

Zhanzhigitov S.

A. Myrzakhmetov Kokshetau University, Kokshetau, Kazakhstan

PEDAGOGICAL RESEARCH IN KAZAKHSTAN: ANALYSIS OF SCIENTIFIC PUBLICATIONS IN SCOPUS

Abstract: The relevance of this study is determined by the intensive development of pedagogical sciences in Kazakhstan. The aim of the work is to analyze trends in pedagogical research in Kazakhstan based on data from the Scopus database for the period from 2000 to 2023. The research methodology includes the collection of data on the keywords "education" and "Kazakhstan," their preliminary processing, and statistical analysis using SPSS to identify the main trends and directions of development in this scientific field. The results showed a gradual increase in the number of publications from 7 paper in 2000 to 287 in 2023, indicating an increased scientific interest in pedagogy in Kazakhstan. The geographical analysis revealed the leading role of Kazakhstan with 1531 publications, as well as significant contributions from researchers from the Russian Federation, the United States, and other countries, emphasizing the international importance of Kazakh pedagogical research. The thematic analysis of keywords confirmed the wide range of topics studied and the multidisciplinary approaches, highlighting educational reform, multilingualism in teaching, and the introduction of innovative technologies into the educational process as the main directions. The conclusions of the study emphasize the theoretical and practical importance of analyzing pedagogical publications for the further development of educational science in Kazakhstan and emphasize the need to continue comprehensive interdisciplinary research in this area.

Keywords: Kazakhstan, pedagogy, Scopus, educational research, academic trend, educational policy, international cooperation.

Introduction

In the modern world, where education plays a key role in the social and economic development of the country, pedagogical research is becoming particularly relevant. Kazakhstan, striving for integration into the global educational and scientific space, is actively working to improve the quality and competitiveness of its educational system. The analysis of scientific publications in the Scopus database related to pedagogical research in Kazakhstan allows not only to assess the current state and trends in the field of education but also to identify key areas for further research. Such an analysis contributes to the development of effective educational strategies and policies aimed at improving the quality of education, which, in turn, will contribute to the sustainable development of the country and increase its competitiveness in the international arena.

In recent years, considerable attention has been paid to pedagogical research in Kazakhstan, with a particular focus on various aspects of education and teaching practice. Research by Chinibayeva et al. (2020) and Zhilbaev et al. (2016) emphasizes the importance of comparative pedagogy and international studies in shaping the education system in Kazakhstan. These works emphasize the importance of theoretical analysis and participation in international rankings to stimulate pedagogical innovation. In addition, studies by Sanjyarova et al. (2021) and Kabbassova et al. (2021) explore the practical application of pedagogical methods, such as the use of interactive methods in teaching foreign languages and the study of the meta-subject potential of foreign languages in teaching natural sciences. These studies provide valuable information on the introduction of innovative approaches to learning into the educational landscape of Kazakhstan. Furthermore, the works of Tajibayeva (2023)

and Kussainov (2021) shed light on important aspects of student adaptation and anxiety in the learning process, especially in scenarios such as distance learning. Understanding and solving the psychological and pedagogical problems faced by students is crucial to creating an effective learning environment. Additionally, studies by Askarkyzy et al. (2017) and Kenzhetaeva et al. (2020) focus on changes in university management and assessment methods in Kazakh schools, respectively. These works highlight the need for continuous improvement and modernization of educational practices to meet the changing needs of students and society.

An analysis of scientific and publication activity in the field of pedagogy in Kazakhstan for the period from 2000 to 2023 was conducted through the Scopus database using the keywords "education" and "Kazakhstan". The analysis revealed significant interest in this area, as confirmed by the published works in 2023. Most of the studies (1,531 publications) were carried out by Kazakhstani scientists, which indicates the active development of this field within the country. At the same time, researchers from the Russian Federation (256 publications), the United States (160 publications), the United Kingdom (212 publications), and other countries have made significant contributions, highlighting the international interest and transnational nature of research in the field of pedagogy. This indicates the importance of cooperation and knowledge exchange for the further development of educational practices and techniques not only in Kazakhstan but also beyond its borders. The use of VOSviewer and Bibliometrix tools for bibliometric analysis, as noted by Cruz-Lovera et al. (2017), as well as an in-depth search for specific keywords in Scopus, highlighted in the works of Pakkan et al. (2022) and Akkaya & Ertekin (2021), has become standard practice in scientific research. This not only provides comprehensive coverage of citations and literary extracts but also expands the profile of journals, improving access to scientific publications and contributing to citation analysis.

The purpose of our research is a comprehensive analysis of scientific publications in the field of pedagogical research in Kazakhstan, indexed in the Scopus database. We strive to identify the main trends, developments, and key directions in this dynamically developing field, with an emphasis on identifying the dominant themes, techniques, and approaches that shape modern teacher education in Kazakhstan. Our analysis is aimed at identifying gaps in existing research, identifying poorly studied or innovative areas where future research can make a significant contribution to the theoretical and practical development of pedagogy. This approach will allow the academic community to focus on these gaps, thereby contributing to innovation and improving the quality of the educational process in Kazakhstan, especially in the context of the rapid development and introduction of new educational technologies and techniques.

