ORIGINAL RESEARCH

# Quality of education and its role in eliminating gender barriers in Kazakhstan

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*Abstract*

Improving the quality of education and achieving gender equality are considered key conditions for sustainable social and economic development. The study aims to identify the factors influencing gender inequality in Kazakhstan, with an emphasis on the role of the education system in ensuring equal access and reducing differences in the labor market. The study's methodological framework included four stages and relied on quantitative and qualitative data analysis. The quantitative part is based on national statistics data for 2008–2024 and the results of a questionnaire survey of 104 respondents. The qualitative study included the interpretation of individual responses and an assessment of the perception of educational processes. In the first stage, flexplot visualization displayed the data structure and trends. In the second stage, principal component analysis was conducted to reduce the dimensionality of the data and highlight key factors. The third stage was multiple regression analysis aimed at quantitatively assessing the impact of investments in education, digital infrastructure, and economic activity on the level of gender inequality. In the fourth stage, a substantive analysis of the perception of the quality of education and its connection with ideas about equality was carried out. Thus, investments in education and professional development contribute to reducing gender differences, while digital connectivity did not demonstrate a statistically significant impact. Most importantly, educational opportunities and quality teaching were identified as key factors. Moreover, the results revealed that public expectations of the role of education are based on availability and quality of education. Education is expected to remove sociocultural barriers and regional disparities and comply with the labor market requirements.

*Keywords*: education, gender equality, quality, government, digitalization, labor market, tertiary education, Kazakhstan.

## *Introduction*

Gender equality in education and employment is a system-forming factor for sustainable social and economic development. Access to quality educational resources determines the level of professional training, the scale of participation in economic activity, and career opportunities for women and men. Thus, education determines the level of professional training. Therefore, expanding educational opportunities promotes a more equitable resource distribution and long-term social development. However, in many countries, occupational segregation and wage inequality are observed since women face barriers in accessing education. According to UNESCO, 122 million girls worldwide do not attend school, which in the future leads to limited professional prospects for them (UNESCO, 2025). Even those who do receive an education often face gender stereotypes that steer them into traditionally "female" professions such as education, health care, or social work. At the same time, men are more likely to choose technical and scientific fields (STEM).

Gender equality in employment implies equal opportunities for women and men to access jobs, equal pay for work of equal value, and equal conditions for career advancement. However, women still face discrimination in the labour market. The global gender gap in employment is about 25 %, and women are more likely than men to work in the informal sector, where social guarantees and labour protections are absent (International Labor Organization, n.d.). In addition, women are paid, on average, 20 % less than men for doing the same work (Bolotnyy & Emanuel, 2022).

International organizations are actively working to promote gender equality in both education and employment. The UN, within the framework of the Sustainable Development Goals (SDGs), emphasizes the importance of achieving gender equality (SDG 5) and ensuring decent work for all (SDG 8) (Chigbu & Nekhwevha, 2023). The ILO develops standards and recommendations to combat workplace discrimination and promote equal pay for work of equal value (ILO, 2025). The World Bank finances projects to improve

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women's access to education and the labour market. UNESCO and UNICEF support programs that help girls receive quality education and overcome cultural barriers. In developed countries, such as the European Union, the United States, Canada, and Australia, gender equality in education has already been largely achieved. Women in these regions often have a higher level of education than men and make up most university students. Despite expanding access to education for women worldwide, there remains a significant gap between educational opportunities and economic participation. The developed support of women's economic activity has not led to a proportionate reduction in gender inequality in the labor market. Structural differences in income levels, representation in managerial positions, and the distribution of family responsibilities remain persistent. In China and India, despite an increase in the number of women with higher education, the participation rate in formal employment remains low: in China, women make up about 40 % of the workforce, while in India, they are less than 25 %. The growth of educational indicators does not remove structural barriers to equal access to economic opportunities. In the United States and Canada, the development of targeted programs to increase the participation of women in STEM fields is aimed at overcoming gender disparities in the professional sphere. On the contrary, the experience of Sweden and Norway showed that participation has a crucial impact on the labor market. Moreover, high rates of gender equality in employment in Scandinavian countries are due to social policies, including paid parental leave, incentives for the equal distribution of family responsibilities, and institutional support for equal opportunities in the labor market (China Briefing, 2025). By 2030, the gender gap in education is expected to be virtually eliminated in these countries, but changes in employment will be slower due to cultural barriers (International Monetary Fund, 2022). In Latin America, such as Brazil and Argentina, women already make up the majority of university students, but they still face discrimination and low pay in the labor market. In the CIS countries, including Kazakhstan, gender equality in education has already been achieved at the primary and secondary levels, but challenges remain in higher education and employment (UNDP, 2017). In Kazakhstan, women make up the majority of university students, but they face discrimination and limited career opportunities in the labour market. In countries such as Uzbekistan and Tajikistan, girls' access to education is limited in rural areas.

*Literature review*

The quality of higher education is a key factor influencing socio-economic development. Accessibility to higher education, satisfaction with educational processes, digitalization, and the impact of education on wages play a decisive role in overcoming gender barriers. Countries that have succeeded in the global economy have actively invested in education, providing equal opportunities for all social groups, due to the need to revise educational standards so that they not only provide academic knowledge but also help overcome gender stereotypes that limit women's professional opportunities. Thus, Little and Green (2009) showed, using the example of the educational systems of China, India, Kenya, and Sri Lanka, that education affects economic growth, which is accompanied by social stability and equality. Moreover, sustainable development requires educational programs that develop critical thinking and social responsibility. Mogensen and Schnack (2010) proposed the concept of "action competence" in education for sustainable development to form in students' knowledge and the ability to participate in social change actively. However, achieving quantitative equality in access to education is not enough to eliminate gender barriers. According to Aikman et al. (2011) curricular content, pedagogical practices, and gender stereotypes in educational materials limit women's choice of professions and career paths, subsequently affecting wage levels and career opportunities. Therefore, sustainable development is impossible without considering educational policies, which must be integrated into broader economic and social processes (Mensah, 2019). De Matos Pedro et al. (2020) noted that investing in higher education increases regions' competitiveness and promotes social mobility.

Economic factors and deeply rooted cultural and social norms limit women's access to higher education. Renn (2017) identifies three main mechanisms through which women's educational institutions provide educational opportunities to women: legal, financial, and cultural. