institutionalized gender policies, systematic monitoring, and targeted support measures. The article concludes that strengthening gender-responsive governance in higher education is essential for transforming quantitative achievements into sustainable qualitative progress.

Keywords: gender equality, higher education, academic career, Bologna Process, Kazakhstan, international experience, educational policy, glass ceiling, women in science, inclusion, STEM gender gap, Gender Equality Plans

Introduction

Gender equality in higher education is recognized as one of the key factors of sustainable development and social justice. Ensuring equal opportunities for women and men in education is aligned with the objectives of the 2030 Agenda for Sustainable Development, including Goal 5 (gender equality) and Goal 4 (quality education) (United Nations, 2015). International organizations such as UNESCO identify gender equality in education as a priority area; in particular, UNESCO emphasizes that gender equality should be integrated across all levels of education and curricula (UNESCO, 2020).

Over recent decades, significant global progress has been achieved in expanding women's access to education. Between 1995 and 2018, female participation in higher education tripled, and in most countries worldwide gender parity or even female predominance in higher education enrollment is now observed (UNESCO Institute for Statistics, 2021). In other words, in approximately 74% of countries the proportion of female students exceeds that of male students, indicating a reduction of the historical gap in access to higher education in favor of women (OECD, 2022).

However, achieving formal equality in access does not imply the complete elimination of gender imbalances. In many countries, so-called horizontal and vertical segregation in academia persists (Blackmore, 2014). Horizontal segregation manifests itself in the concentration of women and men in different fields of study and academic disciplines; for example, in most countries fewer than 25% of female students choose engineering, technical, and ICT-related fields (European Commission, 2021).

Within the European Higher Education Area (countries participating in the Bologna Process), gender equality has been declared one of the objectives of policies aimed at widening participation in higher education. The European Union and other international actors have introduced a wide range of initiatives to support gender balance in science and education, ranging from gender mainstreaming requirements in EU-funded research projects (Horizon Europe) to the exchange of best practices through the European Institute for Gender Equality (EIGE, 2021).

Kazakhstan, having been a member of the Bologna Process since 2010, has been actively striving to align its higher education system with international standards of inclusiveness (Ministry of Education and Science of the Republic of Kazakhstan, 2020). In recent years, Kazakhstan has achieved notable progress in ensuring gender parity in access to higher education. According to statistics from the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, the proportion of women among students exceeds that of men: as of the early 2020s, approximately 55-57% of students enrolled in higher education institutions are women (Bureau of National Statistics, 2024). Moreover, Kazakhstan stands out even in the regional context of Central Asia with regard to women's participation in university leadership: more than a quarter of rectors of Kazakhstani universities are women, which is significantly higher than in neighboring countries and exceeds the global average of 20% (Harden-Wolfson & Shakirova, 2025).

Nevertheless, despite these achievements, the higher education system of Kazakhstan, like that of many other countries, continues to face gender imbalances. Horizontal segregation remains evident: women dominate in the humanities and social sciences, while their participation in engineering, technical, and ICT fields is lower. The share of women among graduates of STEM programs in Kazakhstan is only about 33%, despite the fact that women constitute the majority of the overall student population (Nazarbayev University Graduate School of Education, 2022). Thus, the relevance of this study is driven by the need for a comprehensive analysis of international experience in promoting gender equality in higher education and its comparison with the Kazakhstani context.

Methods of Research

The study was conducted using a multi-stage research design combining qualitative policy analysis and secondary quantitative data analysis. At the first stage, a comprehensive review of scientific literature, international policy documents, and regulatory frameworks related to gender equality in higher education was carried out. This stage included an analysis of key documents of the Bologna Process, reports and policy papers of international organizations (UNESCO, OECD, European Commission), as well as national strategies, laws, and analytical reports regulating higher education and gender policy in Kazakhstan.

Theoretical research methods applied at this stage included systematic literature review, document analysis, and comparative analysis. In addition, secondary quantitative data were analyzed using publicly available statistical sources, including international databases and national statistics. These data covered indicators of gender participation, academic career progression, leadership representation, and gender distribution across fields of study, allowing for cross-national and longitudinal comparisons.

At the second stage, the results of the literature review and data analysis were synthesized to identify key patterns, structural imbalances, and institutional mechanisms shaping gender equality in higher education. Comparative analysis was used to contrast international practices from selected European countries participating in the Bologna Process with the Kazakhstani context. This made it possible to assess both convergent trends and context-specific features of gender equality policies.

At the final stage of the study, elements of analytical modeling were applied to conceptualize the interaction between policy instruments, institutional practices, and observed outcomes. Based on the identified challenges and successful international practices, potential directions for strengthening gender-responsive governance in higher education were formulated. This stage focused on translating analytical findings into policy-relevant conclusions and recommendations aimed at improving the effectiveness of gender equality measures in the higher education system of Kazakhstan.

Literature review

Gender equality in higher education has become an established area of academic inquiry within education studies, gender studies, and public policy research. Early scholarship primarily focused on eliminating formal barriers to women's access to education and increasing female enrollment rates, which were long considered the main indicators of progress (UNESCO, 2015). As access to higher education became more equalized in many regions, research attention gradually shifted toward structural and qualitative dimensions of inequality, including field-of-study segregation, academic career trajectories, and representation in leadership positions (Blackmore, 2014).

A consistent finding across international studies is the persistence of horizontal and vertical gender segregation within higher education systems. Horizontal segregation refers to the concentration of women and men in different academic fields, with women overrepresented in the humanities, education, and social sciences and underrepresented in STEM disciplines (European Commission, 2021; UNESCO Institute for Statistics, 2023). Vertical segregation, often described through the concepts of the "leaky pipeline" and the "glass ceiling," captures the declining share of women at successive stages of academic careers, particularly at the levels of full professorship and senior management (Blickenstaff, 2005). These patterns have been documented across diverse national contexts, indicating that gender inequality in academia is not limited to specific regions or levels of economic development.

The literature identifies multiple and interrelated explanations for these persistent disparities. At the individual level, gender socialization and early educational experiences shape students' academic choices and career aspirations, often reinforcing stereotypes about "male" and "female" professions (OECD, 2019). At the institutional level, opaque recruitment and promotion procedures, reliance on informal professional networks, and evaluation criteria that disadvantage non-linear career paths contribute to the reproduction of inequality (Morley, 2013). These structural factors are further compounded by sociocultural expectations regarding leadership and the unequal distribution of care responsibilities, which disproportionately affect women's academic careers.

In response to these challenges, a substantial body of literature examines policy instruments aimed at promoting gender equality in higher education. In Europe, gender mainstreaming has become a core principle of higher education and research governance, particularly within the framework of the Bologna Process and EU research policy (European Commission, 2021). Gender Equality Plans (GEPs), quotas in decision-making bodies, cascade models for academic promotion, and targeted funding schemes for women researchers are frequently cited as effective mechanisms for accelerating progress (Löther, 2019; Kahlert, 2023). Empirical evidence suggests that such measures are most successful when they are mandatory, linked to funding or evaluation criteria, and supported by systematic monitoring and accountability.

At the same time, scholars caution that formal policy instruments alone are insufficient if they are not embedded in institutional cultures and everyday academic practices. Symbolic compliance, uneven implementation across institutions, and resistance within academic communities can significantly limit policy impact (Morley & Crossouard, 2016). As a result,

recent studies increasingly emphasize the importance of combining regulatory measures with initiatives aimed at transforming organizational cultures and addressing implicit gender biases.

Research on post-socialist and Central Asian contexts highlights additional historical and institutional specificities. During the Soviet period, women's participation in education and science was actively promoted, resulting in relatively high levels of female educational attainment (Silova, 2011). However, this formal equality often coexisted with persistent male dominance in leadership and decision-making. In the post-Soviet period, economic restructuring and the re-traditionalization of gender roles have created new constraints for women's academic careers, particularly at senior levels (Silova & Magno, 2020). Studies on Kazakhstan indicate high female participation in higher education alongside enduring horizontal and vertical segregation, suggesting that numerical parity has not translated into full equality of opportunities (World Bank, 2023).

Overall, the literature demonstrates that gender equality in higher education is a complex and multidimensional process that extends beyond access and participation. While international research provides a rich set of analytical frameworks and policy instruments, comparative studies that systematically connect international experience with national practice in post-socialist contexts remain limited. Addressing this gap is essential for understanding how global gender equality agendas can be effectively adapted to specific institutional and cultural environments.