Literature review

An analysis of scientific publications in Scopus," we will focus on current trends in pedagogical education in Kazakhstan, which have had a significant impact on the development of this field. Our research is aimed at examining various factors, including the prosperity of educational programs and the general educational context in the country, in the context of modern international practice. We rely on the work of Sharplin et al. (2020), which emphasizes the importance of bringing teacher education practices in line with global standards to improve the quality of education. A study by Yakavets et al. (2017) delves into the analysis of the structures and construction of professional knowledge of teachers in the post-Soviet context, emphasizing the importance of professional development and the role of pedagogy in the formation of teacher education in Kazakhstan. These works emphasize the need for continuous improvement and adaptation of pedagogical practices to the changing requirements of the educational sector. In addition, the study by Jumakulov and Ashirbekov (2016) provides important information on the international integration of higher education in Kazakhstan, highlighting the growing attention to integrating international perspectives into teacher

education to improve the quality and relevance of educational practices. Movkebayeva et al. (2020) highlight the factors influencing the legal regulation and management of the educational system in Kazakhstan, highlighting the difficulties associated with the modernization and legislation of higher education in the country, which emphasizes the importance of analyzing and overcoming these challenges for the effective implementation of modern trends in education.

Innovative teaching methods play a key role in improving the learning experience and outcomes for students. Studies by Joensuu-Salo et al. (2020) show that teachers who are more innovative and willing to take risks are more likely to use entrepreneurial teaching methods. Eli (2021) notes the widespread use of gaming methods among innovative educators. Cai and Liu (2022) point out how innovative approaches allow music students to better understand and express music. Subramanian and Kelly (2018) suggest using blogging, podcasting, and social embedding to improve learning in engineering education, while Puranik (2020) examines various innovative teaching methods in higher education to improve student employability and skills development. Yilmaz and Bayraktar (2014), as well as Zhang (2020), emphasize the importance of teachers' attitude towards the adoption of educational technologies and their individual innovativeness for the successful implementation of such methods.

International cooperation and integration in the field of pedagogical research play a key role in improving educational practices not only in Kazakhstan but also around the world. The study by Kewalramani and Havu-Nuutinen (2019) demonstrates how international research can help understand how preschool teachers use technology to involve children in scientific research, emphasizing the importance of intercultural perspectives in education. The work of Li et al. (2022) emphasizes the importance of pedagogical communities in the development of open education and interaction, which is evidence of the benefits of collaborative efforts to improve educational practices. Evans et al. (2020) point to the need for international cooperation to establish formalized standards and sources of funding for pedagogical research in the United States, which underscores the global need for collaboration to enhance the status of pedagogical research. Garwood and Poole (2021) draw attention to the role of information professionals in integrating pedagogical documentation with the life cycle of research, highlighting the need for interdisciplinary interaction in educational research.

In conclusion, international cooperation and integration in pedagogical research open up new horizons for the educational system of Kazakhstan, facilitating the exchange of knowledge, experience, and innovative practices between countries. This not only contributes to improving the quality of education in Kazakhstan but also strengthens its international ties and contribution to the global educational community. Thus, the focus on international integration and cooperation within the framework of pedagogical research is a strategically important area for further development and innovation in education in Kazakhstan.

Methods and organization of research

Materials

As part of the study, 2025 scientific publications identified by the keywords "education" and "Kazakhstan" for the period from 2000 to 2023 were analyzed. These publications were selected in order to understand the development and current state of pedagogical research in Kazakhstan, as well as to identify key trends and directions in this field.

A careful selection approach was applied to the work, which covered a wide range of research types, including 1,592 journal articles, 206 conference reports, 91 book chapters, 66 reviews, as well as other scientific materials illustrating the comprehensive and diverse nature of research in the field of education. A total of 2,023 scientific papers were analyzed, taking into account both the annual growth in the volume of publications and the degree of their scientific impact. This included an assessment of the contributions made by leading journals in

the field. Among them, the Cyprus Journal of Educational Sciences and the Life Science Journal should be noted, each of which has 52 publications, followed by the World Journal On Educational Technology Current Issues with 46 publications. Other significant journals participating in the discussion include Opcion, Espacios, and the international Journal of Environmental and Scientific Education. These publications have played an important role in stimulating discussions and disseminating important research related to the educational landscape of Kazakhstan.

The materials selected for analysis historically cover the period of significant educational reforms in Kazakhstan, including the introduction of new educational standards and educational technologies, which make them especially relevant for study. The study aims to determine the impact of international and local trends in education on teaching practice in Kazakhstan, as well as to identify gaps and opportunities for future research in this dynamically developing field.

Instrument

The Scopus database serves as the main data collection tool in our study "Pedagogical Research in Kazakhstan: Analysis of scientific publications in Scopus." It is an authoritative resource covering a wide range of scientific publications, which provides unique analytical opportunities for tracking research trends and citations in various fields of knowledge, including pedagogy. The use of Scopus eliminates subjectivity in the selection of materials and provides comprehensive coverage of relevant scientific papers on the subject of education in Kazakhstan.

Data analysis will be carried out using the statistical software package SPSS, which offers powerful tools for performing descriptive statistical analysis, correlation and regression analysis, as well as multi-level modeling. This choice is due to the convenience of data visualization and the ease of interpretation of the results obtained. SPSS makes it possible to efficiently process large data sets and carry out complex statistical procedures, which are critically important for our research, given the versatility and dynamism of changes in the pedagogical landscape of Kazakhstan. Additionally, for in-depth qualitative analysis and interpretation of scientific papers, we will use content analysis methods to identify common topics, theoretical frameworks, methodological approaches, and gaps in existing research. These methods of qualitative analysis will be applied to decompose research developments into components and examine the structure and content of scientific discourses in pedagogical research in Kazakhstan.

Thus, Scopus and SPSS, in combination with methods of qualitative analysis, create a comprehensive methodological toolkit that allows for a comprehensive analysis of pedagogical research in Kazakhstan. This analysis aims to reflect its evolution and contribution to educational science and form the basis for subsequent research in this field.

Procedure

The procedural approach to the analysis of the study "Pedagogical research in Kazakhstan: Analysis of scientific publications in Scopus" is organized into several stages, each of which is key to achieving the integrity and reliability of the results.

