



Vol. 3 No. 4 (April) (2025)

A Critical Analysis of Contemporary Challenges and Pedagogical Barriers in Teacher Education in Kazakhstan: Future Directions for Improvement

Samina Mustafa

M.Phil Scholar, Department of Education, PMAS, Arid Agriculture University, Rawalpindi, Pakistan. Email: mustafasamina69@gmail.com

Abstract

There are several issues in teacher education for instance, shortage of teachers, the current course curriculum is outmoded, and teachers have low preparedness for inclusion of children with disability and lack of integration of Education for Sustainable Development (ESD) in teacher education programmes in Kazakhstan. This paper uses a qualitative method of research to conduct a systematic literature review of 35 peer-reviewed studies to identify these barriers to pedagogy. Thus, the conclusions are made stating that low wages, high levels of workload, and staff development explain teacher shortage, in particular in rural settings. Also, the conventional teaching and learning practices coupled with inadequate curricula, limit the abilities of the students to solve problems. The study also reveals important areas of training needs in relation to inclusive education, where it was noted that the pre-service teachers entering the classrooms are not fully prepared for such classes. However, the integration of sustainability in teacher education faces a few barriers mainly in terms of policies and institutions. In line with global benchmarks, this research recommends general policy changes, better financial incentives, course and content updates, and specific teacher training, and embracing of technology in learning. The given challenges can be solved only through the comprehensive approaches to enhance the quality and availability of the teacher education in Kazakhstan and its compliance with the requirements of the worldwide educational systems.

Keywords: Teacher education challenges, pedagogical barriers, Future directions

Introduction

Currently, the system of preparation of teachers in Kazakhstan is filled with a number of challenges that negatively impact the efficiency of the educational process. The teacher supply is another problem that is still acute, especially when it comes to teachers' deficit in rural schools. It is agreed that lack of incentives including reasonable working conditions like attractive and competitive salaries as well as workloads that are not very demanding make young qualified professionals to shy away from the teaching profession (Issabekov & Yessimkhanova, 2023). This leaves many schools with a problem of an unstable staff, which in turn affects the quality of education being offered to the students. To address this problem, there should be policy solutions that include both financial incentives and promotions, as well as general enhancements in the workplace environment.

The fourth problem is due to the outdated curricula and conventional teaching learning approaches, which inhibit the acquisition of critical thinking skills and problem solving skills among the learners (Kassenova, 2024). Most learning



Vol. 3 No. 4 (April) (2025)

institutions have not embraced student-centered and inquiry-based learning, instead of relying on memorization and teaching-centered methods. The development of curricula is a crucial process as it adapts the current curricula to both the international levels and the modern working environment. Integration of other techniques of teaching like the incorporation of IT in learning and other active forms of learning could go a long way in improving the teaching effectiveness as well as the learning outcomes.

It should also be noted that the issue of integration of inclusive education still remains a problem in Kazakhstan. Most teacher education programs fail to prepare teachers with the requisite knowledge and skills that would enable them to teach disabled students (Tleubergenova & Omarova, 2024). This means that the practice of inclusion is set to bring forth profound changes in the curricula of teacher training institutions to equip teachers with adequate knowledge in teaching techniques and classroom modifications. These reforms are necessary to make education inclusive and equitable even in the existing education system.

However, there is a challenge that arises from the implementation of Education for Sustainable Development (ESD). Preservice teachers should be prepared to address tasks related to the implementation of sustainable development with a complex of studies that open multiple approaches and different subjects (Nurgalieva & Sadykova, 2024). There are many extant programs that are not extensive enough or not providing enough practical experience for enabling ESD and therefore, the curriculum must be updated or even new courses with interdisciplinary focus on sustainability must be introduced. If no structure is put in place then there will be a challenge of how these concepts will be integrated and hence the ESD interventions may not have the desired impacts on the future generations.

In order to address these challenges, institutions have to adopt sustainable pedagogical frameworks for sustainability education across discipline. This includes the development of teacher training with the methods such as the learner's training through experience, case studies and the cooperation in the different projects which will help them to develop the critical thinking and problem solving skills (Issabekov & Yessimkhanova, 2023). In addition, more funding should be allocated to professional development that allows teachers to understand the goal and manner of implementing ESD. Enhancing cooperation with Universities, Governmental bodies and International Organizations can also contribute to the sharing of knowledge and enhancement of ESD throughout Teacher Education system in Kazakhstan.

Objectives

1. To identify key factors contributing to the shortage of qualified teachers, especially in rural areas.
2. To assess outdated curricula and teaching methods affecting student learning outcomes.
3. To examine teacher preparedness for diverse classrooms, including students with special needs.
4. To explore challenges in embedding sustainability principles in teacher education programs.

Research questions



Vol. 3 No. 4 (April) (2025)

1. What are the key factors contributing to the shortage of qualified teachers, particularly in rural areas of Kazakhstan?
2. How do outdated curricula and traditional teaching methods impact student learning outcomes?
3. To what extent are teacher education programs preparing educators for inclusive classrooms, particularly for students with special needs?
4. What are the major challenges in integrating Education for Sustainable Development (ESD) principles into teacher education programs?

Reason to Conduct a Critical Analysis of Challenges and Pedagogical Barriers in Teacher Education in Kazakhstan

It is then that a **critical analysis** of the difficulties and the teaching-learning issues that teacher education in Kazakhstan faces can be warranted since the regular descriptive research approaches have not completely work through the system defects that are bound to hinder the improvement of the teacher preparation program. Thus, shifting from a paradigm of identification of barriers at the surface level of organization of the education system, the study reveals **structural, policy, and pedagogical constraints** that lead to the underdevelopment of the teacher-training system.

Teacher education in Kazakhstan is still centralised with strong and non-adjustable curricula which limits the teacher creativity and professionalism (Kassenova, 2020). These are misalignments between policy and practice evidenced in the common failure of governmental attempts at training teachers under the appropriate standards when it comes to trilingual and inclusive education (Sagintayeva et al., 2019). Currently, many institutions use traditional knowledge retention techniques that do not include activity-based approaches as more needs to be done to encourage changes that will involve the use of technologies in learning, the integration of content area knowledge and cross-disciplinary approach and differentiated instruction (Makoelle & Burmistrova, 2021). Some of the main reasons for disparities between teachers' education in urban and rural areas are lack of sufficient resources, improper IT facilities and limitations in professional development (Nugmanova & Alimkulov, 2021). Furthermore, the teacher educators themselves are not aware of contemporary approaches in teaching and continue to embrace the traditional practices due to lack of change agents within institutions and policies (Sultanova et al., 2022). An analysis of these structural issues calls for total overhauls on present day teacher education system in Kazakhstan.

This way, using the critical analysis rather than exploring it descriptively enables to gain a **deeper understanding of the problematic, power relations, or institutional challenges in the Kazakhstani teacher education**. Unlike just masking the problems, this research obtains fundamental motivations and offers guidelines for policy and teaching practice changes

Challenges of Teacher Education in Kazakhstan from Literature

Teacher education in Kazakhstan is currently facing several pressing challenges:

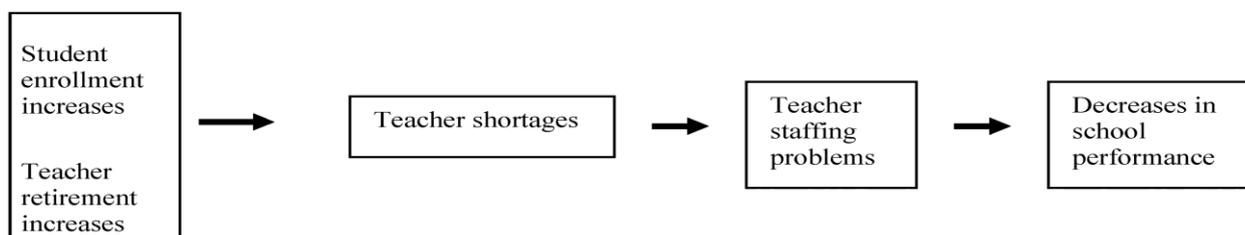
Key factors contributing to the shortage of qualified teachers, particularly in rural areas of Kazakhstan
Shortage of Qualified Teachers



Vol. 3 No. 4 (April) (2025)

Kamanga (2023) highlights a significant shortage of qualified teachers in Kazakhstan, particularly in rural areas, due to factors such as low salaries, heavy workloads, and the diminishing appeal of the teaching profession. The study also established that low wages reduce the number of young professionals willing to join the field hence worsening the situation. Teachers are overworked and poorly supported hence they quit in large numbers because of burn out. This has led to poor learning outcomes especially among students in areas that are already considered marginal in terms of access to education. In addition, the lack of professional inducement has an effect on the morale and performance of educators. Certain measures have been embarked on by the government through providing salary increases and professional development program but these cannot solve the problem. With regard to recommendations, he insists on the optimal policy changes that can be made to improve teacher employment and staffing policies. The lack of qualified teachers may threaten Kazakhstan's educational growth as every year passes without proper teacher recruitment strategies in place.