Results

International experience: gender equality in higher education in the countries of the Bologna Process

The general situation in Europe. The analysis demonstrates that in European countries participating in the Bologna system, a high level of gender parity among higher education students has been achieved; however, imbalances persist at the level of fields of specialization and academic careers. On average across the EU, women account for approximately 54% of the total number of bachelor's and master's students (European Commission, 2021). Nevertheless, as individuals transition into academic employment-and especially into leadership positions-the representation of women declines. In the European Union in 2021, women constituted on average only 26% of academic staff in higher education category A (full professors) and about 24% of heads of higher education institutions (European Commission, 2021).

This trend has been described as the "leaky pipeline," whereby the proportion of women decreases successively at each stage of the academic career despite gender parity at the student level (Blickenstaff, 2005). The phenomenon of vertical segregation is also commonly described through the metaphor of the "glass ceiling," referring to invisible barriers that hinder women's advancement to the highest academic positions.

The role of Gender Equality Plans in the European context. In recent years, a supranational approach to the institutionalization of gender equality in higher education and research has emerged in Europe, with Gender Equality Plans (GEPs) becoming a key instrument. Since 2022, the existence of a GEP has been a mandatory eligibility criterion for organizations participating in the Horizon Europe programme, which has elevated gender equality to the status of a managerial and financial priority (European Commission, 2021).

In the pan-European understanding, a GEP is a comprehensive strategic document that includes the collection and publication of gender-disaggregated data, analysis of gender gaps in career progression and pay, measures to support work-life balance, the integration of the gender dimension into research and teaching, as well as mechanisms for preventing gender-based violence and harassment.

According to the European University Association, by the end of 2022 more than 85% of European universities had developed or updated their GEPs in response to the new requirements, indicating a high level of institutional engagement within the university sector (EUA, 2022). At the same time, research suggests that the effectiveness of GEPs varies considerably and depends on the extent to which they are embedded in university governance and monitoring systems.

Germany.

In Germany, the issue of ensuring equal rights in science and education is enshrined in legislation and supported by both federal and Länder-level initiatives. The Federal Framework Act for Higher Education (Hochschulrahmengesetz) of 2007 obliged universities to promote gender equality and eliminate existing inequalities, linking higher education funding to compliance with these requirements. At the level of the federal states, all higher education laws include provisions on the appointment of gender equality officers (Gleichstellungsbeauftragte) within universities (Löther, 2019).

The so-called "cascade model" (Kaskadenmodell) of target setting is widely applied: university leadership seeks to ensure that the proportion of women at each subsequent stage of the academic career is no lower than their proportion at the preceding stage (Kahlert, 2023). In addition, universities develop gender equality plans (Gleichstellungsplan), which are comprehensive action programs aimed at ensuring equal opportunities for female staff and students.

At the federal level, one of the most prominent initiatives is the Programme for Women Professors (Professorinnenprogramm), which has been in operation since 2008. Jointly funded by the federal government and the Länder, the programme provides universities with grant funding to establish additional professorships for women, contingent upon a successful evaluation of the university's submitted gender strategies. This programme has contributed to a significant increase in the proportion of women professors in Germany-from approximately 15% in the mid-2000s to 26% in 2022 (Kahlert, 2023).

In addition, research funding organizations and associations (such as the German Research Foundation - DFG) have introduced gender equality standards in project selection processes. Since 2008, the DFG has required universities to comply with "gender-oriented standards" in their organizational structures and human resources policies, making adherence to these standards a criterion in decisions on funding applications for large-scale research networks (Löther, 2019). One of the key elements of these standards is the requirement to apply the cascade principle in recruitment to research positions. Overall, the German experience demonstrates a combination of binding requirements (legislation, staffing quotas, and formal criteria) and incentive-based measures (funding and certification) to promote women's advancement in academia. As a result, the share of women among professors in Germany reached 26%, and among heads of research institutions 22% in 2020 (Bundesregierung/GWK, 2021). Although this trend is improving, the goal of full equality has not yet been achieved.

France

The French model is characterized by the active role of the state in establishing a regulatory framework for equality and by mandatory requirements imposed on the education sector. The 2013 Law on Higher Education and Research (Loi Fioraso) obliged universities and research organizations to ensure gender parity in elections to all governing bodies and introduced the position of an equality officer (chargé de mission égalité) in every university (Ministère de l'Enseignement Supérieur, 2013). The French Ministry of Higher Education and Research also signed a Charter for Gender Equality in Higher Education together with the Conference of University Presidents, calling on universities to implement measures promoting equality among both students and staff.

As a result of these measures, the proportion of women in the governing bodies of French universities has increased: by 2022, women accounted for approximately 28% of members of university governing boards and about 20% of university presidents (Ministère de l'Enseignement Supérieur, 2022). France has also promoted the visibility of women scientists: since 2001, the Irène Joliot-Curie Prize has been awarded annually to outstanding women researchers (L'Oréal-UNESCO, 2023). Overall, the French experience demonstrates the effectiveness of combining legal quotas (ensuring a minimum share of women in committees and governing bodies) with planning instruments (mandatory equality action plans) for the institutionalization of the principle of equal opportunities.

Italy

In Italy, the promotion of gender equality in universities is based on mandatory plans and equal opportunity committees, combined with financial incentives. Law No. 183/2010 established Joint Committees for the Guarantee of Equal Opportunities (Comitati Unici di Garanzia, CUG) in public institutions, responsible for developing internal rules to prevent discrimination (Italian Parliament, 2010). Earlier, in 2006, the Code of Equal Opportunities was adopted, requiring all public institutions to approve a Positive Action Plan (Piano di Azioni Positive, PAP) every three years to eliminate gender barriers (Italian Government, 2006).

The most recent stage is the adoption of the National Strategy for Gender Equality for 2021-2026, which includes provisions aimed at encouraging universities to achieve gender balance among academic staff and leadership (Presidency of the Council of Ministers, 2021). In particular, the strategy proposes taking gender indicators into account when allocating public funding to universities. These efforts have begun to yield results: by 2022, the share of women among university professors in Italy reached approximately 24%, and among rectors about 15% (ANVUR, 2022). Although these figures remain relatively low, a positive dynamic has been established, supported both “from above” (through strategies and recommendations) and “from below” (through initiatives of universities themselves and networks of women academics).

The Netherlands

Historically, the Netherlands had one of the lowest shares of women professors in Western Europe; however, in recent years it has made a significant leap forward due to targeted initiatives. The legal framework in the Netherlands prohibits discrimination in education (the Higher Education and Scientific Research Act includes a general provision on non-discrimination and the obligation of equal treatment of men and women in universities). For a long time, the primary emphasis was placed on university self-regulation and soft measures. In 2017, the government launched the Westerdijk Talent Impulse programme, timed to coincide with the 100th anniversary of the first woman professor in the country. Under this programme, the state allocated funding for the appointment of 100 women professors (Ministry of Education, Culture and Science, 2017). The programme was highly successful: by 2019, all 100 additional women professors had been appointed. This increased the proportion of women professors nationwide from approximately 19% in 2016 to 26% in 2021 (LNVH, 2021).

In 2020, the Dutch Ministry of Education presented the National Action Plan for Diversity and Inclusion in Higher Education and Research (Ministry of Education, Culture and Science, 2020). The plan sets several objectives, including integrating diversity principles into research evaluation and accreditation procedures, improving the monitoring of diversity data, and introducing reward systems for promoting inclusivity. As a result of these measures, the share of women professors in the Netherlands increased to approximately 26%, and the proportion of women in university executive leadership reached around 30% by 2023 (VSNU, 2023).

In addition, grant schemes are in place to encourage the promotion of women to the next career stages. For example, the Aspasia grant provided by the Netherlands Organisation

for Scientific Research (NWO) offers universities a financial bonus if a woman researcher who received a high evaluation in a competitive call (but did not obtain funding) is nevertheless promoted to associate professor or full professor. In this way, universities are incentivized to promote women even if they did not win the grant itself, receiving compensation (€40,000-€120,000) for the promotion of each such candidate. The Netherlands also hosts active professional women's networks and civic initiatives. The LNVH foundation brings together approximately 1,400 women professors and associate professors, lobbying for their interests and conducting research on barriers to career advancement. An annual Girls' Day is also organized as a national initiative, during which technical companies and universities invite schoolgirls aged 10-15 and introduce them to science and ICT in order to stimulate girls' interest in STEM fields. As a result of these measures, the share of women professors in the Netherlands increased from 20% in 2016 to approximately 26% in 2021, while the share of women in university executive leadership rose to around 30%. Although informal academic culture may change slowly, the existence of a National Action Plan and the involvement of all key stakeholders constitute positive factors for further progress.