Stage 1: Data collection. Using the Scopus database, we will search for publications using the keywords "education" and "Kazakhstan" for the period from 2000 to 2023. This will create a database for subsequent analysis, including information about publication years, document types, and the number of works each year. Special attention will be paid to identifying the dynamics of the growth in the number of studies during this period.

Stage 2: Data preprocessing. The resulting dataset will undergo preprocessing in SPSS, which includes checking for duplicates, omissions, and identifying anomalies in the data. This stage ensures the purity and accuracy of the data for analysis.

Stage 3: Statistical analysis. Based on the processed data, a descriptive statistical analysis will determine general trends. Inference analysis will also be conducted, including testing hypotheses about the presence of statistically significant relationships and differences between groups of publications. The frequency and trends of changes in the number of publications over time will be calculated for each type of document.

Stage 4: in-depth analysis and interpretation. The next step involves conducting a deeper analysis of the data. Key journals and platforms for publishing research on pedagogy in Kazakhstan will be identified. The most cited works will be analyzed, and the main research centers and authoritative sources will be identified. This allows for an understanding of the scientific contribution of Kazakhstani researchers to the global pedagogical community.

Stage 5: Visualization of the results. The analysis results will be visualized to provide a more visual representation of the main conclusions. This will include graphs displaying the distribution of publications by year and diagrams showcasing leading journals, among other visual representations.

Stage 6: Report generation. At the final stage, a detailed report will be compiled that combines all the analytical data and interpretations formed during the research process. This document will serve as the basis for a scientific article and can be used in further research.

Each of these steps is an integral part of the methodological process that guarantees the reproducibility of the study and ensures the scientific rigor of the results.

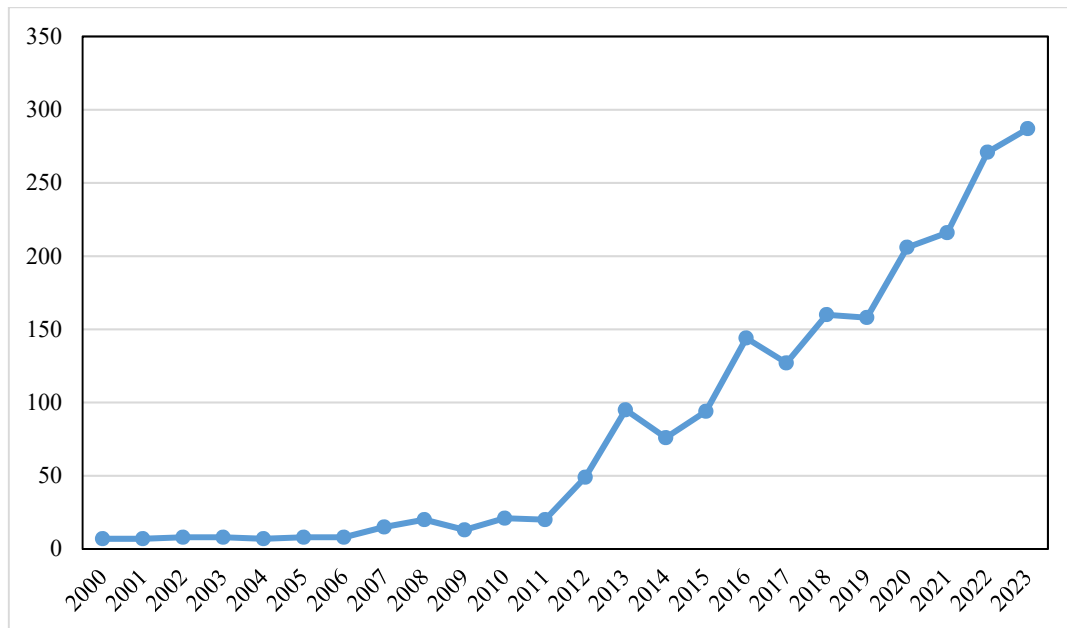
Research results and their discussion

The current section presents the results of the analysis of pedagogical research in Kazakhstan based on publications indexed in the Scopus database for the period from 2000 to 2023. Carrying out a thorough analysis, we tracked the dynamics of publication activity over the years, which revealed an increase in interest in educational topics in the academic community of Kazakhstan. The distribution by country indicates the leading role of Kazakhstani scientists, while international cooperation is also noted as a significant factor. The sectoral analysis by branches of knowledge highlighted the multidisciplinary nature of pedagogical research, and the analysis of keywords in the titles of publications reflected the prevailing trends in research. Through the review of leading journals, we identified the main platforms for discourse in the field of education, and the citation showed the influence of research and its contribution to the development of pedagogical science. Thus, the results indicate pronounced trends and patterns in pedagogical works, which emphasizes the importance of continuing research activities in this field.

The analysis of the dynamics of scientific publications in the field of pedagogical sciences in Kazakhstan, as reflected in the Scopus database from 2000 to 2023, reveals a significant increase in academic interest in this field of knowledge. In 2000, only 7 works were registered, and by 2003, this number remained relatively stable. However, since 2007, there has been a steady increase in the number of publications, reaching 15 works. This growth became more pronounced after 2012, when the number of publications more than doubled compared to the previous year, reaching 49 papers. This rise continued in subsequent years, with a particularly noticeable increase from 2013 to 2016, when the number of publications increased from 95 to 144, respectively (see Figure 1).