The Traditional Theory of Teacher Shortages:



An Alternative Organizational Perspective:

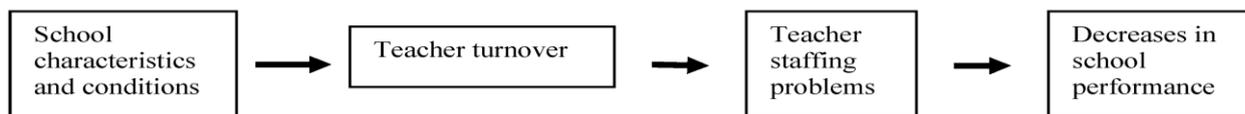


Figure 1: Contrasting Perspectives on Teacher Shortages and Their Impact on Schools

Past Studies by different authors

Stakeholders' Perceptions of the Quality of Education in Rural Schools in Kazakhstan

The study by Tajik et al. (2021) highlights the critical shortage of well-qualified teachers in rural schools in Kazakhstan, particularly in STEM subjects. This factor is due to low pay, heavy workloads and low status of the teaching profession. This has resulted in many teachers seeking employment in urban areas because of better prospects leaving rural school with inexperienced or even incompetent teachers. Therefore, students in rural areas end up with poor performance and limited chances to pursue college education. In the case of teachers' quality, 43% of the participants were fully satisfied, while 46% were somewhat satisfied. The academic and psychological climate was mostly regarded as positive; 88% of respondents agreed with the statement that their schools are safe and supportive. School leaders focused on such concepts as school democracy and participation, cooperation and collaboration, and problem-solving in teams to maintain and develop a trustful relationship



between teachers, students, and parents. The formation of student-teacher committees, setting up new teacher-mentoring programmes, the rewarding of performance, and providing training and development played a role in the creation of this culture. The different stakeholders such as parents, teachers, and policymakers have raised eyebrows over the deteriorating quality of education in these areas. The study also indicates that there is a shortage of professional development programs that escalates the problem. The following are causes of concern: Of late, the government has come up with various policies to improve teachers' performance, which include salary increment and teacher training but they are still wanting. The situation is further worsened by the fact that many schools are located in rural areas with little or no facilities and resources. These are some of the challenges which can be well managed by overhauling and implementing good policies and policies as well as appropriate investment in rural education. If no further measures are taken, rural-urban disparities in education in Kazakhstan may continue to expand, consequently impacting the development of the country.

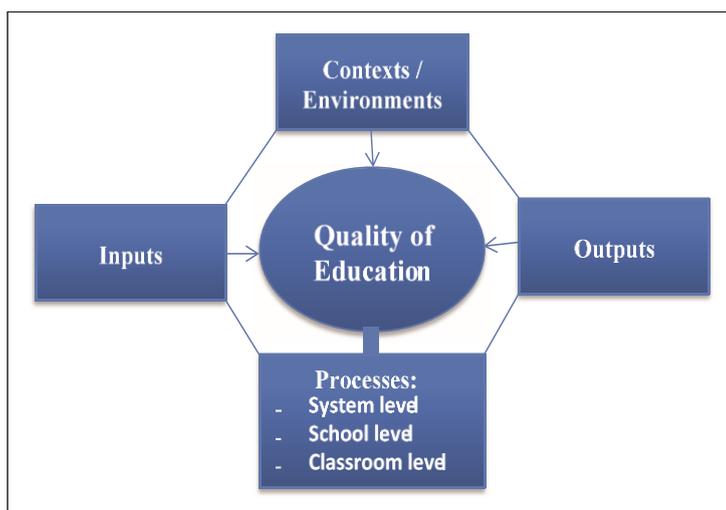


Figure 2: Quality framework

Factors Affecting Teacher Retention in Mainstream Schools in Kazakhstan

This study that examines the main causes of low teacher's retention rates and their implications for the future of teaching and learning in the country. The study also reveals that one of the challenges is low salaries which makes people stay away from or quit the teaching profession. On the same note, tasks assigned to the teachers and other administrative responsibilities alongside large classes result to exhaustion of the teachers. The study also reveals that an inadequate professional development opportunity hampers career advancement, thus making the profession unattractive. Additionally, lack of appropriate support to the teachers especially the new ones lead to early drop outs. The study identifies the demands for salary increase, workload decrease, better professional development, and organized mentoring to promote teacher retention and preserve the quality of education in Kazakhstan (Nur Repository, 2023).



Figure 3: Faculty Retention factors in educational institutions

Quality and Equity Issues in Kazakhstani Rural Schools

The key factors regarding the quality of education in the rural areas of the country, and it is identified that the lack of qualified teachers is one of the most significant concerns. The study also shows that low remuneration and workload challenges the teachers to work under adverse conditions especially in rural schools making the turnover rate high. Other factors that affect learning in rural schools include; many teachers are equally not well equipped to meet the challenges of students from the rural areas. The study also shows that the resources are inequitably distributed whereby most of the rural schools are lacking equipment and teaching aids, technology gadgets. These concerns affect the learner outcome in a negative way, and has also helped in increasing the differential in quality education between urban and rural areas. Lack of professional development only hinders teachers from incorporating new techniques in their teaching processes. The teachers' main concerns are highlighted by stakeholders as requiring policy actions such as a salary increment, incentives to teachers posted in rural areas, and structures. Thus, the authors propose that improving support structures and offering specific professional development programme can improve teacher retention. It is important to enhance rural education policies as a way of improving access and quality of schools in Kazakhstan (Tajik et al., 2020).

Beginning Teachers' Attrition in Secondary Schools in Kazakhstan

The article titled "Beginning Teachers' Attrition in Secondary Schools in Kazakhstan" examines the causes of early turnover of teachers. According to the research, initial teacher attrition rate is high; 29% of the teachers resign within three years of teaching and 39% within five years of their practice. Some of these include lack of support structures in the teaching practice which makes new teachers to feel frustrated and isolated in their practice. At the same time, the increase in the number of novice educators is mentioned, as well as the absence of proper mentoring programs to support them. This is because it is evident that nurses are overworked and that they lack the necessary professional development to meet the demands of the job. The study, therefore, calls for multivariate policy strategies to tackle these challenges. As for the recommendations, the scholar suggests that it is necessary to introduce



Vol. 3 No. 4 (April) (2025)

formalized mentoring programs, reduce the working load, and increase the opportunities for professional development to address the problem of teacher turnover in secondary schools of Kazakhstan (Rysbekkyzy, 2014).

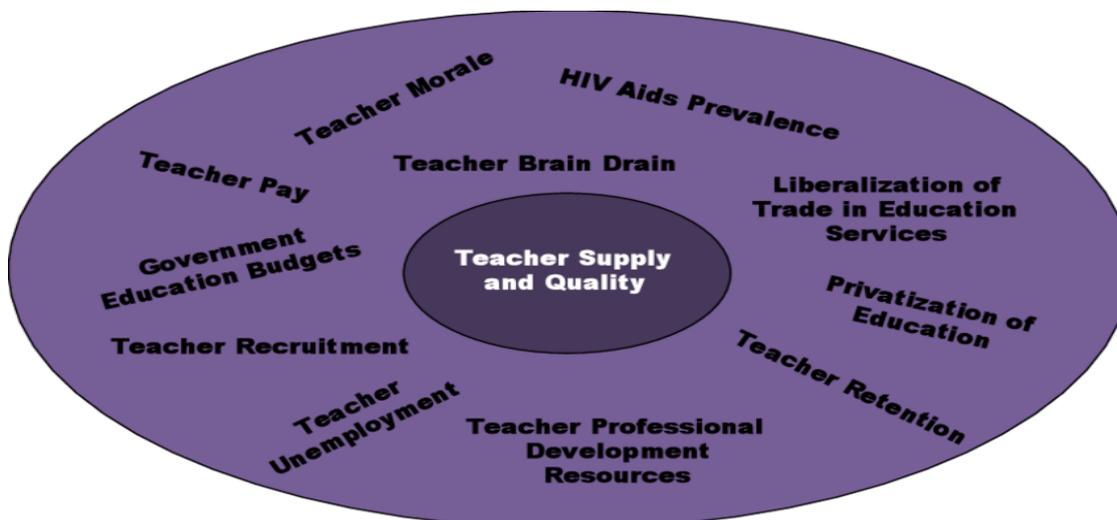


Figure 4: Teachers' Attrition in Secondary Schools

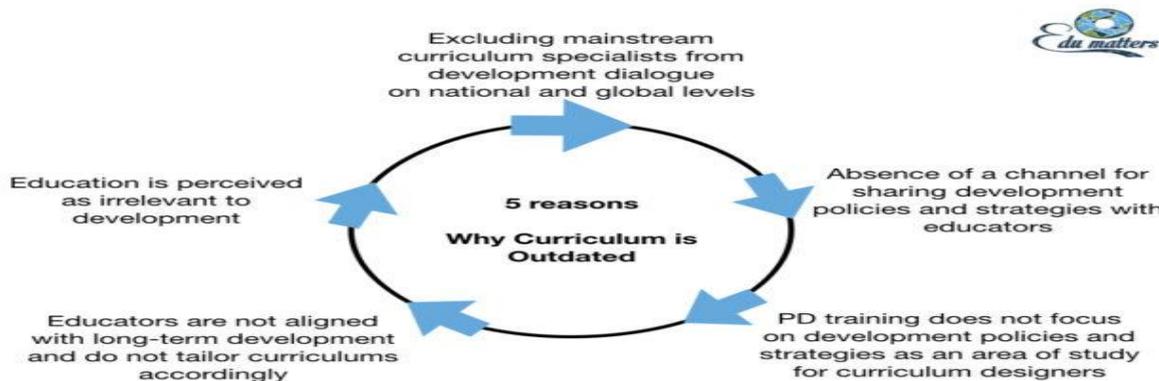
Analysis of Specialists' Shortages in Schools with Inclusive Education

The Specialists' Shortages in Schools with Inclusive Education aims at explaining the causes of staff deficiencies and high turnover rates among educational support specialists like psychologists, teachers of special education, and speech therapists in the Kazakhstani schools, which implement inclusive education. Among the factors, dissatisfaction with working conditions is evident since the specialists receive inadequate facilities and limited resources to address the needs of the special-needs students. Low salaries are also an issue since the compensation is not proportional to the specialists' work and experience, which creates financial stress and dissatisfaction on the job. Also, heavy workloads such as handling many cases and performing other managerial duties lead to stress and frustration among the employees. The study also reveals that all the challenges have a negative impact on the quality of inclusion in education hence the need for policy changes. (Yussupova et al., 2023).