Finland

The Nordic countries are traditionally associated with high standards of gender equality; however, in the field of academic research and education they also face specific challenges. In Finland, equality legislation (the Act on Equality between Women and Men of 1986) applies to the education sector as well, requiring teaching and research to promote the objectives of the Act. The law obliges all educational institutions and employers with more than 30 employees, including universities, to have Gender Equality Plans. These plans must cover issues of equal recruitment, pay, working conditions, and the prevention of harassment, among others. However, for a long time insufficient attention was paid to the implementation of this requirement: monitoring of the existence and effectiveness of GEPs in universities was irregular (Ministry of Education and Culture, 2020).

The Finnish government has made efforts to integrate gender mainstreaming. As early as 2010, the first government report on gender equality was published, including objectives related to promoting women in research careers and strengthening gender studies. Nevertheless, for a long time there were no specific strategies on gender equality specifically in science and higher education, as gender was treated as part of broader social policy. In 2020, the Ministry of Education and Culture published the report "Promoting Gender Equality and Non-Discrimination in Higher Education Institutions," which identified shortcomings: most university gender equality plans were outdated and required updating, as no assessment of the effectiveness of previous measures had been conducted. In the same year, the plan "Towards More Accessible Higher Education" was prepared, including measures to widen participation in universities for underrepresented groups, taking into account gender segregation and the distinct challenges faced by men and women as separate categories in access to education (Ministry of Education and Culture, 2020).

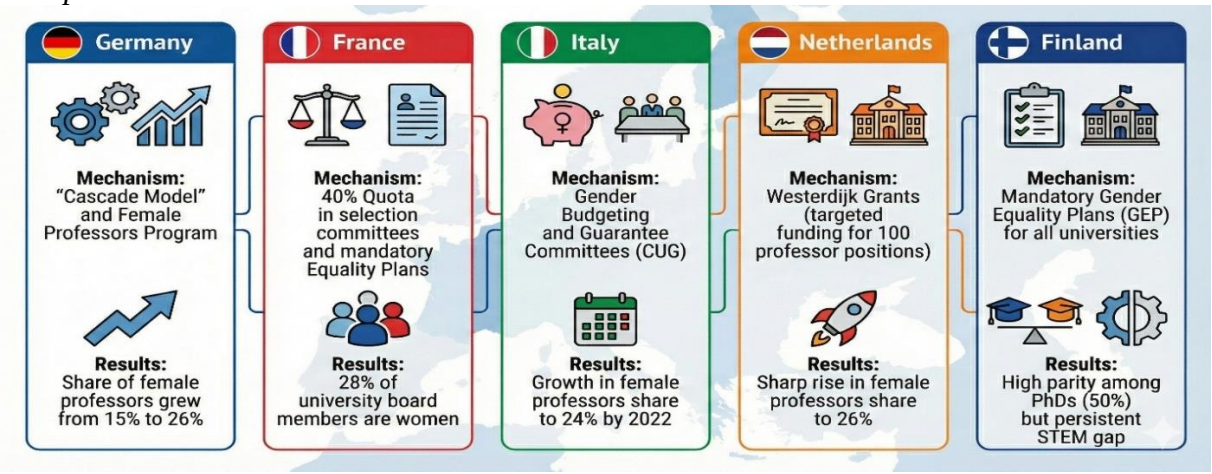
All Finnish universities are required to appoint equality officers (tasa-arvovaltuutettu), yet the implementation of their plans is rarely subject to systematic review. Nevertheless, Finland demonstrates relatively high indicators: women account for approximately 50% of PhD graduates and about 28% of professors as of 2023 (Statistics Finland, 2023). A persistent problem remains strong gender segregation by discipline: women dominate in education and the social sciences but are underrepresented in engineering and ICT. The Finnish experience illustrates that even in contexts of overall equality, targeted efforts are required to monitor policy implementation at the organizational level-in this case, the updating and systematic monitoring of university gender equality plans.

Despite differences in national contexts, the countries of the Bologna Process reviewed above demonstrate a shared tendency toward the institutionalization of gender equality in

higher education through a combination of regulatory, organizational, and financial mechanisms. These instruments range from mandatory gender equality plans and quotas in governance bodies to targeted funding schemes and cascade models of academic promotion; however, in all cases, political commitment and the integration of gender considerations into university governance systems play a decisive role. Comparative analysis indicates that it is precisely the comprehensive and systemic nature of these measures that enables European countries to gradually reduce horizontal and vertical gender segregation, although the pace and depth of change remain uneven. A synthesized comparison of key mechanisms and achieved outcomes in Germany, France, Italy, the Netherlands, and Finland is presented in **Figure 1**, which illustrates the diversity of institutional approaches to promoting gender equality in higher education.

Figure 1.

Comparative matrix of gender equality mechanisms in higher education in selected European countries.



Source: author's elaboration

Against this background, it is methodologically justified to turn to the analysis of the Kazakhstani case, which has evolved under different historical and institutional conditions but has increasingly aligned itself with international and European reference frameworks in recent years. Examining the experience of Kazakhstan makes it possible to assess to what extent high quantitative indicators of women's participation in higher education are accompanied by the development of institutional gender equality mechanisms and how closely the national model converges with the practices of Bologna Process countries.

Kazakhstani practice: achievements and challenges in ensuring gender equality in higher education

Women in the higher education system. Over recent decades, Kazakhstan has maintained a high level of women's participation in the higher education system. By the end of the 1990s, the previously existing gender gap in access to higher education had been eliminated, and women began to predominate among students (Silova, 2011). At present, women account for approximately 55-57% of the total student population in higher education institutions (Bureau of National Statistics, 2024). In terms of the gross enrollment ratio in higher education among young people aged 18-24, Kazakhstan outperforms many countries: around 65% of women in this age group are enrolled in higher education, compared to approximately 54% of men (World Bank, 2023). Gender parity has also been achieved at

preceding levels of education. Thus, at the level of access and participation, Kazakhstan demonstrates a female advantage within the higher education system.

Despite the numerical predominance of women among students, a pronounced differentiation persists in their distribution across fields of study. To provide a clear comparison of the gender distribution of students across major fields of education, Table 1 presents aggregated data on the share of women in higher education by field of study.

Table 1.
Share of women among students by major fields of study

Field of study	Share of women, %	Source
Humanities	>70	UNESCO-UIS, 2022
Education (Pedagogy)	>75	UNESCO-UIS, 2022
Arts, social and medical sciences	>70	UNESCO-UIS, 2022
All STEM fields (graduates)	32-33	Nazarbayev University, 2022
ICT	~25	Ministry of Education and Science, 2023
Engineering sciences	~28	Ministry of Education and Science, 2023
Natural sciences	~45	Ministry of Education and Science, 2023

According to the table, despite the overall numerical dominance of women in the higher education system, the distribution across fields of study demonstrates pronounced horizontal segregation. This pattern largely reflects entrenched gender stereotypes regarding “male” and “female” professions, as well as differences in professional aspirations that are formed already at the school level. Studies indicate that in Kazakhstan women are more likely to orient themselves toward fields related to the social sphere, linguistics, and economics, whereas their motivation to pursue careers in IT, engineering, and related fields is lower, although the situation is gradually changing under the influence of new opportunities in the technology sector. Public policy acknowledges this imbalance: strategic documents on the development of education emphasize the need to attract more girls to technical and natural science fields and to eliminate gender stereotypes in career guidance.

One of the most important indicators of gender equality is the representation of women among academic and teaching staff in higher education institutions and, in particular, in leadership positions. In Kazakhstan, the share of women among research and teaching staff is relatively high at junior levels: approximately 54% of university lecturers are women (Committee on Statistics, 2022). As career advancement progresses to higher academic ranks (associate professor and full professor), the proportion of women gradually declines. However, even among holders of doctoral degrees and professors in Kazakhstan, the figures remain higher than global averages: women account for around 41% of all individuals who have obtained doctoral degrees in the country and approximately 30% of currently active professors (Ministry of Science and Higher Education, 2024).

The most indicative dimension is women’s presence in academic management. According to a 2022 study by the Analytical Center under the Ministry of Education and Science of the Republic of Kazakhstan, women held 22 out of 116 rector positions (approximately 19%) in public and private universities in Kazakhstan (Kazakhstan Institute for Public Development, 2024). However, more recent data for 2024-2025 suggest an improvement in the situation: following a series of new appointments, the share of women rectors exceeded 25%, meaning that every fourth university in Kazakhstan is now headed by a woman (Ministry of Science and Higher Education, 2025). This represents a very high indicator in the global context, exceeding the global average of 20% and the European average of 22% (IAU, 2020).