Figure 1

Dynamics of publication activity in the field of pedagogical research in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)

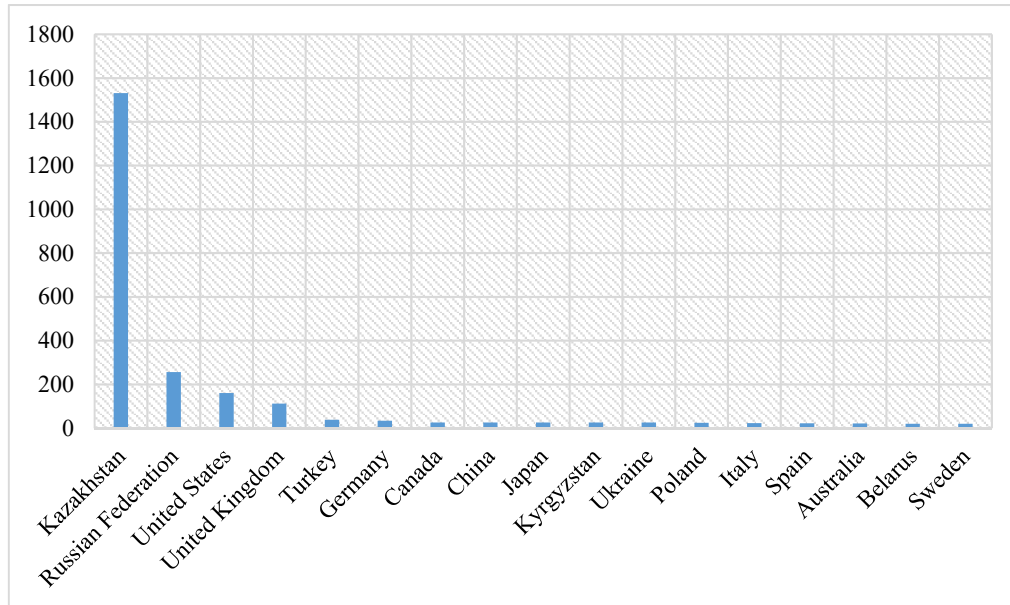


Following this trend, by 2023, the number of pedagogical publications indexed by Scopus reached a peak of 287 papers. This indicates the increasing contribution of Kazakhstani scientists to the global scientific community and the development of research infrastructure in the country. The continuous growth in the number of studies in this field may be associated with government support for educational initiatives, as well as with the growing recognition of the importance of pedagogical innovations and international exchange of experience in the educational process. These factors are likely to contribute to a further increase in the quality and quantity of pedagogical research in Kazakhstan.

Turning to the analysis of publication activity by country, the data show that researchers from Kazakhstan make the greatest contribution to the development of pedagogical sciences with 1,531 publications. This reflects a strong academic environment and a focus on educational research within the country (Figure 2). The Russian Federation ranks second with 256 papers, emphasizing the close research and cultural ties between these countries. The United States and the United Kingdom follow with 160 and 112 publications, respectively, demonstrating significant international interest in Kazakh pedagogical science.

Figure 2

Geographical distribution of pedagogical publications by country: analysis of country contributions to scientific research in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)