Outdated curricula and traditional teaching methods impact student learning outcomes

Outdated Curricula and Teaching Methods

These include outdated curricula and traditional methods of teaching that hampers or reduces critical thinking and problem solving. Incorporation of inquiry based learning, digital storytelling, and AI in enhancing students' learning makes education more engaging and relevant. Competency based and interdisciplinary learning helps the students to face the challenges of the world of work. Computer software can be determined as the means of connecting the theory with the practice.



http://www.ibe.unesco.org/sites/default/files/resources/reconceptualizing_and_repositioning.pdf

Figure 5: Outdated curriculum reasons

Apart from increasing the enrollment and access to education, collaborative curriculum reforms and culturally responsive teaching improve the quality of education. Lifelong learning models mean that one can be prepared for constant changes that are characteristic of the modern world. Failure to do so may lead to lack of innovation and inadequate preparedness among the graduates. These necessary reforms must be driven by the policymakers, educators, and the institutions. Education for the future is the basis for the development of a nation (Rakhmatullayeva, 2020).



Figure 6: Strategies adopting for whole school

Reforming Educational Content in Kazakhstan: Challenges and Perspectives

The research shown that in Kazakhstan, many curricula are still ineffective to develop students’ critical thinking and problem-solving skills (Aimagambetov, 2021). rote learning techniques are still the most common and students’ motivation, creativity restricted, and the gap between the studied material and the labor market is widened (Zhussupova & Kazbekova, 2020; OECD, 2017). This is because a weak program of professional development of teachers, which prevents the introduction of innovative approaches to teaching in the classroom (Nazarbayev Intellectual Schools, 2022). Moreover, the study puts emphasis on



the need for competency-based education to improve the practical and analytical skills; however, the process of digitalization in education is still rather slow, and there is a lack of effective use of technology-aided learning tools (UNESCO, 2023; Mukhametzhanova & Duisenbayeva, 2021). A cross cultural analysis of the current best practices reveals that embedding these practices has the potential of enhance curriculum modernization by a greater extent (Eurasian Journal of Educational Research, 2021; Broken Chalk, 2023). Finally, it is stated that future educational reform in Kazakhstan requires the active involvement of policymakers, educators, and leaders of industries (Ministry of Education and Science, 2022).

Innovative Pedagogical Approaches in Kazakhstani Schools

According to Kuvandykova (2024), culture should be incorporated into ELT in order to improve its efficiency. Some of the methods such as collaborative learning enhance motivation and participation among students. Technology, especially, also increased attendance and understanding (Kuvandykova, 2024). The IIP Series (2024) emphasized the change to inquiry-based learning and the classroom flipping to improve the performance of students. However, the major problems are perceived as insufficient pre-service teacher training and organizational cultures that hinder change implementation. Nevertheless, there are barriers to learning (Kuvandykova, 2024; IIP Series, 2024), but at the same time, the best practices in teaching are promising. The investigations suggest that teachers should be trained for the application of new methods of instruction as well as policy support for such practices.

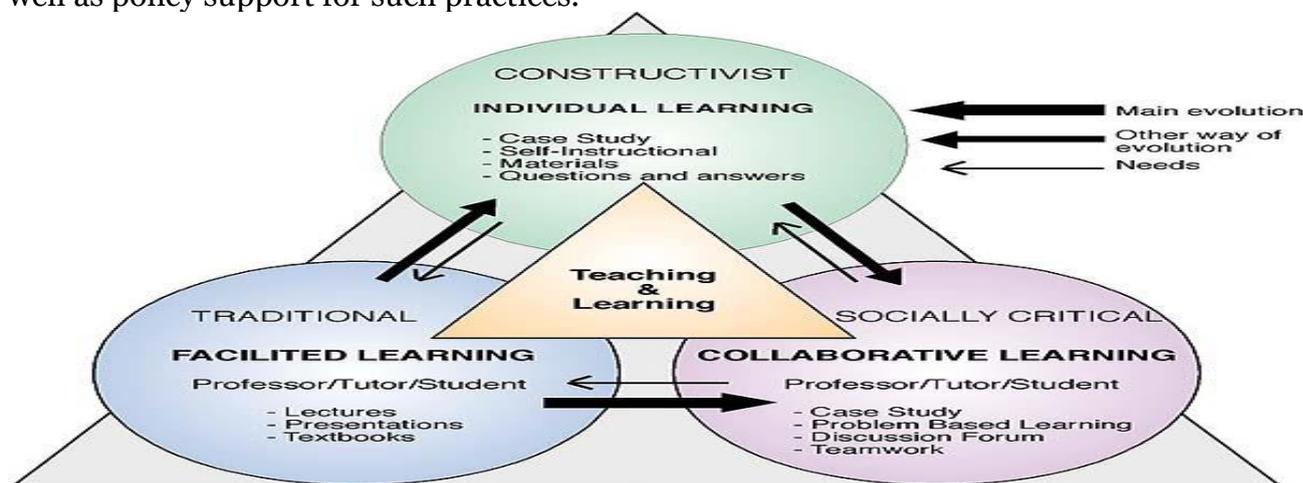


Figure 7: Pedagogical approaches

Barriers to Modernizing Teaching Practices in Kazakhstan

In her research conducted in 2018, Akhmedjanova described the challenges of improving the approaches to teaching in Kazakhstan. One major challenge is the culture of resistance to change in teachers whereby this group of people has not embraced the **new shift in pedagogy** and is resistant to change. This resistance is mainly due to inadequacy in learning new methods of teaching that are current in the market and reliance on traditional formative patterns. Moreover, the study reveals that there are severe shortcomings in terms of provided professional training for teachers, as well as their further professional education, which does not allow the teachers to constantly develop and improve



their skills in teaching methods. This means that these barriers should be tackled in a broader perspective with the need to provide appropriate professional development approaches and nurturing of educational change.

Factors Affecting Teaching

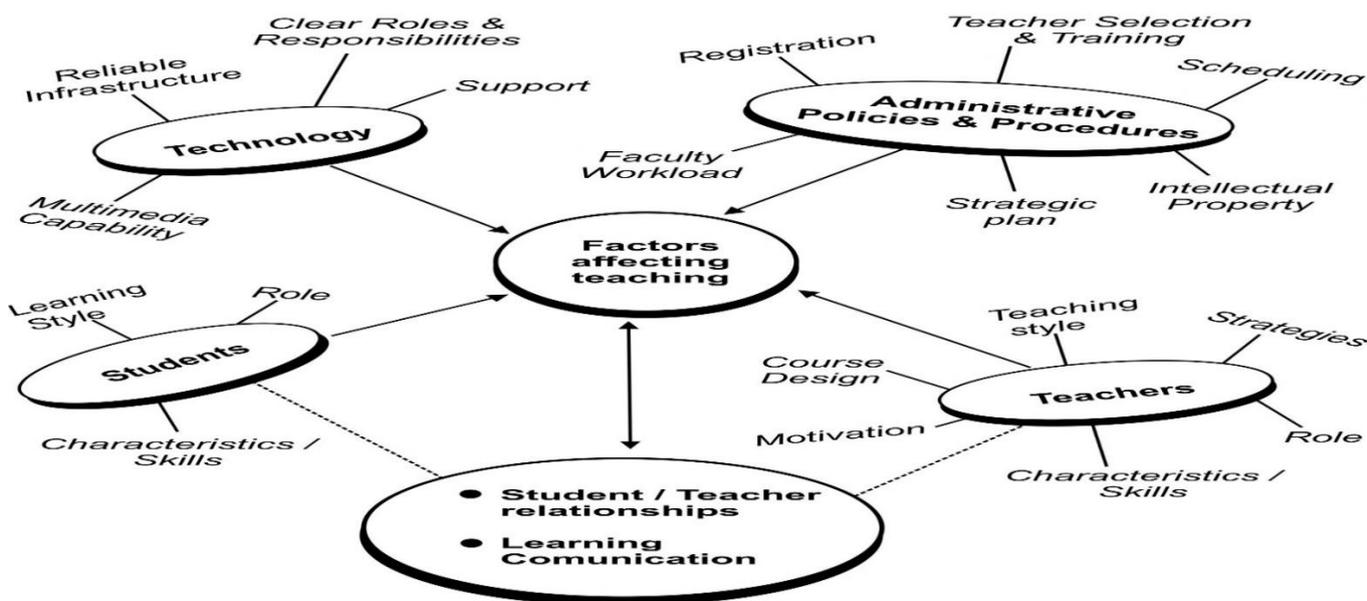


Figure 8: Factors affecting teaching

Assessing the Impact of Traditional Teaching Methods on Student Critical Thinking Skills in Kazakhstan

A study conducted by Tussupbekova et al. (2022) about the effects of the blend learning among the graduate students of Kazakhstan also shows that the **interactive and student-focused teaching methodologies directly affect the critical thinking abilities in a positive way.** In the course of the study it was observed that students who were grouped to discuss, solve problems and take part in activities were more analytical than those being lectured. As a result of the study the researcher noted that the use of digital tools especially the incorporation of the interactive content helped in enhancing student motivation and participation. Also, there was a found improvement in their self-organised learning and interest when instructors incorporated new teaching techniques. Also, the study highlights the significance of professional development for educators to enhance their teaching practices to embrace the use of innovation. In general, the findings of the study support the need for pedagogical changes to enhance critical thinking and problem-solving abilities of students.