Overall, the education sector in Kazakhstan has historically exhibited a higher proportion of women in leadership positions compared to other sectors of the economy. This can be partly explained by the legacy of the Soviet period, during which the teaching profession was feminized and women were often promoted to managerial positions within education. Nevertheless, despite this relatively favorable picture, vertical barriers persist: women are less likely to become rectors of large national universities and major research institutions. For example, among the leaders of Kazakhstan's flagship national research universities (such as Nazarbayev University, Al-Farabi Kazakh National University, Karaganda State University, and others), the share of women remains low. Women are also somewhat underrepresented in the structures of academic science: among directors of research institutes of the National Academy of Sciences, men traditionally predominate.

Studies focusing on the Kazakhstani academic space point to the presence of typical gender-related challenges, including a "glass ceiling" in women's careers, shaped by both institutional factors (such as insufficient transparency of selection procedures for leadership positions and the influence of male-dominated informal networks) and sociocultural factors (stereotypes about leadership and the double burden borne by women in balancing paid work and domestic responsibilities). Women researchers in Kazakhstan often face the need to balance family responsibilities with academic careers, which can slow their professional advancement. Self-limitation is also evident: surveys show that some women are less likely to apply for senior positions due to concerns about increased responsibility, exposure to criticism, or a lack of mentorship. Thus, the statistically observed decline in the share of women at the upper levels of the academic hierarchy reflects a complex set of interrelated causes that require targeted policy responses.

State policy and initiatives. Kazakhstan has ratified all major international agreements on gender equality, including the United Nations Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). Since the late 1990s, a national gender policy has been gradually developed in the country. In 1998, the National Commission on Women's Affairs and Family and Demographic Policy was established under the President, with the mandate to promote gender initiatives at the governmental level. In 2006, the Gender Equality Strategy for 2006-2016 was adopted, containing provisions aimed at expanding women's participation in the economy, politics, education, and other spheres. In the education sector, the strategy focused on eliminating gender disparities in access to education (which was effectively achieved ahead of schedule) and on revising curricula to incorporate gender perspectives. As a result of the implementation of this strategy, the elimination of the gender gap in literacy and education was officially declared. In 2009, the Law of the Republic of Kazakhstan "On Equal Rights and Equal Opportunities for Men and Women" was adopted, proclaiming equal rights for both sexes in access to education, employment, and career advancement. The next stage was the approval in 2016 of the Concept of Family and Gender Policy until 2030 (which replaced the previous strategy). This Concept sets an ambitious goal of ensuring equal rights, benefits, responsibilities, and opportunities for women and men in all spheres of society by 2030 and eliminating all forms of gender discrimination. In education, the Concept envisages the introduction of gender education, the promotion of a culture of non-violence, the removal of stereotypes from textbooks, and related measures. The practical implementation of these objectives is reflected in the State Programme for the Development of Education and Science. For example, in the State Programme for the Development of Education and Science for 2020-2025, one of the guiding principles is the provision of equal learning conditions regardless of gender, and among the quality indicators is the achievement of parity between women and men in technical and vocational programmes.

In the context of higher education, Kazakhstan has relatively few specialized programmes comparable to those in Europe (such as grant schemes exclusively for women

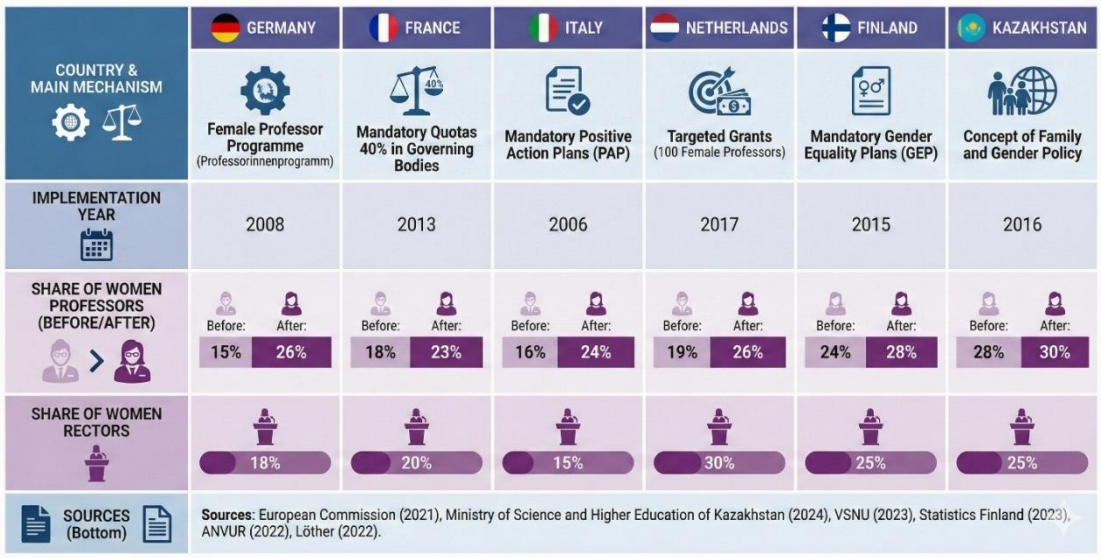
researchers). Nevertheless, a number of initiatives are being implemented with the support of international partners. For instance, gender resource centers have been established at some universities, and projects aimed at integrating gender-related courses into curricula are being carried out. One example is a project on the introduction of a gender equality course in pedagogical universities with the support of UNESCO. In April 2024, UNESCO, jointly with the Ministry of Education of the Republic of Kazakhstan, conducted an analysis of national educational programmes and textbooks in terms of gender sensitivity. Experts highlighted the need to include topics related to gender norms and the prevention of stereotypes in educational content, as well as to take gender aspects into account in policy development and the design of educational materials. It is expected that the recommendations resulting from this analysis will be used to revise school and higher education curricula.

Kazakhstan also participates in a number of international initiatives aimed at supporting women in science and education. For example, Kazakhstani academics and researchers regularly become recipients of scholarships under the L'Oréal-UNESCO "For Women in Science" programme (L'Oréal-UNESCO, 2024). UNDP implemented a pilot Gender Equality Seal project for public institutions in Kazakhstan in 2022-2024, and some universities have expressed interest in a similar certification. In addition, a number of Kazakhstani universities voluntarily join global movements promoting academic equality, for instance by organizing events in support of girls in science (annually on 11 February, the International Day of Women and Girls in Science, proclaimed by the United Nations).

Comparative analysis of mechanisms and outcomes. Unlike many European countries, Kazakhstan does not yet have a mandatory requirement for each university to adopt a formal gender equality plan or to appoint a designated gender equality officer. Within universities, issues of equal opportunities are more often addressed by general departments responsible for student affairs or social development, without the establishment of a dedicated position. However, certain elements of international best practice are gradually being introduced: transparency in recruitment is increasing (vacancies are publicly advertised), and concepts of academic ethics and the inadmissibility of harassment have been introduced (in 2018, a Memorandum on Counteracting Discrimination and Harassment in Higher Education Institutions was signed). Kazakhstan, which already has a strong foundation in the form of gender parity among students, now faces the challenge of focusing on qualitative aspects of equality-women's representation in positions of influence, the elimination of hidden barriers, and the creation of a university culture of equal opportunities. National policy documents acknowledge this task: the Concept until 2030 calls for gender audits of organizations and the widespread implementation of equality principles. Thus, Kazakhstan has favorable initial conditions (the absence of discrimination in access and even women's advantage in education) and is seeking to adopt advanced international practices to address the remaining challenges.

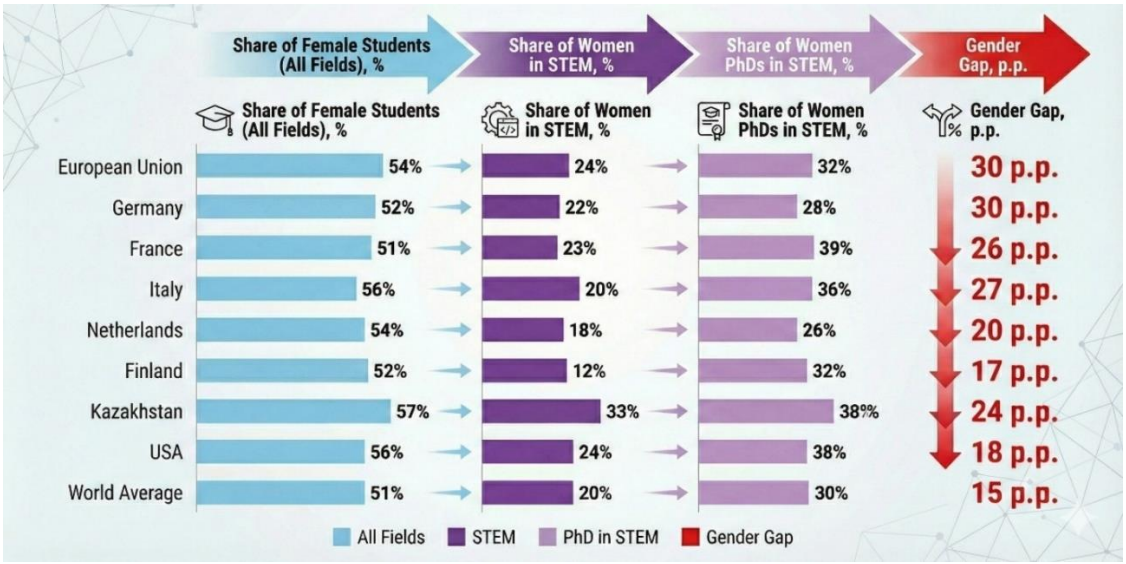
A comparison of European experience and Kazakhstani practice reveals both common features and specific characteristics. Figure 2 presents a comparative overview of the main mechanisms and their outcomes.