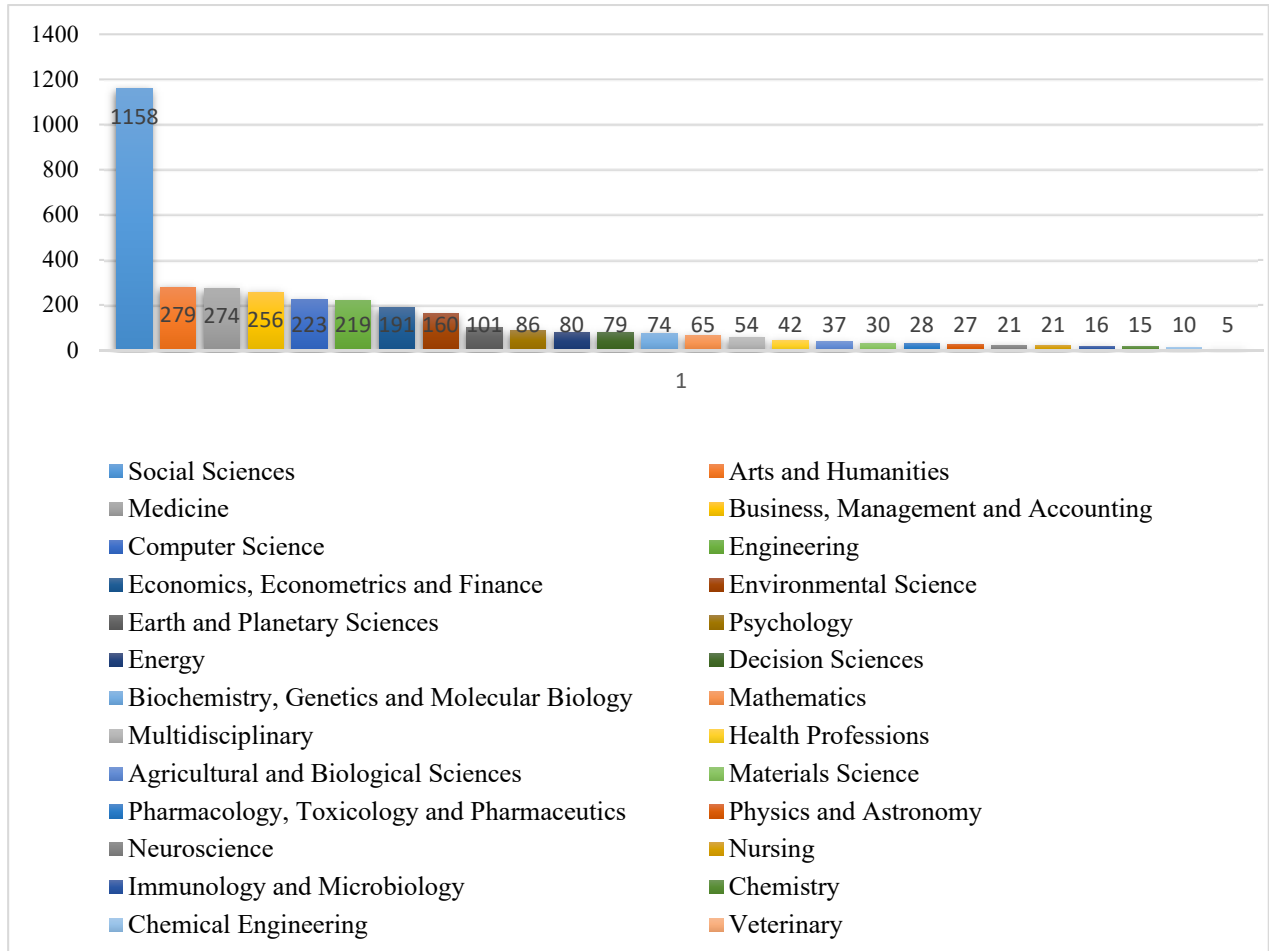


Further analysis of the distribution of publications by country reveals the participation of authors from more than 50 countries around the world, which indicates a global interest in the pedagogical science of Kazakhstan. Turkey, Germany, and other European countries, as well as Asian countries, make significant contributions, highlighting the multicultural and international nature of research in this field. Such wide geographical participation reinforces Kazakhstan's position as a significant center for pedagogical research and knowledge exchange in the international educational community.

An analysis of the sectoral distribution of scientific publications related to pedagogy in Kazakhstan shows the predominance of social sciences, which occupy a leading position with 1,158 works, emphasizing the multidisciplinary nature and importance of education in a social context (see Figure 3). Arts and humanities, with 279 publications, as well as medicine, with 274 publications, also occupy a significant share, reflecting the relationship of pedagogy with cultural development and the health of society. Publications in the fields of business, management, and accounting (256 papers) and computer science (223 papers) highlight the growing role of educational innovation and information technology in the modern educational process.

Figure 3

Distribution of pedagogical publications by branches of knowledge: an interdisciplinary view of scientific research in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)

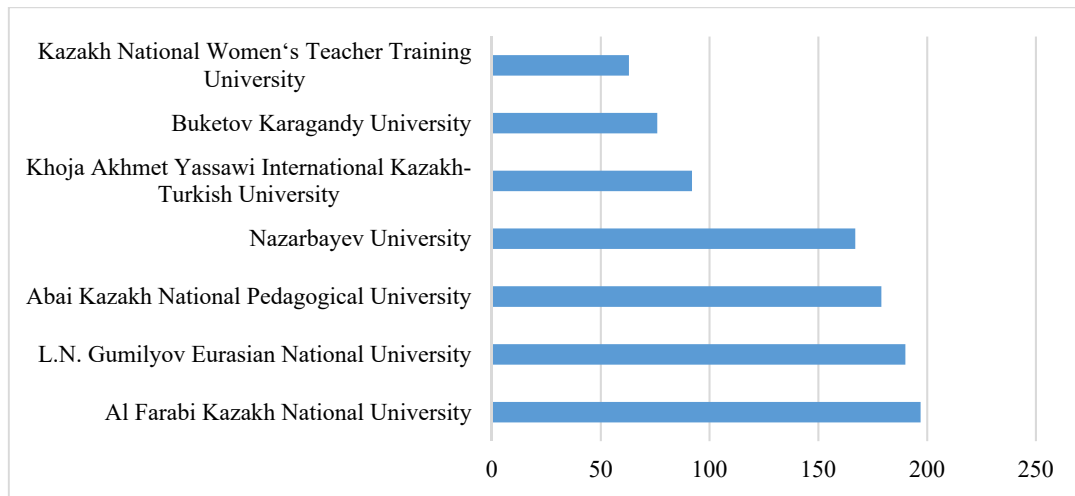


In engineering sciences, with 219 publications, the importance of engineering education and its integration with pedagogical research is emphasized. This contributes to the development of innovative learning and technological progress. On the other hand, branches of knowledge such as materials science, pharmacology, and astronomy, despite having fewer publications, are important for the development of specialized and interdisciplinary training programs. This set of disciplines, which reflects publications in this field, shows a wide range of applications of pedagogical principles and approaches in various fields of knowledge, reflecting the complex nature of educational science.

A study of the activity of scientific publications on organizations engaged in pedagogical research in Kazakhstan reveals the leading positions of major universities in the country. Al-Farabi Kazakh National University tops the list with 197 publications, reflecting its status as the leading research center in the region (see Figure 4). L.N. Gumilyov Eurasian National University with 190 publications and Abai Kazakh National Pedagogical University with 179 papers also make a significant scientific contribution to the development of pedagogical sciences.

Figure 4.