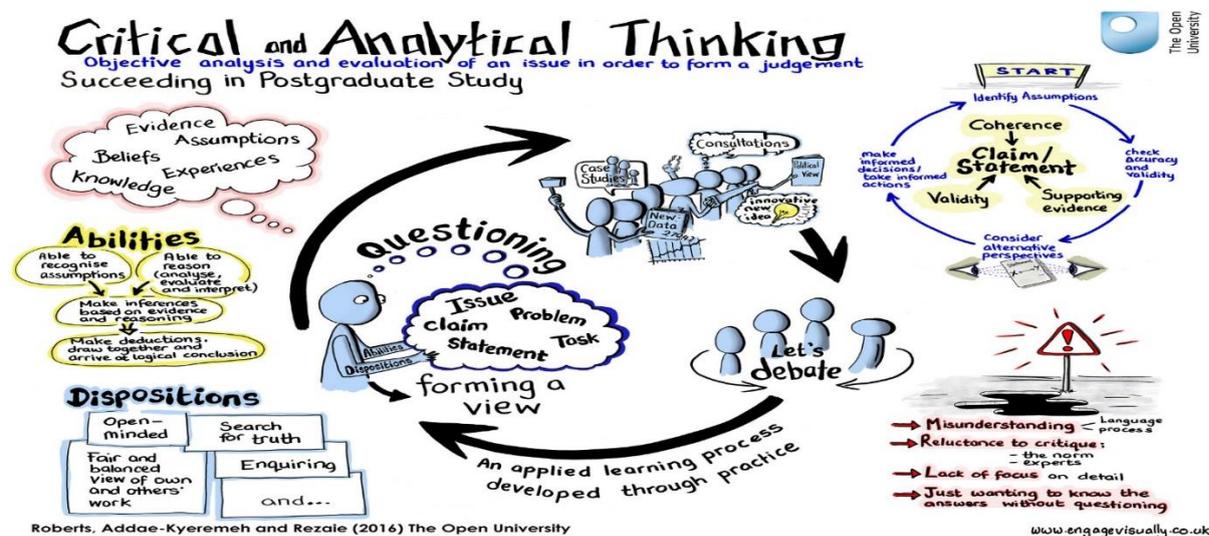


Figure 9: Traditional Teaching Methods and Student Critical Thinking Skills of students

Teacher education programs preparing educators for inclusive classrooms, particularly for students with special needs
Inclusive Education Implementation

An issue that still persists is on how to implement integration of inclusion for children with disabilities. **Teacher training courses also do not provide much sufficient preparation to cater for students with learning disabilities in their classrooms.** Makoelle and Burmistrova (2021) have also conducted a study about the factors that facilitate and hinder the preparation of pre-service teachers in Kazakhstan for inclusion. Some of them were as follows, absence of proper courses in inclusive education in the faculties of teacher training and development; and confined practice in real-life inclusive education teaching-learning contexts. Consequently, the study suggested that teacher training institutions should offer focused training on the subject of inclusive education and physical experiences on inclusive classroom environment. The above recommendations could help to increase the preparedness of the future educators to address diversity in classrooms and students with learning difficulties.

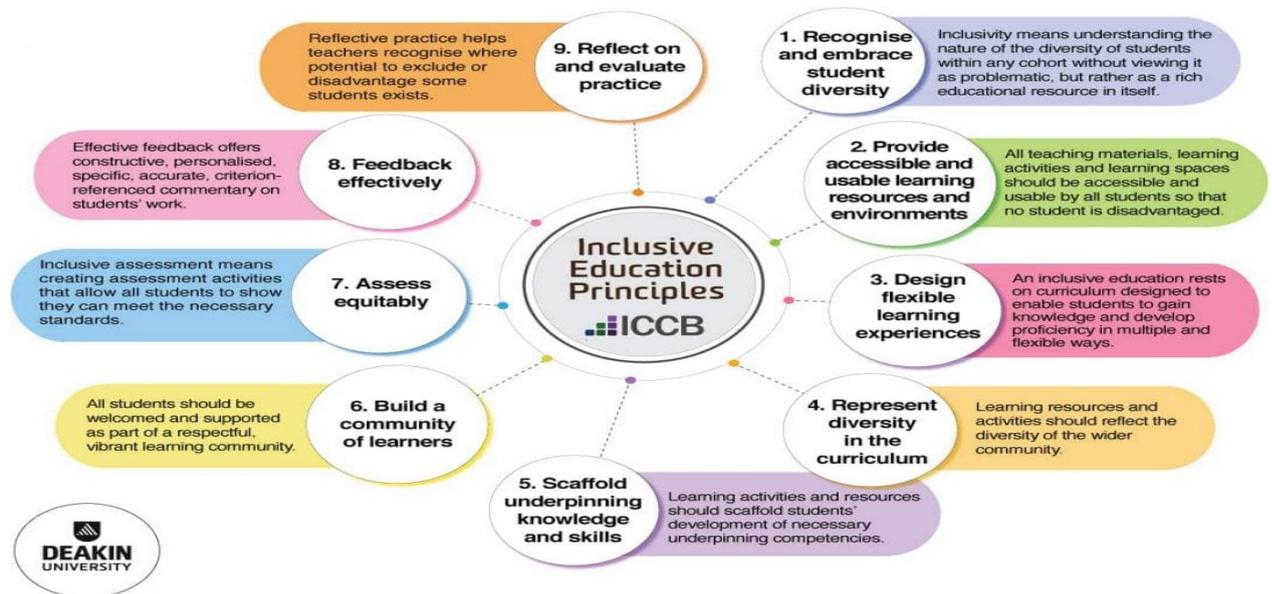


Figure 10: Inclusive education implementation and principles

Teacher Education and Inclusive Education in Kazakhstan

Kasa et al., (2019) have discussed about the development of resource Centre in school in Nur-Sultan city of Kazakhstan for the implementation of inclusive education. Several factors that were found to facilitate the implementation of these centers are as follows; first, there is a **commitment from the leadership**; second, there is **multi-stakeholder partnerships**; third, there is **focused professional development among the educators**. Nevertheless, some of the obstacles highlighted include; inadequate resource, lack of adequate training for teachers, and community perception to disability. The study concluded that the implementation of the recommendations of the study include improvement of teacher training where modules on teaching children with disabilities should be included, more resources be provided, and awareness creation through public campaigns be made on inclusive education. The results of the study stress the need for a complex solution to improve the conditions of inclusiveness in education in Kazakhstan. According to Makoelle and Burmistrova (2021), there are some shortcomings in developing teachers in Kazakhstan for inclusive education, including few specialized courses, practical training, and inclusive approach in courses.



Figure 11: Teacher Education and Inclusive Education teaching practices

Empowering Inclusion: A Study of Pre-Service Teachers’ Proposals for Enhancing Initial Teacher Education in Kazakhstan

Tussupbekova et al., (2024) have recently carried out a study that explored the pre-service teachers’ beliefs about improving the initial teacher education for Inclusive Education in Kazakhstan. The study revealed that although the course in “Inclusive Education” was introduced in 2016, the pre-service teachers lack adequate knowledge on how to practice inclusion efficiently. This is to mean that more field practical experiences including early internships and master-apprenticeship practices were called for to close the theory-practice gap. The study also realised that there is a challenge of inadequate resource and support in educational facilities as a hindrance to implementing inclusive education. As such the authors made policy recommendations aimed at enhancing the teacher education by enhancement of practical training and adequate support for the pre-service teachers. These measures are aimed to equip future educators with competencies to address the diversity of students and the classroom.

Teachers’ Attitudes towards Inclusive Education in Kazakhstan

Agavelyan et al. (2020) surveyed the current state of attitudes of teachers in Kazakhstan toward IIE and found them to be mostly neutral. The study applied the Sentiments, Attitudes, and Concerns about Inclusive Education Revised (SACIE-R) questionnaire to collect the perceptions from 416 general secondary school teachers teaching in the Pavlodar region. The study showed that although teachers did not actively against inclusion they were not very for it either. This



was due to perceived lack of adequate specialized preparation and perceived self-efficacy when dealing with diverse learners. The study pointed out the need for professional development programs that would meet the needs of educators in order to support inclusive practice. Also, the promotion of positive attitudes towards students with special educational needs was considered as one of the requirements for the implementation of inclusive education in Kazakhstan.



Figure 12: Teachers’ Attitudes towards Inclusive Education

Implementing Inclusive Education in Kazakhstan: Objective Needs and Real Options

A study titled *Implementing Inclusive Education in Kazakhstan: The article “Objective Needs and Real Options (2020)”* focused on the topic of readiness of university students in pedagogical specialties for inclusive education. This study established that a vast majority of these students had poor comprehension of the idea and practice of inclusion. This was due to the poor implementation of inclusive education in teacher training. The study showed that it is important **to improve the curriculum in order to prepare educators in training for enabling learning for all**. Specific recommendations made to addresses these issues were to incorporate comprehensive teaching modules on inclusion into the existing programs as well as arrange practical slot in order to ensure that learners can practice what they learn in class. These measures seek to enhance the capacity of pre-service teachers in dealing with diversity in schools.