Figure 2.
Comparative analysis of mechanisms for ensuring gender equality in higher education



As shown in the table, Kazakhstan, in terms of the share of women professors (30%) and women rectors (25%), is at the level of or above the indicators observed in most European countries. However, it is important to note that European countries have demonstrated more dynamic growth in these indicators over the past 10-15 years as a result of targeted policy programmes. Figure 3 illustrates gender segregation in STEM education across different countries.

Figure 3.
Gender segregation in STEM education: an international comparison (2020-2024).



Sources: European Commission (2021), UNESCO Institute for Statistics (2023), National Science Foundation (2022), Bureau of National Statistics of Kazakhstan (2024).

Thus, Kazakhstan demonstrates the smallest gender gap in STEM among the countries considered (24 percentage points), which can be explained both by the Soviet legacy of actively

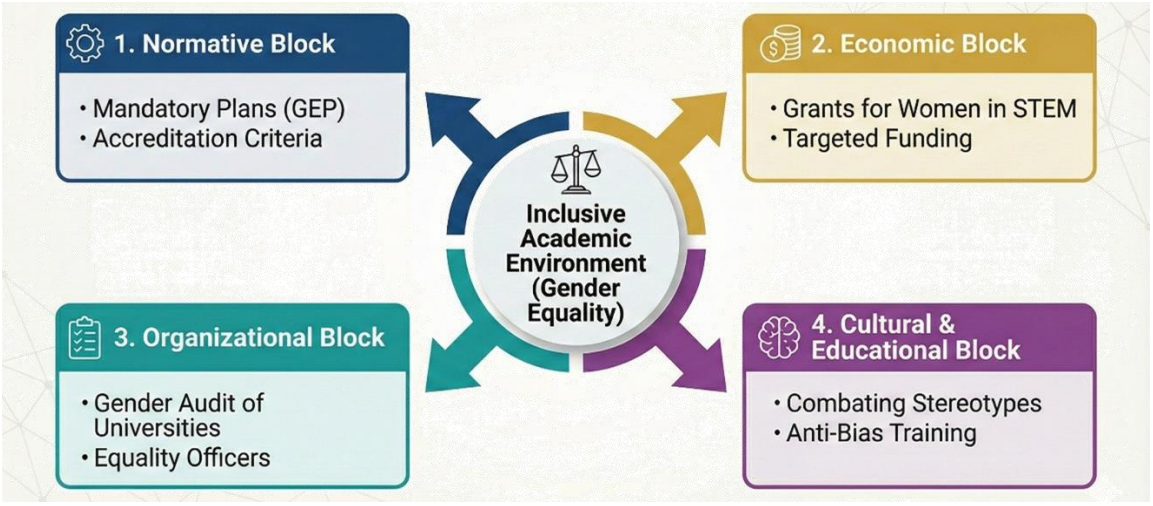
involving women in technical professions and by the relatively high overall level of women's education.

Discussion

The reviewed European country cases provide Kazakhstan with a range of potentially effective solutions. First, a key priority is the institutionalization of gender equality within higher education institutions through the introduction of mandatory action plans and the designation of responsible officers. Requiring each university to adopt an up-to-date gender equality plan with clearly defined objectives—such as increasing the share of women professors, reducing gender imbalances among students across fields of study, and implementing training to address gender bias—could help structure and systematize institutional efforts in this area. As demonstrated by practices in countries such as Finland and France, these plans should be regularly updated (every two to three years) and their implementation systematically evaluated. The overarching logic of these measures and their interconnections with other gender policy instruments are illustrated in Figure 4, which presents a strategic framework for the institutionalization of gender equality in higher education in the Republic of Kazakhstan.

Figure 4.

Strategic framework for institutionalizing gender equality in higher education in the Republic of Kazakhstan



Source: developed by the author based on international best practices and national policy analysis.

However, second, structural gender imbalances within higher education systems persist: women and men are unevenly distributed across fields of study and across levels of the academic hierarchy (Blackmore, 2014). This phenomenon is universal in nature: from Europe to Asia, women remain underrepresented in STEM fields and in senior university leadership. The underlying causes lie both in enduring societal gender norms and in the internal cultures of academic organizations.

In many countries, targeted policy interventions have been required to begin addressing these disparities. For example, in European states the introduction of quotas and mandatory plans has encouraged universities to work consciously on the recruitment and retention of women staff. Comparative analysis shows that political will and institutional mechanisms are key drivers of change. Where governments or universities themselves have implemented

systemic approaches (Gender Equality Plans, targeted funding, cascade models), an acceleration in the growth of women's participation indicators can be observed (Kahlert, 2023).

Specific features of Kazakhstan. Kazakhstan's practice demonstrates an interesting combination of achievements and challenges. On the one hand, many problems typical of developing countries are absent: there is no literacy gap, girls enter universities on an equal footing with boys, and women are widely represented in the academic profession (Silova, 2011). Kazakhstan thus has favorable starting conditions, including the absence of discrimination in access and even women's numerical advantage in education.

On the other hand, hidden barriers to the full realization of educated women's potential persist. Figuratively speaking, horizontal and vertical segregation "narrows the funnel": many women enter the system, but their share decreases at the top (although it remains above the global average). Although 54% of all research staff in the country are women (Committee on Statistics, 2022), their contributions are concentrated primarily in the humanities and social sciences.

Notably, Kazakhstan surpasses many European countries in terms of the share of women rectors (approximately 25%) (IAU, 2020). This advantage can be explained by several factors. First, the total number of universities in Kazakhstan is relatively small (around 125), and managerial decisions on rector appointments are often taken at the state level with considerations of representativeness. Second, the education sector is traditionally perceived as socially acceptable for women leaders, which minimizes societal resistance to female leadership in this domain.

Nevertheless, the quality of these achievements requires closer examination: do women holding rector positions face the same opportunities as men? Are "gendered leadership stereotypes" being reproduced, whereby women are more often entrusted with leading pedagogical or humanities-oriented universities, while technical universities are predominantly headed by men? Research on Central Asia suggests that women's leadership is often confined to specific niches and is not accompanied by a systemic redistribution of power. Therefore, a mere increase in the number of women at the top is a necessary but insufficient condition for achieving gender equality.

Lessons from international experience for Kazakhstan. The European country cases reviewed offer Kazakhstan several potentially effective solutions. First, the institutionalization of gender equality within universities through mandatory action plans and designated responsible persons. Introducing a requirement that each university have an up-to-date equal opportunities plan-with concrete targets such as increasing the share of women professors, reducing gender imbalances among students by field, and conducting anti-bias training-could help structure institutional efforts. Such plans should be updated every two to three years and their implementation evaluated, as is practiced, for example, in Finland and France.

Second, monitoring and data publication. International practice (EIGE, *She Figures*) demonstrates that the public disclosure of indicators (the share of women at each level, gender pay gaps, representation in governing bodies) creates incentives for progress and provides a basis for informed managerial decisions. In Kazakhstan, national statistics already publish some of these data, but they could be expanded and analyzed in greater depth (for example, gender breakdowns by field of study, type of institution, and academic rank). Accountability fosters a competitive dynamic: when universities see that peers perform better, this can motivate corrective action to avoid lagging behind.

Third, supportive programmes and incentives. Kazakhstan could consider introducing special grant schemes for early-career women researchers (analogous to European scholarships and awards), such as competitive funding for the best research projects led by women or prizes for women lecturers for teaching innovation. Measures similar to the Dutch initiative of appointing 100 women professors could also be effective: centrally funding additional

positions for talented women researchers ready to take up professorial roles. This would help rapidly increase the share of women in senior academic positions and challenge stereotypes about a supposed "lack" of qualified women candidates. Naturally, such programmes must be transparent and merit-based to avoid doubts about qualifications.