Distribution of publications on pedagogical research among leading organizations in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)

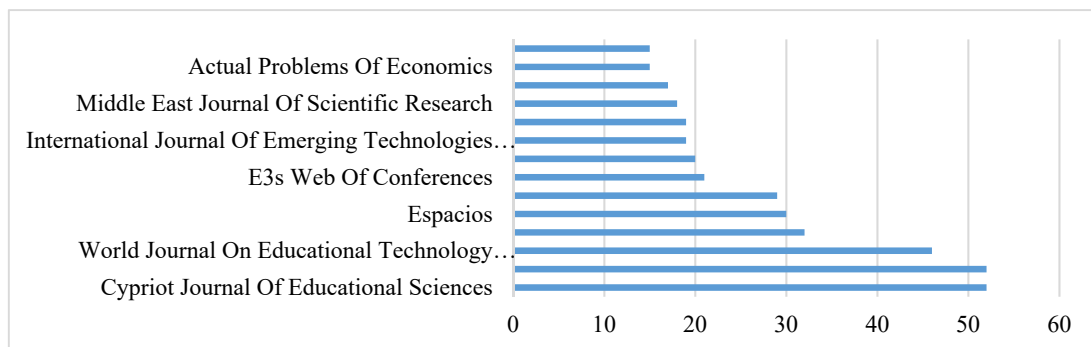


Nazarbayev University, with 167 publications, demonstrates a high level of research work, strengthening its position as a center of innovation and scientific growth. The international Kazakh-Turkish University named after Khoja Akhmet Yasawi, with 92 works, and Bouquets Karaganda University, with 76 publications, also significantly contribute to the expansion of the country's research base. This diversity of leading universities highlights Kazakhstan's commitment to strengthening academic cooperation and developing pedagogical knowledge, which, in turn, promotes global exchange and innovation in education.

An analysis of publication activity in scientific publications dealing with the topic of pedagogical research in Kazakhstan shows that the "Cypriot Journal Of Educational Sciences" and the "Life Science Journal" share leadership, with 52 publications each, emphasizing their important role in the dissemination of scientific knowledge in the field of education (see Figure 5). The World Journal On Educational Technology Current Issues, with 46 publications, highlights the impact of technology in modern teaching practice, while Opcion and Espacios, with 32 and 30 articles, respectively, stand out as active platforms for discussions in the field of education and social sciences..

Figure 5

Key scientific publications in the field of pedagogical research in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)



The importance of the international journal of Environmental and Science Education with 29 articles testifies to the growing interest in environmental education, which is important in the context of global challenges of sustainable development. Journals such as E3s Web of Conferences and Man in india, with 21 and 20 publications respectively, demonstrate a more specialized academic interest, reflecting a wide range of research and highlighting Kazakhstan's contribution to the international scientific arena. This variety of publications shows the multidisciplinary nature and depth of pedagogical research conducted in Kazakhstan, and their importance to the global educational community.

Keywords in the titles of scientific publications are an indicator of thematic accents in research and help to identify subject areas that are most relevant in a particular field of knowledge. In the context of pedagogical research in Kazakhstan, the word "Kazakhstan", which appears in the names 849 times, not only indicates geographical specificity but also emphasizes the national context of research. "Education", mentioned 613 times, stands out as the central theme, while "Development" and "Students" with 217 and 187 mentions respectively reflect the focus on educational progress and student life (see Table 1).

Table 1

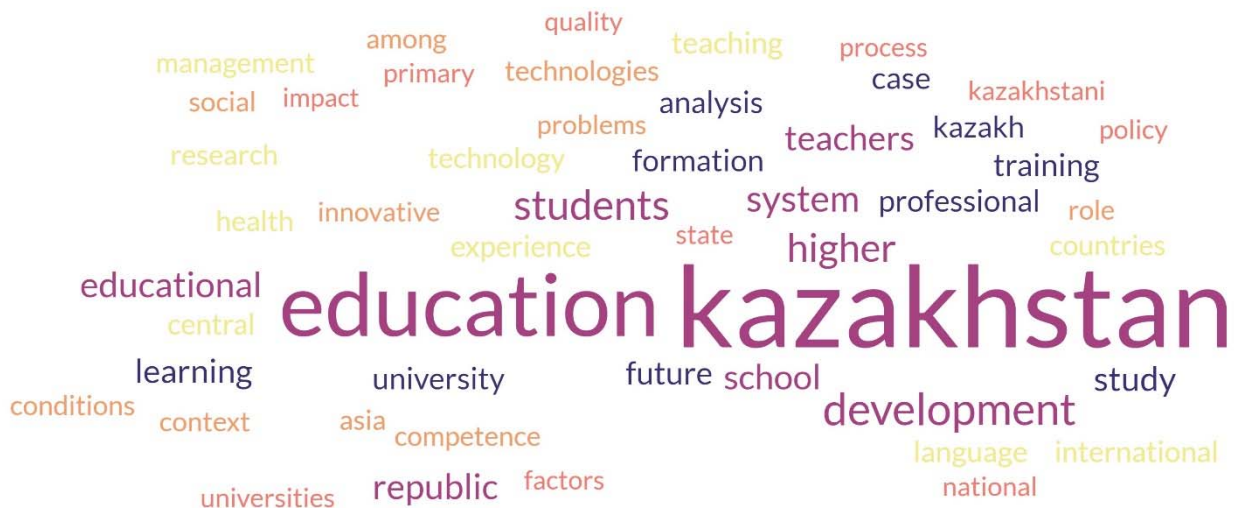
The prevalence of keywords in scientific publications on pedagogical research in Kazakhstan: analysis of Scopus data for 2000-2023 (Source: own calculations based on data from publications indexed by Scopus)

Keywords	Number Of Keywords
Kazakhstan	849
Education	613
Development	217
Students	187
Higher	170
System	147
Educational	137
Republic	134
School	127
Teachers	126
Study	122
Learning	113
Future	101
Training	98
Case	93
University	89
Formation	88
Analysis; Professional	87
Kazakh	84
Teaching	83

Experience	79
Language	78
International	76
Central	73
Research	70
Health; Technology; Countries	69
Management	67
Technologies	65
Asia	63
Context; Conditions	62
Among; Competence; Social	61
Role	57
Problems; innovative	56
National	55
Universities; Primary	54
Kazakhstani; Policy	53
Factors; Process	51
State	50

Figure 6

Keywords and thematic areas in pedagogical research in Kazakhstan are identified in scientific articles based on the analysis of publications in Scopus.



The terms "Higher" and "System" are also highlighted, which are present in the names 170 and 147 times, reflecting attention to higher education and educational systems. The words "Educational" and "Teachers", with 137 and 126 mentions, emphasize the importance of educational processes and the professionalism of teachers. The keywords "Learning", "Future", and "Training", appearing 113, 101, and 98 times, respectively, indicate the dynamic

development of research aimed at studying teaching methods, educational prospects, and training specialists. These data illustrate the diversity of research interests and approaches in the pedagogical field of Kazakhstan, emphasizing the importance of educational research for social development and the global scientific community.

The citation analysis of key scientific papers covering a wide range of topics in the field of education in Kazakhstan provides a unique look at current trends and leading research areas in this field. The data presented in Table 2 draws attention to the top 10 papers, each of which scored more than 50 citations. Based on the Scopus database, works with a high citation level have been identified, which emphasizes their significant contribution to the development of pedagogical sciences. For example, the 99-citation study "Private tutoring in Eastern Europe and Central Asia: Policy choices and implications" (Silova, 2010) explores the politics and consequences of private tutoring, standing out in the context of educational policy and practice. It is also worth noting the work of "Educational mobility and the gendered geography of cultural capital: The case of international student flows between Central Asia and the UK" (Holloway et al., 2012), which scored 96 citations and highlights gender geography and educational mobility. These and other highly cited articles reflect important research interests and accents in the field of education in Kazakhstan..

Table 2

The impact and directions of research in the pedagogical sciences of Kazakhstan are based on the citation analysis (Source: own calculations based on data from publications indexed by Scopus).

Authors	The title of the work	Classification	Type of work	Cit.
(Silova, 2010)	Private tutoring in Eastern Europe and Central Asia: Policy choices and implications	Educational policy and private tutoring	Article	99
(Holloway et al., 2012)	Educational mobility and the gendered geography of cultural capital: The case of international student flows between central Asia and the UK	Gender geography and educational mobility	Article	96
(Knox-Hayes et al., 2013)	Understanding attitudes toward energy security: Results of a cross-national survey	Sociology and perception of energy security	Article	82
(Chankseliani et al., 2021)	Higher education contributing to local, national, and global development: new empirical and conceptual insights	Higher education and its contribution to development	Article	81
(Fierman, 2006)	Language and education in post-Soviet Kazakhstan: Kazakh-medium instruction in urban schools	Language and education in the post-Soviet space	Article	72
(Lee and Kuzhabekova, 2018)	Reverse flow in academic mobility from core to periphery: motivations of international faculty working in Kazakhstan	Academic mobility and international staff in education	Article	66
(Sovacool et al., 2012)	Exploring propositions about perceptions of energy security: An international survey	International research on energy security perceptions	Article	64
(Agrawal, 2007)	Economic growth and poverty reduction: Evidence from Kazakhstan	Economic growth and poverty reduction	Article	55
(Koch, 2014)	The shifting geopolitics of higher education: internationalizing elite universities in Kazakhstan, Saudi Arabia, and beyond	The geopolitics of higher education and globalization	Article	53
(Tokbolat et al., 2020)	Construction professionals' perspectives on drivers and barriers of sustainable construction	Sustainable construction and its factors	Article	50

Further, analyzing the trends and topics of citation, one can see a variety of research interests covering both traditional and innovative fields of pedagogy and education in Kazakhstan. The works devoted to the issues of academic mobility, economic growth and poverty reduction, as well as the geopolitics of higher education, emphasize the multidimensional nature of the research field. An important area is also the study of sustainable construction and its factors, which indicates a growing interest in the problems of sustainable development. In general, the identified trends and recommendations for future research can serve as a basis for further analysis and development of educational strategies and policies that promote innovative and inclusive development of pedagogical science in Kazakhstan.

Summarizing the results of our analysis of pedagogical research in Kazakhstan, we can note the growing academic interest in this field, confirmed by an increase in the number of publications during the study period. The geographical analysis highlighted the leading role of Kazakhstan, as well as the importance of international cooperation. The industry analysis revealed the dominance of the social sciences and the emphasis on innovative approaches in education. The contribution of the organizations underlines the country's desire to strengthen scientific positions in the field of pedagogy, and the analysis of journal publications reflects the strategic direction of scientific research. Finally, the study of citations showed which works had the greatest impact on the development of pedagogical science, emphasizing the importance of such topics as educational reforms, multilingualism in teaching, and the integration of innovative technologies into the educational process.

The study of pedagogical research in Kazakhstan aimed to analyze the dynamics of publication activity and identify key areas of scientific work in education. The task was not only to track quantitative indicators, such as the growth in the number of publications in recent years, but also to understand which topics and research issues are receiving special attention from scientists in the context of Kazakh education. This comprehensive approach allowed us to shed light on current trends in pedagogical research and identify the main theoretical and practical directions that will contribute to the further development of the educational sphere in the country. An important part of the work was the study of the impact of international cooperation and global educational trends on local pedagogical practices and theories, which opens up new prospects for the integration of Kazakhstan into the global educational space.

The analysis showed a significant increase in the number of publications, which, according to Rancan et al. (2021), may be due to increased investments in educational institutions and the introduction of new educational concepts, such as a cultural and historical approach (Meshcheryakov et al., 2022). This is also confirmed by the work of F et al. (2022), indicating an increase in the research activity of teachers. The interest in public health education and its development (Armstrong-Mensah et al., 2019), as well as the impact of educational initiatives on improving health (Yan et al., 2022), demonstrates the importance of educational efforts in various fields.

Works by Pérez et al. (2021) and Spring (2008) emphasize the dynamic interaction of global and local influences on educational structures. Research such as Liu and Li (2019) and Simaan (2020) emphasize the need for culturally responsible pedagogies that combine local and global contexts, contributing to the decolonization of educational approaches. Kazakhstan has made a significant contribution to the development of pedagogical concepts, as shown by the research of Želvys et al. (2014) and Nurbatsin (2020), who studied aspects of education management and innovation. Hanley (2021) on the introduction of empathic pedagogy in global citizenship education and Wilson and Sharimova's study (2019) on the practice of Lesson Study (LS) in Kazakh classrooms emphasize the practical application of pedagogical concepts to improve teaching methods. Our research has revealed Kazakhstan's significant contribution to the international educational and scientific community, highlighting the

country's commitment to integrating global educational standards and innovative practices. The analysis of 101 scientific papers selected by the keywords "education" and "Kazakhstan" from the Scopus database revealed significant potential for the further development of the educational system in Kazakhstan. However, it also pointed out the essential need to strengthen the research base and create conditions for innovative learning. The country faces the task of comprehensively updating the educational paradigm, including updating curricula, improving the skills of teachers, and introducing advanced technologies. Special attention should be paid to the development of interdisciplinary research and deepening cooperation between educational institutions at all levels, which will be the key to creating sustainable partnerships and knowledge sharing.

Based on the analysis of 2025 scientific papers on various aspects of education in Kazakhstan reflected in the Scopus database, a thematic analysis was conducted. As a result, the following 12 areas for future research in the field of pedagogy were identified:

1. *Digital Transformation in Education*: Examine the long-term impact of digital transformation on learning outcomes, teacher readiness, and student engagement, especially in response to the acceleration of online learning due to the COVID-19 pandemic.

2. *Inclusive Education Practices*: Examine the effectiveness of inclusive education strategies for children with disabilities, focusing on integration methods, teacher training, and student outcomes.

3. *Multilingual Education*: Explore the challenges and successes in implementing the trilingual education policy in Kazakhstan, paying special attention to the sociolinguistic and cultural implications for learning Kazakh, Russian, and English.

4. *Educational policy and reforms*: Analyze the impact of recent educational reforms in Kazakhstan, taking into account international influence, adaptation to local conditions, and the balance between global trends and national identity.

5. *STEM Education*: Explore the impact of STEM initiatives (science, technology, engineering, mathematics) on youth interests, education and career choices, and explore gender differences in these areas.

6. *Environmental education*: Explore the integration of environmental sustainability into the curriculum and the development of environmental awareness among students as a response to global climate challenges.

7. *Internationalization of higher education*: Assess the impact of internationalization strategies on higher education in Kazakhstan, including student mobility, academic cooperation, and the establishment of international university campuses.

8. *Vocational education*: Assess the relevance of vocational education programs to the needs of the labor market, paying special attention to the development of appropriate skills for a developing economy.

9. *Teacher training*: Examine the effectiveness of professional development programs in improving the competence of teachers, especially in rural areas, and their impact on the quality of education.

10. *Educational Migration*: Explore the trends, motivations, and outcomes of educational migration from and to Kazakhstan, with an emphasis on the implications for brain drain or profit.

11. *Socio-economic factors in education*: Analyze the relationship between socio-economic status and access to education, achievements, and outcomes, identifying strategies to mitigate inequality.

12. *Religious education*: Explore the role of religious education in the secular education system of Kazakhstan, considering its impact on social cohesion, cultural identity, and interfaith understanding.

These recommendations take into account the breadth of topics that have been addressed in the scientific literature and also recognize areas where further study could provide valuable information to educators, policymakers, and other stakeholders in the education sector in Kazakhstan.

Conclusion

In conclusion, our study on pedagogical research in Kazakhstan summarizes the results of an extensive analysis of scientific papers published in this field. Our research has shown that pedagogical science in Kazakhstan is actively developing, reflecting both global trends in education and unique local needs and contexts. Throughout our work, we discovered a significant increase in the number of publications, indicating a growing interest in research in the field of pedagogy and education.

The purpose of our study was not only to track quantitative indicators, such as the increase in the number of publications in recent years, but also to understand which topics and research issues receive special attention from scientists in the context of Kazakh education. This comprehensive approach allowed us to identify current trends in pedagogical research and determine the main theoretical and practical directions that will contribute to the further development of the educational sphere in the country.

We found that Kazakhstani scientists actively participate in the international academic dialogue, contributing to the development and adaptation of innovative educational methods and approaches. Our analysis also highlighted the importance of interdisciplinary collaboration and the need to integrate new technologies into the educational process. The study identified several key areas in which Kazakh education can develop, including improving the quality of teacher training, developing inclusive educational programs, and increasing attention to the digitalization of learning.

A necessary aspect of our research is to emphasize the need for constant analysis and monitoring of pedagogical research to ensure the adaptation of Kazakhstan's educational system to the changing requirements of the modern world. This involves not only the introduction of new approaches to teaching and curriculum development, but also an in-depth study of the effectiveness of these innovations in practice.

We are convinced that our research contributes to a better understanding of the current state and prospects for the development of pedagogical science in Kazakhstan. It opens up new areas for further research and offers a framework for strategic planning in the field of educational policy and practice aimed at supporting the sustainable development of the country's education system in the context of globalization and technological change.

Thus, our study highlights the importance of continuing scientific activities in the field of pedagogy, which will contribute to improving the quality of education and strengthening Kazakhstan's position in the international educational community.

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

Zhanzhigitov Syrym Zhanmuratovich – PhD, A. Myrzakhmetov Kokshetau University, Kokshetau, Kazakhstan; e-mail: syrymphd@gmail.com.