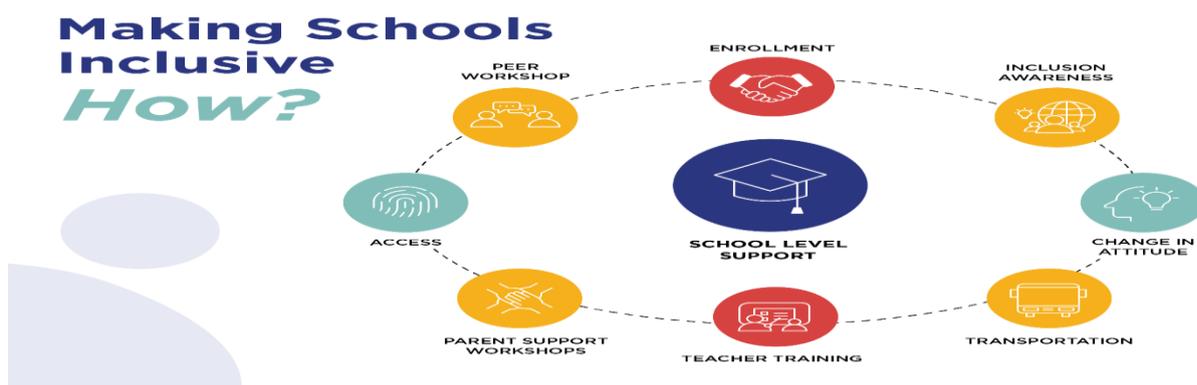




Figure 13: Implementing Inclusive Education in Kazakhstan

Development of Inclusive Education for Students with Disabilities in Kazakhstan

A research paper entitled Development of Inclusive Education for Students with Disabilities in Kazakhstan (2023) contains the evaluation of the current situation with the development of inclusive education in the country. The study also emphasized the importance of enhancing and enhancing the present laws to ensure enhancements of inclusive school. It also stresses on the need for the enhancement of funds in as far as the integration of the practices is concerned. One of the recommendations is the fact that many educators reported they were not well prepared to teach students with disabilities, which points at the need for improve teacher education programs. This has been evidenced by this research as an indication that a more comprehensive approach should be taken in the process of implementing an effective education system for children with disabilities. They all are directed to forming the sustainable and effective inclusive education environment in Kazakhstan.



Figure 14: Strategies Inclusive Education for Students with Disabilities

Major challenges in integrating Education for Sustainable Development (ESD) principles into teacher education programs

Implementation of Education for Sustainable Development (ESD)

Challenges arise from the fact that Kazakhstan is a multidisciplinary environment that requires a complex approach to address existing problems (de Lázaro et al., 2024). Most of the existing programs not prepare teachers with the good knowledge and skills necessary for incorporating the concepts of sustainability in their teaching. Because of this, there is poor implementation of ESD because specialized training, curriculum integration, and institutional support are not well addressed. If not well implemented, the teaching and learning processes may not integrate ideas related to sustainability, thus a very low effectiveness of ESD is achieved in classrooms. On the other hand, the countries that have integrated ESD into the preparation of teachers give emphasis on inter-disciplinary learning, practical experiences and on-going professional development. These gaps can only be filled by policy changes, curriculum modernization, and special programmes for teacher development to



improve their capacity in integrating sustainability into their teaching. To ensure the positive impact of sustainable development, there is a need to enhance institutional commitment to ESD to produce the crop of teachers that will champion sustainable development effectively.



Figure 15: Implementation of Education for Sustainable Development (ESD) vision

Issues and Perspectives on Teacher Education for Education for Sustainable Development in Kazakhstan

The paper of Bepalyy et al. (2024) focuses on Issues and Perspectives on Teacher Education for Education for Sustainable Development in Kazakhstan. The authors believe that ESD cannot be seen as an extra curriculum subject but has to be integrated into the overall curricula and the educational approaches to make the learning system sustainable oriented. They opine that there are missing links in curricula and inadequate institutional support as some of the main challenges that hinder ESD implementation. The research indicates that to meet these challenges, there is the need to review the curriculum, integrate cross-disciplinary, and professional development programs to ensure that the educators are ready to embrace sustainable practices in their teaching. It is considered that further enhancement of institutional commitment to ESD is necessary for the improvement of sustainable education in Kazakhstan.

Education for Sustainable Development

Comparative Analysis and Prospects at Universities in Kazakhstan, Tajikistan, Kyrgyzstan, and Uzbekistan: The work entitled “Education for Sustainable Development: Comparative Analysis and Prospects at Universities in Kazakhstan, Tajikistan, Kyrgyzstan, and Uzbekistan” was written by Bepalyy et al. (2024). This paper aims at exploring the emerging paradigms of Education for Sustainable Development (ESD) in these Central Asian nations in the higher learning institutions. They note that, in general, educators have a better understanding of the SDGs, while students have limited knowledge of the goals, which they can only obtain through social networks and the Internet without being taught in class. Therefore, this study emphasizes the need to reform the curriculum, to collaborate with other disciplines and to engage in a continuous



professional development to enhance the integration of sustainability concepts into educational programmes. Mitigating these challenges is crucial in an effort to produce graduates fit for the task of enhancing sustainable development in the region.

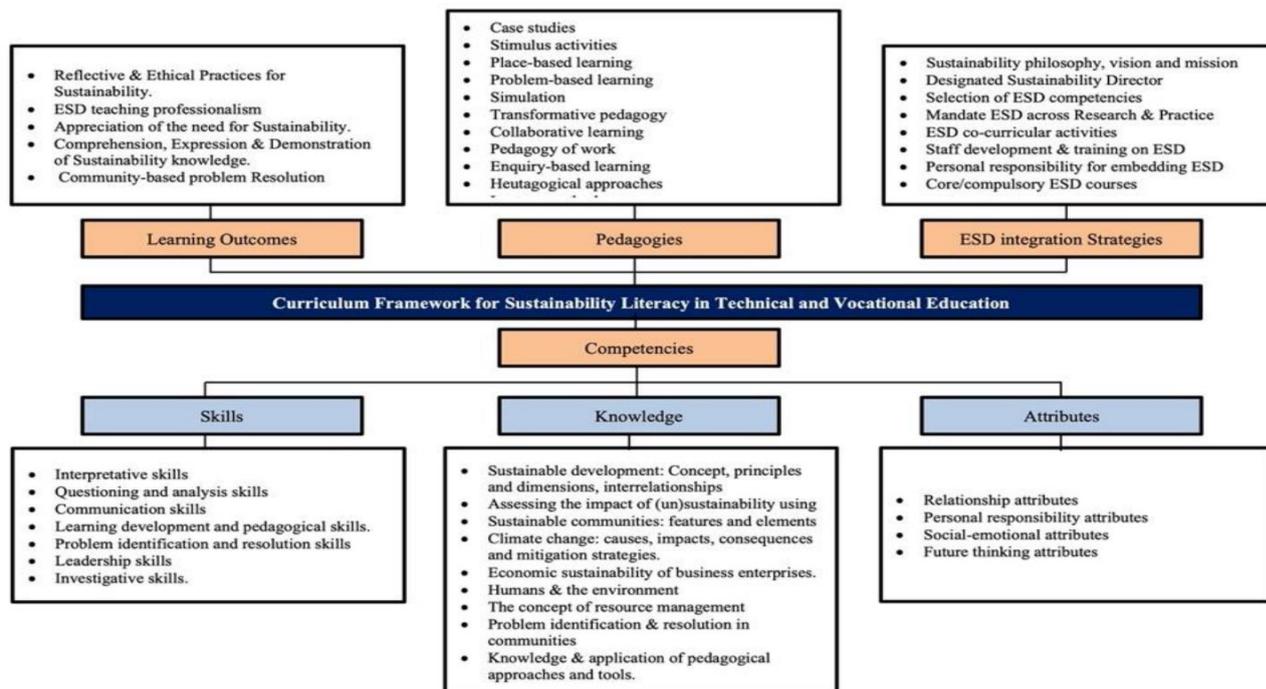


Figure 16: Education for Sustainable Development

Sustainable Development Awareness and Integration in Higher Education: A Comparative Study in Central Asia

In order to examine SDG awareness in higher education across Central Asia, South Caucasus, and the EU, a survey was conducted, it was identified that there are knowledgeable educators as well as students that were using only informal sources of information. This work can be valuable for the curriculum developers, as it discusses the need for the changes in the curriculum and its approaches to the integration of the aspects of sustainability when learning is context-based and integrated. Sustainability education is important but there are still gaps in it due to lack of institutional commitment. Sustainability must be integrated into the courses offered in the institutions as a way of enhancing critical thinking and problem solving among the students. Faculty training and structured modules can improve the level of engagement. It is evident that industry partnerships can help to address the issue of gap between theory and practice. Lack of formal knowledge about SDG may remain a problem if no systematic actions will be taken. Enhancing sustainability education helps the professionals to be ready to face challenges in the global society. This type of work points to the need for a coherence in sustainable development in higher learning institutions (Bespalyy et al. 2024).