The fourth lesson concerns combating bias and supporting work-family balance. European experience (especially from the Nordic countries) indicates that sustainable equality requires changes in organizational culture: providing training for selection committees on unconscious gender bias, introducing flexible working arrangements, and supporting parents (for example, through extended paid parental leave or on-campus childcare facilities). In Germany, for instance, many universities have undergone the "family-friendly university" audit (*Familiengerechte Hochschule*) to improve conditions for combining work and family responsibilities. Such an audit could also be useful for Kazakhstani universities, given that a significant proportion of academic staff are women with family obligations.

While international solutions can be adapted, it is important to take the Kazakhstani context into account. Some measures (such as quotas in committees or leadership bodies) are relatively feasible and could be introduced through ministerial regulations. Others, such as making Gender Equality Plans a prerequisite for research funding, are more difficult to apply directly, given that research funding in Kazakhstan is less extensive and competitive than EU grant schemes. Instead, the presence of elements of gender policy could be made a condition for receiving state grant support (for research projects or targeted investments). Another important dimension is the role of society: efforts to promote gender equality within universities must be supported by broader societal progress toward equality. If traditional norms remain strong in society, universities alone cannot overcome them. Therefore, work on gender stereotypes must begin at earlier stages -through schools, career guidance, and the media.

Conclusion

The analysis conducted demonstrates that significant progress has been achieved over recent decades in reducing the gender gap in higher education at the levels of access and participation. Women are now not only actively involved in the educational process but also constitute the majority among students and graduates, indicating the formal achievement of gender parity. At the same time, this progress is largely quantitative in nature and does not eliminate structural imbalances within the higher education system itself.

At a deeper level, persistent forms of horizontal and vertical gender segregation remain. Women continue to be concentrated in the humanities, education, and social sciences, while their representation in STEM disciplines remains limited. Simultaneously, as academic and managerial hierarchies are ascended, a decline in the share of women is observed, pointing to the existence of career advancement barriers and the phenomenon of the "glass ceiling." These dynamics indicate that formal equality of access does not automatically translate into equality of opportunities and outcomes.

International experience confirms that overcoming such imbalances requires systemic and institutionally embedded measures. The most effective approaches are comprehensive in nature and combine regulatory frameworks, targeted support for women at critical stages of academic careers, the implementation of gender equality plans at universities, and the development of mechanisms for regular monitoring. Equally important is work with cultural and social norms that shape educational and professional trajectories from the early stages of socialization.

Kazakhstan, despite its high level of women's participation in higher education and relatively favorable starting conditions, faces structural challenges similar to those observed in many other countries. The lack of systematic institutionalization of gender policy at the

university level, limited monitoring, and insufficient integration of gender criteria into education governance and funding constrain the transition from quantitative achievements to qualitative change. Under these conditions, further progress toward gender equality requires a shift in focus from declarative principles to sustainable managerial and educational practices.

In the long term, ensuring gender equality in higher education should be viewed not only as a matter of social justice but also as a strategic resource for the development of human capital, scientific capacity, and an innovation-driven economy. With the consistent implementation of comprehensive measures, Kazakhstan has the potential to build a more inclusive and effective higher education system and to assume a leading position in the region in the field of gender-responsive education policy.

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Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

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Information about authors

Bekebaeva Ainagul **-** postodoctoral researcher, PhD, L.N. Gumilyov Eurasian National University, Astana, 010000, Kazakhstan, e-mail: ainash11@mail.ru, https://orcid.org/0000-0002-4608-7514

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Sjur Bergan

Independent expert

THE FUNDAMENTAL VALUES OF THE EUROPEAN HIGHER EDUCATION AREA: WHAT ARE THEY, AND HOW DID THEY DEVELOP?

Abstract. The European Higher Education Area has defined six fundamental values: academic freedom, academic integrity, institutional autonomy, student and staff participation in higher education governance, public responsibility *for* higher education, and public responsibility *of* higher education. The article describes the process leading to the definition of these values as well as the circumstances that meant that these values could no longer be taken for granted. Instead, in the space of a few years, a consensus emerged that the values need to be a policy priority. Along with the list of fundamental values, the Ministers of the EHEA adopted fairly extensive statements outlining their understanding of these values. Nevertheless, continued consideration is required both to develop a better understanding of the many issues that influence the way in which fundamental values are implemented and on developing arrangements for assessing how the values are put into practice in EHEA Member States.. Many of the values relate to various aspects of the relationship between public authorities and the higher education community, in particular higher education institutions.

Introduction

In the communiqués adopted since 2018 (Bologna Process 2018, 2020a, 2024a), the Ministers of the European Higher Education Area (EHEA) adopted a set of fundamental values, defined as

- Academic freedom;
- Academic integrity;
- Institutional autonomy;
- Student and staff participation in higher education governance;
- Public responsibility for higher education;
- Public responsibility of higher education.

In statements adopted as appendices to the Rome and Tirana Communiqués (Bologna Process 2020b, 2024b), the Ministers outlined their understanding of these fundamental values. The three communiqués and two statements do, however, give little indication of the process that led the EHEA to an agreement on its values. Before taking a closer look at how the six values are understood, it is therefore worth providing an overview of the process (Bergan and Matei 2025).

A long process toward a common understanding

From its outset, the Bologna Process gave importance to its fundamental values. In 1999, it was perhaps natural that a declaration adopted in Bologna (Bologna Process 1999) give pride of place to the Magna Charta Universitatum (Magna Charta Observatory 1988), which had been adopted by European Rectors in the same city eleven years earlier. In so doing, the Ministers identified academic freedom and institutional autonomy as cornerstones of the Bologna Process, which would lead to the establishment of the European Higher Education Area in 2010 (Bologna Process 2010), the year in which Kazakhstan acceded to it.

Representatives of students and staff were not officially present in Bologna in 1999, but representatives of the European Students Union (then known as ESIB – European Students' Information Bureau) were invited to the next meeting of Ministers, held in Prague in 2001. In

the Communiqué adopted at this meeting, Ministers underlined that "the involvement of universities and other higher education institutions and of students as competent, active and constructive partners in the establishment and shaping of a European Higher Education Area is needed and welcomed" and that "students should participate in and influence the organisation and content of education at universities and other higher education institutions" (Bologna Process 2001: 3 - 4).

In other words, in 2001 we see a budding reference to what later became a more precise reference to student and staff participation in higher education governance. This was further strengthened by a statement in the Berlin Communiqué to the effect that "[s]tudents are full partners in higher education governance" and a call on "institutions and student organisations to identify ways of increasing actual student involvement in higher education governance" (Bologna Process 2003: 5). We had to wait until the Bergen Communiqué, however, to see a reference to staff participation as well as the inclusion of Education International (EI) as a member of the Bologna Follow Up Group (Bologna Process 2005: 6). To my recollection, this delay reflects the fact that EI was less present in the European policy debate at the time than was ESU rather than any considered view on the relative importance of student and staff participation.

In 2003, Ministers changed the criteria for accession to the Bologna Process from participation in the EU programs Socrates, Leonardo da Vinci, and Tempus-Cards (Bologna Process 2001: 3) to all countries parties to the European Cultural Convention (Council of Europe 1954) provided that their competent public authorities "declare their willingness to pursue and implement the objectives of the Bologna Process in their own systems of higher education" (Bologna Process 2003: 8).

Even if the objectives of the Bologna Process were outlined in the successive declarations and communiqués adopted by Ministers, this provision made it necessary to identify the specific objectives to which applicant countries would need to commit. In a largely forgotten document (Bologna Process 2004), the BFUG spelled out its understanding and also adopted a procedure for assessing new applications. The BFUG adopted five "principles" to which new applicants – and presumably also all the countries that had joined the Bologna Process between 1999 and 2003 – would adhere. The list includes three elements that were later included among the fundamental values of the EHEA (institutional autonomy, student (but still not staff) participation in higher education governance, and public responsibility *for* (but not yet *of*) higher education. In addition, the list includes two elements that were later not included among the six fundamental values but that were nevertheless of crucial importance to the EHEA and that were later the subject of a specific strategy (mobility of students and staff; Bologna Process 2012a) and a set of principles and guidelines (the social dimension of the EHEA; Bologna Process 2020c).

While three fundamental values were included, academic freedom was not, even if there was a reference to it from the very beginning of the Bologna Process. Even with the benefit of hindsight, I am unable to explain this oversight, except by saying that it was most likely seen as subsumed under institutional autonomy, which was again seen, at least indirectly, as a reference to the Magna Charta Universitatum. This is perhaps not a very satisfactory explanation but at the time, academic freedom and institutional autonomy were often considered - wrongly – as different aspects of the same value.

There were further references to values and principles in the subsequent communiqués up to and including the Bucharest Communiqué (Bologna Process 2012b), but there was no mention of further fundamental values. The Budapest-Vienna Declaration (Bologna Process 2010), which formally established the EHEA, refers to "academic freedom as well as autonomy and accountability of higher education institutions as principles of the European Higher Education Area and underline the role the higher education institutions play in fostering

peaceful democratic societies and strengthening social cohesion", acknowledges "the key role of the academic community - institutional leaders, teachers, researchers, administrative staff and students - in making the European Higher Education Area a reality" Bologna Process 2010: 2), and also refers to the EHEA as "a unique partnership between public authorities, higher education institutions, students and staff, together with employers, quality assurance agencies, international organisations and European institutions" and one in which "higher education institutions, supported by strongly committed staff, can fulfil their diverse missions in the knowledge society" (*ibid*.: 1).

Even if almost all Declarations and Communiqués adopted between 1999 and 2012 include some reference to values, there was little discussion at Ministerial conferences or in the BFUG and its working groups of how these values could be fostered, and there was no attempt to establish a coherent list of values. Different values and principles were mentioned in various communiqués but there was not attempt to establish an authoritative or consolidated list.

This is a reflection of the fact that up to and including 2012, the values of the EHEA were largely taken for granted. In the space of three years, by the Yerevan Conference (Bologna Process 2015a), this situation would change.

Toward 2015, there was a perception that the fundamental values on which the EHEA builds were under threat. Partly, this was caused by political developments in some member states, and the 2018 Bologna Implementation Report identifies three: Hungary, Russia, and Turkey (European Commission/EACEA/Eurydice 2018: 42). These were the most blatant but not the only examples of situations that gave rise to concern. Belarus again applied for accession to the EHEA, after the country had been dissuaded from applying in 2005 and rejected in the run up to the Ministerial conference in 2012 (Bologna Process 2012c: 24 – 25). In 2015, its application was accepted but with a Roadmap that also included explicit reference to fundamental values (Bologna Process 2015b: 2 - 3). A broader phenomenon was the emergence and consolidation of populist movements (Müller 2017) that openly disregarded the importance of academic knowledge and understanding as a basis for societal decision making and that questioned the values of democracy itself , in at least one case by using the contradictory label of "illiberal democracy". The danger of disregarding academic research became very obvious when the COVID pandemic struck and a vocal minority of public opinion not only questioned the need for and benefits of vaccines but in some cases also subjected academics working on vaccines to pressure and intimidation (Bergan *et al.* 2021, Birchall and Knight 2022, Lynas 2020).

The renewed attention to fundamental values and the realization that they could no longer be taken for granted led the BFUG to launch work on defining and exploring these values. From a first discussion at its meeting in Bratislava in December 2016 (Bologna Process 2016), the BFUG arrived at the six values adopted by Ministers and, with the help of a dedicated working group, the more detailed statements adopted in 2020 and 2024. Five of the values had been listed in one or more communiqués prior to 2018, whereas academic integrity was brought into the debate only in the preparation of the Paris Communiqué (Bologna Process 2018). As noted, some values and principles remain important in the EHEA but are nevertheless not included among its fundamental values.

The fundamental values of the EHEA

The six fundamental values of the EHEA are open to some interpretation, and Ministers also adopted a set of statements that outline a common understanding of them. The statements are worth reading in full (Bologna Process 2020b, 2024b), but they may be summarized as follows.

Academic freedom is seen as the freedom of academic staff and students to engage in research, teaching, learning and communication in and with society without interference nor fear of reprisal.

Academic integrity is understood as a set of behaviors and attitudes in the academic community internalizing and furthering compliance with ethical and professional principles and standards in learning, teaching, research, governance, outreach, and any other tasks related to the missions of higher education.

Institutional autonomy is defined as the will and ability of higher education institutions to fulfil their missions without undue interference and to set and implement their own priorities and policies as concerns organization, finance, staffing and academic affairs. It is a precondition for academic freedom and a prerequisite for higher education institutions to fulfil both their democratic mission and to provide high quality learning, teaching and research for the benefit of society.

The participation of students and staff in higher education governance is in some ways the most difficult value to define briefly. It encompasses the right of students and staff to organize autonomously, in accordance with the principle of partnership and collegiality, without pressure or undue interference; to elect and be elected in open, free and fair elections; have their views represented and taken into account; initiate and participate in all debates and decision-making in all governing bodies; and, through their representative organizations, be duly involved in issues concerning the governance and further development of the relevant higher education institutions and system.

Public responsibility *for* higher education designates a set of duties, mainly exercised at the level of the national higher education system, which public authorities must fulfil as part of their overall responsibility for the education sector and society as a whole, whereas public responsibility *of* higher education refers to the obligations of the higher education community to the broader society of which the higher education community is a part. The former is mainly exercised by public authorities and the latter mainly by the higher education community organized through higher education institutions.

The understanding of each value is described separately but Ministers underline that the six values constitute a coherent whole and cannot be put into practice selectively. For example, a country that allows a high degree of institutional autonomy but only a low degree of academic freedom, such as by encouraging autonomous but authoritarian institutional leadership, cannot be said to fully implement the fundamental values of the EHEA.

Challenges to implementation

Having obtained agreement by all members of the EHEA on a set of common fundamental values is no small achievement. It does, of course, not solve all problems. To the contrary, the fundamental values moved to center stage of the EHEA because they are being challenged to a greater degree today than in the early stages of the Bologna Process. The examples of high profile violations identified in the 2018 Bologna Implementation Report (European Commission/EACEA/Eurydice 2018: 42) have unfortunately been supplemented by others since then. These are mostly what we may call “headline grabbing “ cases, in other words cases that are seen as newsworthy in either the country in which the violations occur, in other countries, or both. Such cases are often political in nature and concern instances in which public authorities seek to restrict the right of institutions or individuals to exercise their rights.

Therefore, public authorities and the higher education communities must continue to work together to ensure that the fundamental values are put into practice. This will require work in each country as well as continued discussion at European level among both policy makers and academic researchers.

This discussion will need to focus on, the relationship between public authorities and the higher education community. In principle, this looks straightforward: public authorities are

responsible for the higher education system, while higher education institutions are responsible for their own learning, teaching, and research. In practice, there are many gray zones. While public authorities would most likely be acting within their competence if they decide to establish a new institution or study program in an underserved part of the country or in an academic discipline where the government considers that the country needs increased competence, such as Artificial Intelligence, are there limits to the government's margin of maneuver? Can it disregard quality concerns or give very precise indications of what should be taught or researched? By way of example, in 2021 the then Norwegian government decided to establish a "decentralized" teacher training program in a small locality in the norther part of the country. Even if the decision was ultimately to establish a study program under the auspices of an existing institution rather than establish a new institution (Fanghol and Vartdal 2021), it ran against the advice of the Norwegian quality assurance agency (Schei 2021) as well as the preferences of the institution ultimately made responsible for the program. While there is an argument for saying that the comet public authorities act within their competence if they decide to establish a study program or institution in an underserved part of the country, it is much less clear that they act within their competence if, in so doing, they disregard the concerns of the quality assurance agency and the institution that will have to run the study program.

In this particular case, the funding for the new study program was not reallocated from other parts of the education budget. More broadly, a legitimate question is nevertheless whether there are there limits to the extent to which public authorities may redirect funding to specific institutions or programs. Are there, or should there be, criteria for the proportion of program or project specific versus basic or lump sum public funding?

Not least, at a time when legitimate concerns about national security interests are increasing, what is the proper relationship between these concerns, the ability of universities to hire the staff they consider best qualified regardless of their nationality and background, and the ability of staff and students to conduct their research and publish their findings without, as the EHEA definition has it, "without interference nor fear of reprisal". What is the proper balance between the duty of public authorities to ensure the safety of their country and protect it against espionage and even terrorism and the right of the academic community to pursue its teaching and research without interference?

Institutional autonomy has sometimes been thought of as the legal relationship between public authorities and higher education institutions. This is of course too simplistic but legal regulations are important to putting the fundamental values into practice. Laws and regulations can both hinder and foster the fundamental values of higher education. Most countries have specific laws on either higher education or on education more broadly. It is not sufficient, however, that such laws be compatible with fundamental values. Other laws also impact on the way in which institutions function and individual academics and students work. Few would argue that the principle of institutional autonomy would exempt universities from observing public safety regulations for laboratories, for example, or dispense them from following public regulations for financial accountability. Few would also argue that academics do not need to be protected by labor legislation. However, how could labor legislation setting strict limits on working hours be adapted to situations where members of the academic community periodically need to work long and intensive hours to complete an experiment or complete a publication? If higher education is a special case that requires specific regulations or exemptions from general legislation, how can the specificity of higher education be argued convincingly, and to which cases does it apply?

The importance of fundamental values may be argued using two sets of arguments, and both are important and valid. One the one hand, they cannot be exercised fully except in a democracy, and societies cannot be fully democratic unless they honor the fundamental academic values. On the other hand, learning, teaching and research cannot be of high quality

unless members of the academic community can challenge established theories and received wisdom.

We are, however, not talking about freedom of speech generally but rather about the freedom to think outside of the box while observing the standards of the pertinent academic discipline(s). A professor of literature or sociology may be free to maintain that the earth is flat without worrying about the consequences for his or her academic career, even if many people may find it difficult to take a person espousing such views seriously. If an astrophysicist were to maintain that the earth is flat, this would be such a marked breach of the standards of the disciplines that he or she would most likely be unable to continue as an academic – unless they were able to argue successfully that the standards of the discipline need to be revised.

In this case, the likelihood of convincing other astrophysicists that the earth is flat is exceedingly small. There are, however, cases in which the standards of a discipline have been revised, sometimes in the face of strong opposition from the academic community. The revision of medical standards of hygiene on the basis of the work by Dr. Ignaz Semmelweiss is an obvious example. Medicine is at the same time an example of a discipline where hazardous theory and practice can have serious and immediate consequences, as we saw during the COVID pandemic, where a very small proportion of the medical community provided "arguments" to a vocal populist anti-vax movement with sometimes lethal results. One high profile case was that of a professor of medicine, Didier Raoult, who developed a following in France even if his methods and recommendations were manifestly unsound and were condemned by the vast majority of the medical community (Lapointe 2025).

Artificial Intelligence is a young and emerging field but it is already clear that it will challenge some of the ways in which academics work. It is perhaps not equally clear in which ways it will do so. Artificial Intelligence is here to stay, so the policy debate and research should focus on how AI can be used and how we can avoid abuse. In terms of our fundamental values, AI is probably a particular challenge to academic integrity. How can academics use AI as a legitimate support for their work, and at what points can the use of AI turn into unethical practice or fraud? Can AI be a co-author, and if yes, on what conditions? Can AI be used to identify fraud and, if so, on what conditions, under what circumstances, according to what criteria, and how can cases of fraud identified by AI be assessed, to ensure that a decision to take disciplinary action is ultimately made by humans on the basis of evidence reviewed and assessed by humans?

Avoiding fraud and abuse will need to rely on a double approach. On the one hand, and most importantly, there needs to be a culture by which members of the academic community internalize ethical standards and behavior. This is largely the case today but AI may challenge this culture of ethics by making it less straightforward to determine what is proper actions and what is not. In some cases, the potential benefits to individuals if the fraud goes undetected are such that some individuals will decided to run what they may see as a modest risk of detection, whether this concerns using academic titles they have not earned, plagiarizing the work of others as part of a thesis or an article, or falsifying research results. Even where these is a well-developed culture of ethics, the academic community will therefore need to be able to sanction violations. Again, AI is a serious challenge not only because cases of fraud may be difficult to accept but also because developments are – at least currently – so rapid that keeping laws and regulations up to date is much more easily said than done.

Assessing fundamental values

One of the milestones of the European Higher Education Area was when Ministers accepted that their implementation of the goals and policies of the EHEA would be assessed by their peers on the basis of implementation reports prepared by outsiders (Bologna Process 2003: 7). Even so, many of the data on which the implementation reports are based are provided by the public authorities of the countries concerned.

Assessing the extent to which fundamental values are implemented in national education systems is even more complicated than assessing for example structural reforms. Partly this may be because the criteria are less straightforward, even if the definitions and statements adopted by Ministers give a fairly good indication of the basis for assessment. In large part, it is also due to the sensitivity of the judgment. For the vast majority of Ministers, it is easier to admit that the national qualifications frameworks is imperfect than to admit that one's country is lacking in academic freedom or in exercising the public responsibility for higher education. An imperfect qualifications framework may be seen as a temporary technical imperfection, but serious issues with the fundamental values of higher education are most likely seen as a failure of democracy with potential implications for the quality of one's higher education.

At the same time, it would be difficult to maintain that the values of the EHEA are fundamental but that the degree to which they are implemented cannot be assessed. Therefore, Ministers in 2024 stated that a reliable monitoring of implementation of fundamental values within all the education systems of the EHEA is required, welcomed the work on creating a technical monitoring framework, and asked the BFUG to report back to the 2027 Ministerial Conference (Bologna Process 2024a: 3).

The proposal referred to in the Communiqué is under development as part of the EU-financed NewFAV project. A preliminary version submitted to the 2024 Ministerial Conference (Bologna Process 2024c: 28 - 33) outlined the principles for the assessment and categorized academic freedom, institutional autonomy, and student and staff participation in higher education governance as "rights/freedoms", whereas it labeled academic integrity, public responsibility *for* higher education, and public responsibility of higher education as "duties/obligations". Within each category, the assessment will seek to establish both *de iure* protection and promotion (for all values) and *de facto* either infringements, threats, and positive developments (rights/freedoms) or fulfillments, threats, and positive developments (duties/obligations). One innovative aspect of the proposed evaluation scheme is to include "outlook". In some cases, proposed legislation or practice may change the assessment of a country's implementation for either better or worse (Matei, Crăciun, and Potapova 2025: 442). However, the prospects of change need to be followed by action. If, for example, a proposed legal amendment is flagged in one edition of the assessment but has not been adopted by the next assessment, this will be indicated as a promised in the first but as a failed promise in the second. A planned action cannot be indicated as "outlook" indefinitely.

Another potentially difficult issue is the sources of information. A country's implementation of fundamental values cannot be assessed on the basis of information provided by its public authorities alone. Therefore, other sources will also need to be used, and the New FAV project is currently exploring a system of national correspondents for all countries involved. These will need to be independent of but trusted by the public authorities responsible for higher education.

As will be seen, assessing the implementation of fundamental values is challenging, and will require both public authorities and the higher education community to exercise a considerable degree of detachment and self-criticism. This may be difficult but it is also essential to the success of the exercise and ultimately to the credibility of the EHEA.

Conclusion

Continued European cooperation in fostering the fundamental values of higher education will be essential for years to come. The reasons for this are both negative and positive. On the one hand, our political systems seem likely to remain under severe pressure for the foreseeable future, for both external and internal reasons. The geopolitical situation, as exemplified by Russia's war on Ukraine but also by other conflicts (Bergan and Uvalić-Trumbić 2025: 78 – 80), seems unlikely to improve substantially very soon. With this, the very notion of a rules

based world order will probably remain challenged. Within many countries, populist political movements – mostly of the right but in some cases also of the left – that challenge both democracy and the notion that societal decision and developments need to be based on academic knowledge seem likely to remain strong and in many cases to either maintain or gain governmental power. They also question the value of international cooperation, so that international higher education cooperation is likely to come under double fire, from those who adhere to neither higher education and research nor international cooperation. The current, second Trump Administration in the United States may be an extreme example but it is not alone.

On a more positive note, continued reflection is required to make fundamental academic values a cornerstone of our higher education policy. Developments within the EHEA demonstrate that these values can no longer be taken for granted but they also demonstrate the benefits of sustained debate and reflection. Even if some violations of our fundamental values are prominent in the news, and even if these cases concern primarily a limited group of EHEA member countries, we also need to develop a more nuanced view of the less dramatic aspects of our fundamental values. How can public authorities best be exercised in respect of these values, and how can the academic community foster them?

Finding good answers to these questions is essential to the future of the EHEA, to our democracies, and to the quality of our higher education and research. These questions concern all members of the EHEA and they should be high on our policy agenda over the coming years, beyond the 2027 EHEA Ministerial conference in Iaşi and Chişinău.

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Information about authors

Sjur Bergan - Independent education expert, Head of the Council of Europe Education Department until 2022. Member of the Bologna Follow Up group 2000 – 22 and of the Working Group on Fundamental Values 2020 – 24, currently associated with this group through the NewFAV project. Chair and co-chair of EHEA working groups on qualifications frameworks and structural reforms 2007 – 15. Author of Qualifications: Introduction to a Concept, Not By Bread Alone, and European Higher Education, Social Responsibility, and the Local Democratic Mission as well as of numerous book chapters and articles. Series editor of the Council of Europe Higher Education Series 2004 – 23. email: sjurbergan@gmail.com