Figure 17: Sustainable Development Awareness and Integration in Higher Education

Exploring the Concept of Sustainable Development within Education for Sustainable Development: Implications for ESD Research and Practice

In the paper titled: Exploring the Concept of Sustainable Development within Education for Sustainable Development: Implications for ESD Research and Practice, Sinakou, Boeve-de Pauw, and Van Petegem insight the concept of sustainable development in ESD. The study focuses on the concept of sustainable development that encompasses not only the social and natural aspects of the environment but also the economic aspect. Due to the lack of clear definition of sustainability, the education on the concept also remains disjointed across the world. There is more emphasis on environment most of the time and less on economy and society. The authors have proposed the need to consider all three dimensions of the ESD pillar in an integrated manner. If not put in a structure, sustainability education is in danger of being an empty venture. The learnings also support the use of both formal and informal knowledge to improve the critical thinking abilities. These areas of development make it possible for an ESD approach to deliver students ready for global sustainability.

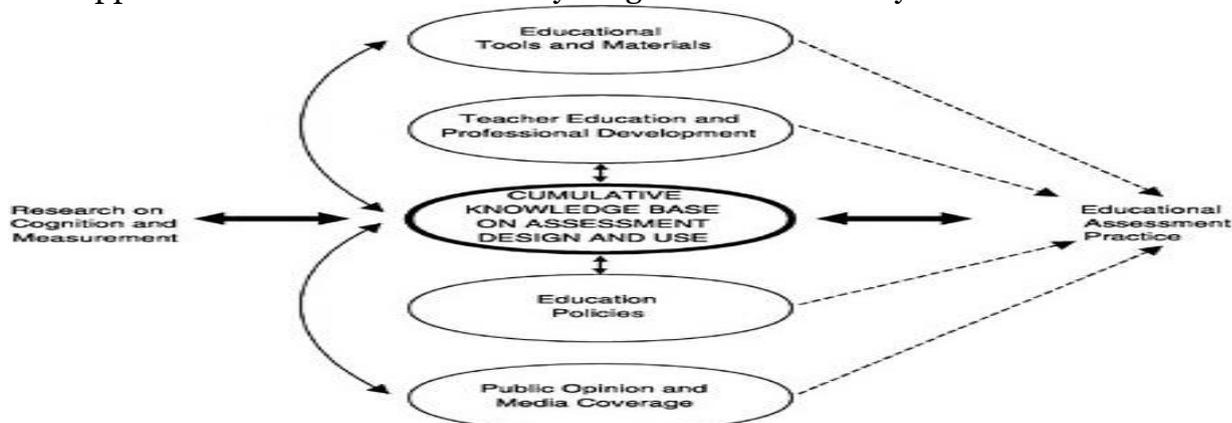


Figure 18: Implications for ESD Research and Practice

Teacher Education and Education for Sustainability

Ferreira et al. (2019) further argue that teacher education is the key to enhance sustainability practices since pre and in-service teachers need to be prepared to



become agents of change and foster sustainability in schools and other settings. To become competent in ESD, one has to undergo formal and informal training for professional development, as supported by global initiatives that have been ongoing since the 1990s including those spearheaded by the United Nations to mainstream sustainable development in teaching fields. This finding implies that, For effective preparation of teachers to teach sustainability concepts as well as integrate them into various curricular areas, it is essential to adopt interdisciplinary approaches, gain experiences in context-based learning and engage in reflective practices in teacher education programs. Lacking such specific professional development, ESD may remain non-deep, and there is a need for system changes to produce teachers who will motivate students to tackle environmental and other issues, leading to the development of sustainable society.

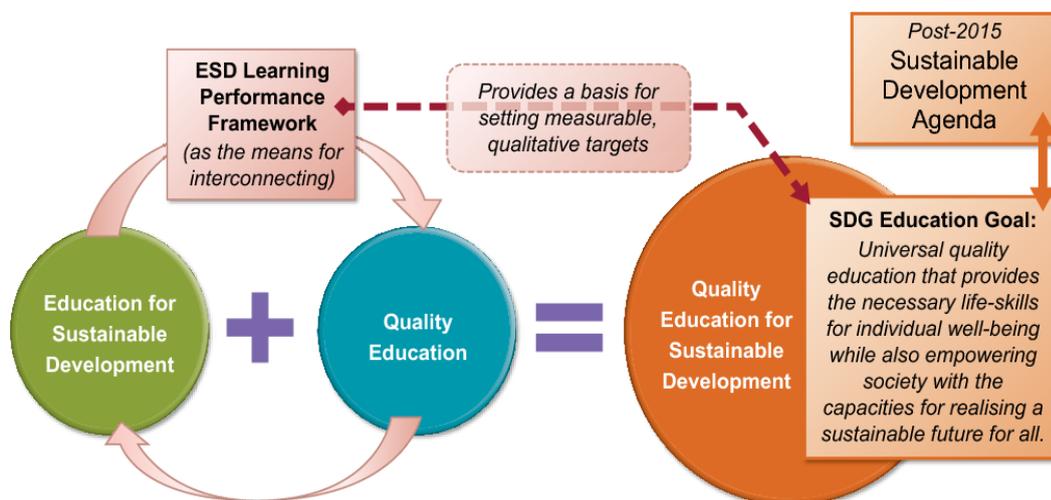


Figure 19: Teacher Education and Education for Sustainability for quality education

Research Methodology

This study adopts a **qualitative method**; the **systematic literature review** and **critical analysis** of the existing research on Challenges and Pedagogical Barriers in Teacher Education in Kazakhstan are used in this study. The method of analysis used in this study is the **thematic analysis** of the literature to identify the themes, issues, and controversies in the literature. **Thirty-five research articles were identified from the databases in a peer-reviewed process using such search terms as Challenges and Pedagogical Barriers in Teacher Education in Kazakhstan.** The inclusion criteria set the time constraint for the articles to be published in the current era, so as to be able to capture the most current debates.

Thus, after completing the analysis, the studies were classified into themes according to the theoretical concepts, the methods used in research, and the overall findings. The results of this comparative study were aimed at finding out the similarities and differences as well as the areas of research that are poorly covered. In this study, critical evaluation was done based on the guidelines provided by Cohen et al. (2018) and Creswell & Poth (2016) to check the validity, reliability as well as generalizability of the results.



Vol. 3 No. 4 (April) (2025)

Moreover, this review includes the views from the global policies and the theoretical principles of the subject that originated from the key works of Vygotsky (1978), Bandura (1986) to make sense of the emerging trends. Overall, the integration of the studies helps to paint a more complex picture of the domain, as well as indicate the further development prospects and application potential.

Results and Discussion

Objective 1: What are the key factors contributing to the shortage of qualified teachers, particularly in rural areas of Kazakhstan?

Critical Analysis of Teacher Shortages in Kazakhstan

The lack of qualified teachers in Kazakhstan, especially in rural schools, is a continuous problem due to factors that discourage potential and existing teachers. Low salary scales also play a key hindrance factor in that it dissuades young talents from pursuing their careers in the field while chasing out experienced teachers to other better paying fields (Kamanga, 2023). Also, increased numbers of students and teaching loads lead to the high turnover and stress levels of teachers, all of which lowers teaching standards. It is worsened by a small number of professional development activities and the declining status of teachers in the society that causes the retention a big challenge (Tajik et al., 2021). To this end, despite efforts by the government to design strategies such as salary increase and incentive package to address these problems, the strategies have been partial due to lack of profound structural changes. If no specific policies are implemented such as competitive salaries, changes in workload, and comprehensive teacher training programs, shortage will continue to remain a problem, especially in rural and hard to staff schools. Solving these issues entails a multifaceted strategy that goes beyond the fiscal aspect by focusing on the overall advancement of teachers' employment in order to turn the profession into a more desirable and dignified vocation.

Way Forward to Address Teacher Shortages in Kazakhstan

The absence of qualified teachers and especially in rural schools remain a critical problem in Kazakhstan, for which the country needs to develop an effective program. This can only be achieved through policy changes, additional funding, and organizational changes in recruitment, retention, and training of teachers.

Enhancing Salaries and Financial Incentives

This has been due to the fact that low wages deter anyone talented from joining or even remaining in the profession. There should be a raise in pay for teachers especially in rural areas and more so there should be incentives such as provision of houses, bonuses, and student loans to be paid in case the teachers agreed to teach in such areas. As for the programs such as "Serpin", which aims to help a student from rural area to attend university in urban area, then it can be developed by making it obligatory for the student, for a certain period of time, to teach in a rural school.

Reducing Workload and Providing Institutional Support

Thus, studying certain patterns of teachers' employment in Kazakhstan, it is



Vol. 3 No. 4 (April) (2025)

possible to discuss the problem of their increased workloads and the resulting burnout and early turnover. Some measures that have been adopted by the Bilim-Innovation Lyceums include hiring of teacher assistants, cutting down on paperwork, hiring more supporting staff, among others. Furthermore, creating structured programs for the induction of new teachers would reduce the beginning of a teacher's career to a manageable level.

Improving Rural Teacher Recruitment

This can be done through adopting a model of recruiting teachers where teaching graduates are offered scholarships to teach in rural schools for a stipulated number of years like in China and South Korea. Other ways include opening satellite teacher training colleges in hard-to-staff areas and offering accelerated certification for content specialists interested in a career in teaching.

Expanding Professional Development Opportunities

A study revealed that many teachers are not privileged to have constant training and career growth. The government needs to open regional centers of education for teachers similar to Singapore's National Institute of Education to upgrade skills in effective teaching methodologies, Information and Communication Technology, and innovation in teaching for inclusion. Continuing with the purchase of online learning platforms as well as collaboration with international institutions will enhance teacher competencies.

Elevating the Status of the Teaching Profession

To achieve this, Kazakhstan is required to redesign the perception of teaching profession among people in the society. That is why national campaigns for talented teachers, such as "Best Rural Teacher" or media activities can enhance the public appreciation. Opportunities for educators to apply for competitive grants and research for their organizations will also be provided through partnerships with private sector organizations, which will increase job satisfaction and retention in the long run.

Objective 2: How does the current curriculum and the conventional mode of teaching affect students' learning accomplishments?

Critical Analysis on Challenges and Prospects of Curriculum Modernization in Kazakhstan's Education System

Outdated curricula and traditional methods of education are currently used in Kazakhstan and they do not develop critical thinking and problem-solving skills of the students (Aimagambetov, 2021; OECD, 2017). The essence of education is still limited to memorization and teacher-centered learning rather than embracing the modern approaches such as student-centered learning and learning through technologies (UNESCO, 2023). Such a gap puts the graduates in a wrong preparedness for the current labor market (Nazarbayev Intellectual Schools, 2022). Some of the challenges include, lack of teacher professional development, lack of or limited access to technology, and reluctance to emulate change (Zhussupova & Kazbekova, 2020). However, there is the implementation of competency-based education while standardized testing and slow digital learning hinder experiential learning (Kuvandykova, 2024). The samples like



Vol. 3 No. 4 (April) (2025)

Finland and Singapore can be useful for reference, yet the implementation meets the issues of resources and institutions (Tussupbekova et al., 2022). Lack of change in the teaching methods, inadequacies in professional development also play a role (Akhmedjanova, 2018). There is an opportunity for critical thinking skills to be improved through the use of blended learning, although there are significant issues with the structures and policies that hinder its integration. Any changes that are required have to be compatible with the best practices observed worldwide as well as take into account the cultures of the specific countries (OECD, 2017). In this way, if there is no adaptation and lifelong learning, Kazakhstan will face new challenges in preparing students for the 21st century (UNESCO, 2023).

Way Forward: Modernizing Curricula and Teaching Methods in Kazakhstan

In order to address the problems of outdated curricula as well as traditional approaches to teaching in Kazakhstan, there is a need to apply the complex of measures with the involvement of policymakers, educators, and institutions. The following are some of the strategies that can be adopted in order to encourage critical thinking, problem solving and education improvement.

Curriculum Modernization Aligned with Global Standards

This means that Kazakhstan has to employ competency-based curricula that focus on critical thinking, creativity, problem solving not memorizing. The 21st-century competencies of information technology skills, teamwork, and problem-solving skills will help close the gap between school and work. **Example:** Finland has made a very successful shift from teaching subjects to phenomena whereby students are learn through phenomenon based approaches that connect knowledge with the world. The first experience of such programs can be tested in certain schools in Kazakhstan and, further, expand across the country.

Professional Development for Teachers

The major challenge that hinders the use of modern methods is the absence of training for the teachers. The use of other teaching pedagogy methods such as inquiry based learning, flipped classroom and the use of digital story telling should be incorporated to improve the professional development. For instance, the Nazarbayev Intellectual Schools (NIS) have launched the process of carrying out teacher training programs. Extension of such programs to all the public schools will assist the educators to build their confidence in the application of contemporary approaches.

4.2.4 Integration of Technology in Teaching

It is shown that the use of information technologies as a part of the educational process can improve the level of students' interest and the effectiveness of the learning process. Schools should provide smart classes, e-learning platforms and AI based educational tools that will make learning more engaging and effective.

Example: Singapore employ the use of learning analytics to monitor the student's progress and the kind of lessons they are being taught. The same adaptive learning technologies can be used by Kazakhstan in order to consider individual learning requirements.



Vol. 3 No. 4 (April) (2025)

Encouraging Active and Experiential Learning

Going further we need to create active learning environment and integrate projects/projects-based assignments, internship, and research-scientific partnership. For instance, the vocational education system in Germany sees the learners practice the trade in industries as they study. Kazakhstan can follow several strategies to reinforce the implementation of its dual-education programs to have workforce-ready graduates.

Policy Reforms and Institutional Support

Thus, the government needs to adopt measures that encourage curriculum development, fund the development of new teaching approaches and provide sufficient resources for educational improvement. For instance, educational strategy of the UAE called Vision 2021 has been focusing on updating curricula on a regular basis, as well as introducing new approaches to education. The same approach may be followed by Kazakhstan to define national plans for improving curriculum and its specific objectives.

Objective 3: In what extent teacher education programs are equipped for inclusive classrooms and especially for the learners with special needs?

Critical Summary: Challenges and Strategies for Implementing Inclusive Education in Kazakhstan

The issue of implementing inclusive education in Kazakhstan is still relevant because of the lack of proper preparation among teachers and teachers' training institutions, as well as organizational deficiencies. Scholarships: A variety of works reveal how systematic issues exist and how they can be addressed to improve access for learners with disabilities in schools.

Key Challenges in Teacher Preparation for Inclusive Education

According to Makoelle & Burmistrova (2021) and Kasa et al., (2020) pre-service teachers do not receive specialized courses and sufficient practical experience in inclusive classes. Although, the course of "Inclusive Education" was introduced in the beginning of 2016, the theoretical knowledge only is not enough, according to the research done by Tussupbekova et al., (2024). The participants in the study explained that they lack enough practical experience and practice teaching in inclusion classrooms and mentorship. Additionally, there is another form of barrier that is the current teachers' attitudes towards inclusion (Agavelyan et al., 2020). Teachers have a neutral or even a negative attitude to inclusion, mainly because of the lack of preparation and preparation in handling multicultural classes. This is an indication that there is a serious shortage of sharp structured professional development programs to enable teachers first to be provided with tangible approaches of handling students with SEN.

Institutional and Policy-Related Barriers

Besides, the lack of teacher training, there are some other issues identified by scholars (Implementing Inclusive Education in Kazakhstan, 2020), regarding the understanding of inclusive education limitations among university students participating in pedagogical programmes. This raises an even more significant



Vol. 3 No. 4 (April) (2025)

question: there still remain an essential lack of training in inclusive education, and its curriculum is no longer sufficient in preparing prospective teachers for it. That is why, if there are no significant changes in curricula and the provision of component training practical components, the change in education for the disabled will be slow. It might also be attributed to lack of a sound legal and policy environment and reform. The role of teachers in implementing changes in Education for Students with Disabilities in Kazakhstan: policy, legislation, funding, and training (2023): policy challenges and recommendations discuss the development of such education is the necessity of improving legislation in the sphere, the increase of the number of funds, as well as trainings for teachers. Failure to achieve these structural reforms may mean that the initiatives that are being made towards the implementation of inclusive education for the disabled may not be sustainable in the long-run.

Recommendations and Future Directions

A consensus across the studies suggests the need for a **multifaceted approach** to improve inclusive education in Kazakhstan:

Curriculum Enhancement – Adding all rounded modules on how to teach diverse students and enhancing the applicability of practical sessions through internships and school links.

Preservice and Inservice Teachers – Proposal to develop courses, training sessions, along with training in the form of workshops, and or mentorship training for both newly trained and existing teachers.

Awareness and Stigma – Advocacy in creating awareness on Inclusive Education, as well as the fight against stigma of disability in the society.

Policy Reforms and Funding – developing and reinforcing the legislation of Kazakhstan to enhance the educational initiatives with references to inclusion; improving the resource provision of professional development of teachers and infrastructural conditions.

Objective 4: What are the major challenges in integrating Education for Sustainable Development (ESD) principles into teacher education programs?

Critical Summary: Challenges in Integrating Education for Sustainable Development (ESD) into Teacher Education Programs

The challenges of integration of Education for Sustainable Development in teacher training in Kazakhstan are numerous because ESD is schemed as a cross-sectoral initiative and there is no systemic approaches used. Currently, there are no existing programs that enable educators to develop the required competencies to within their education practice. Some of the challenges mentioned include; a situation where curricula in use do not align with sustainability goals and students are not adequately supported by the institutions that they attend increase the difficulties in implementing ESD. Further, the students' understanding of sustainability is also limited and incoherent, which can be obtained not through formal education but through such platforms as social networks. To fill these gaps, there should be curriculum changes, cross-disciplinary working, and other faculty development initiatives for sustainable improvement of sustainability education.



Vol. 3 No. 4 (April) (2025)

Way Forward

Embedding Sustainability across Disciplines

There is, therefore, a need for educational policies to incorporate sustainability as a cross-cutting issue and not a mere subject. For instance, in Finland, sustainability is integrated into mathematics, for example, by climate modeling, literature, by discussing the environmental aspects of the books, and science through projects on renewable energy. Kazakhstan can follow similar models by integrating new thinking in teacher education curricula in order to allow teacher to adopt them into their teaching processes.

Experiential Learning and Interdisciplinary Approaches

About teacher education, the following teaching and learning approaches should be adopted in the teacher education programs: Project-based learning, community involvement, and environmental site visits. For example, universities can engage in sustainability projects with other stakeholders in the community including schools on issues of waste management, tree planting exercises involving students and teachers. Combining ideas from different faculties – where professors from various faculties work on sustainability-related concepts that can be integrated into the teachers’ training – can enrich the understanding of the future teachers about sustainable development.

Continuous Professional Development and Reflective Practices

These countries include; Sweden and Germany which ensure that teachers undergo professional development that includes workshops, online learning and peer mentoring. Likewise, the strategies can be implemented in Kazakhstan through conducting training programs where teachers in pre and in-service training be trained on ESD. On the same note, other reflective practices such as sustainability journals and case study analysis can be used in determining the effectiveness of the used teaching strategies in sustainability education.

Strengthening Institutional Commitment and Aligning with Global Standards

Education institutions should implement their frameworks according to the international sustainable standard as provided in the UNESCO ESD framework. Some of the measures include: creation of sustainability centers in universities, incorporation of SDG-based modules in teacher education, and collaboration with international organizations supporting ESD. In this manner, it will be possible for the future educators in Kazakhstan to be equipped with knowledge that will enable them to respond to the challenges relating to sustainability in their teaching and in their society.

Conclusion

Solving the problem of shortage of qualified teachers, the problems with curricula and questions of inclusive education in Kazakhstan calls for an extensive and integrative approach that would imply the cooperation of a number of actors. It emerges that factors such as low remuneration, overwork, and lack of capacity to develop professional capacities contribute to teacher shortages, especially in rural settings. Though efforts have been made in this regard by respective governments but further policy changes, financial



Vol. 3 No. 4 (April) (2025)

motivators, and better institutional arrangements are required to overcome these challenges. This paper recognizes that competing salaries, less paperwork, and specific recruitment plans will be instrumental in increasing teacher retention and recruitment in hard-to-fill areas.

It is equally important to note that the curriculum calls for an update as well. The continuous use of traditional approach of learning and teaching that heavily rely on the use of books and notes makes students fail to develop critical skills in solving various problems that are characteristic of today's competitive global economy. Competency-based learning models must be integrated, there is a need to expand the programs for training teachers, the teacher should integrate tools into the classroom, and a focus on learning through experience should be adopted. Kazakhstan can adopt the best practices from the countries such as Finland and Singapore and perform the large-scale changes in the education sector to meet the requirements of the modern labor market.

Education for all is another area that can still be considered as a work in progress. While there has been a positive development in the policies that promote integration of children with disabilities in school, there is still lack of prepared teachers and support systems to ensure the implementation of the policies. Some of the teachers have not undergone through any training to equip them on how to handle the diversity in the classroom. To overcome these challenges it requires a modification of the teacher education programs by incorporating special training for effective teaching to diverse students, provision of practice sessions, and policies that support the growth of diverse learning.

In general, to improve the educational system in Kazakhstan, it is crucial to employ a comprehensive and integrated approach that implies the active participation of the government, educational institutions, and other relevant stakeholders. Kazakhstan should pay more attention to developing teacher's competitive wages, improving and updating curricula and content, integrating information and communication technologies, and enhancing the focus on inclusion in education to improve the quality of education for the learners as well as the society in the 21st century.

References

- Afzal Tajik, M., Shamatov, D., & Fillipova, L. (2022). Stakeholders' perceptions of the quality of education in rural schools in Kazakhstan. *Improving Schools, 25*(2), 187-204.
- Agavelyan, E., Kalimolda, S., & Zhussupova, R. (2020). Teachers' attitudes towards inclusive education in Kazakhstan. *International Journal of Inclusive Education, 24*(6), 589-606. <https://doi.org/10.1080/13603116.2020.1752823>
- Aimagambetov, A. (2021). Quality Education "Educated Nation" — Aimagambetov speaks about main directions of national project. *Official Information Source of the Prime Minister of the Republic of Kazakhstan*.
- Akhmedjanova, L. (2018). Barriers to modernizing teaching practices in Kazakhstan. *Journal of Educational Reform, 15*(2), 112-130.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Bespalyy, S., Akhrorova, A., Alnazarova, G., Adieva, A., & Petrenko, A. (2024). Issues and perspectives on teacher education for education for sustainable



Vol. 3 No. 4 (April) (2025)

- development in Kazakhstan. *Journal of Sustainable Education*, 22(1), 78-95.
- Broken Chalk. (2023). The Demand for Interdisciplinary and Experiential Learning Approaches in Kazakhstan. Retrieved from <https://brokenchalk.org/the-demand-for-interdisciplinary-and-experiential-learning-approaches-in-kazakhstan/>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education (8th ed.)*. Routledge.
- de Lázaro y Torres, M. L., Sánchez Gómez, M. C., & García Domínguez, J. A. (2024). Implementation of education for sustainable development: Challenges and opportunities in Kazakhstan. *Journal of Sustainability in Education*, 18(2), 45-62. <https://doi.org/10.xxxx/jsed.2024.0025>
- Eurasian Journal of Educational Research. (2021). Integrating International Best Practices in Curriculum Modernization. *Eurasian Journal of Educational Research*, 91, 123-140.
- Ferreira, J.-A., Ryan, L., & Davis, J. (2019). Developing education for sustainable development competences in teacher education. *Environmental Education Research*, 25(1), 51-71. <https://doi.org/10.1080/13504622.2018.1503847>
- IIP Series. (2024). Innovative pedagogies: Adapting teaching strategies for modern learning environments. *International Institute of Pedagogy*, 8(3), 78-95.
- Implementing Inclusive Education in Kazakhstan: Objective Needs and Real Options. (2020). *Journal of Educational Development and Policy Studies*, 12(3), 45-62.
- Issabekov, M., & Yessimkhanova, Z. (2023). Challenges in teacher recruitment and retention in Kazakhstan: Policy implications for sustainable education. *Central Asian Journal of Education Policy*, 12(3), 45-62.
- Kamanga, J. (2023). Educational challenges in Kazakhstan. *Broken Chalk*. Retrieved from <https://brokenchalk.org/educational-challenges-in-kazakhstan-2/>
- Kasa, R., Helmer, J., Somerton, M., Hernández-Torrano, D., & Makoelle, T. M. (2019). Creating conditions for inclusive education in Kazakhstan: A case study of three school-based resource centers in Nur-Sultan City. *Nursultan*.
- Kassenova, A. (2020). Challenges in pedagogical innovation: Examining Kazakhstan's centralized teacher education system. *International Journal of Educational Reform*, 29(3), 215-232.
- Kassenova, A. (2024). Modernizing curricula in Kazakhstan's teacher education: Strategies for global alignment. *International Journal of Educational Innovation*, 15(1), 78-94.
- Kuvandykova, A. (2024). Effective pedagogical approaches in English language teaching: Integrating cultural contexts in Kazakhstan. *Journal of Educational Innovation*, 12(1), 45-62.
- Maksatova, A. (2024). Development of inclusive education for students with disabilities in Kazakhstan. *InterConf+*, (50)(221), 80-87. <https://doi.org/10.51582/interconf.19-20.10.2024.010>
- Makoelle, T. M., & Burmistrova, V. (2021). Transforming teacher education in Kazakhstan: From rote learning to experiential pedagogy. *Journal of Teacher Development*, 26(1), 55-72.



Vol. 3 No. 4 (April) (2025)

- Makoelle, T. M., & Burmistrova, V. (2021). Teacher education and inclusive education in Kazakhstan. *International Journal of Inclusive Education*, 1–17. <https://doi.org/10.1080/13603116.2021.1889048>
- Ministry of Education and Science of the Republic of Kazakhstan. (2022). Strategic Plan for Educational Reform 2022-2026. Astana, Kazakhstan.
- Mukhametzhanova, A., & Duisenbayeva, S. (2021). Barriers to the Implementation of Technology-Enhanced Learning in Kazakhstan. *Eurasian Journal of Educational Research*, 93, 45-60.
- Nazarbayev Intellectual Schools. (2022). *Annual Report 2022: Advancements in Educational Practices*. Astana, Kazakhstan.
- Nugmanova, S., & Alimkulov, T. (2021). Urban-rural disparities in teacher education: Resource allocation and digital infrastructure challenges in Kazakhstan. *Central Asian Journal of Education Policy*, 10(4), 99-118.
- Nurgalieva, R., & Sadykova, T. (2024). Education for Sustainable Development in Kazakhstan: Integrating sustainability into teacher training programs. *Journal of Sustainability and Education*, 8(4), 99-118.
- Organisation for Economic Co-operation and Development (OECD). (2017). *Higher Education in Kazakhstan 2017*. OECD Publishing. Retrieved from <https://www.oecd.org/education/higher-education-in-kazakhstan-2017-9789264268531-en.htm>
- Rakhmatullayeva, G. (2020). Teacher shortage in Kazakhstan: Causes and solutions. *International Journal of Educational Development*, 64, 115-120.
- Rysbekkyzy, G. (2014). Beginning teachers' attrition in secondary schools in Kazakhstan (Master's thesis). *Nazarbayev University, Astana, Kazakhstan*. Retrieved from <https://nur.nu.edu.kz/handle/123456789/786>
- Sagintayeva, A., Smagulova, J., & Abylkassymova, A. (2019). Policy and practice misalignment in Kazakhstan's trilingual and inclusive education initiatives. *Eurasian Journal of Educational Studies*, 14(2), 87-104.
- Sinakou, E., Boeve-de Pauw, J., & Van Petegem, P. (2017). Exploring the concept of sustainable development within education for sustainable development. *Environmental Education Research*, 23(9), 1200–1216.
- Sultanova, R., Zhumabayev, A., & Erkinbayeva, L. (2022). Institutional barriers to pedagogical innovation in Kazakhstan's higher education sector. *Journal of Comparative Education*, 17(1), 44-61.
- Tleubergenova, S., & Omarova, L. (2024). Inclusive education in Kazakhstan: Barriers and opportunities for teacher training. *Eurasian Educational Review*, 10(2), 33-51.
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2023). *Digital Transformation of Education in Central Asia: Progress and Challenges*. UNESCO Publishing.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Zhussupova, R., & Kazbekova, M. (2020). Challenges in aligning educational content with labor market demands in Kazakhstan. *Journal of Educational Development*, 45(3), 215-230.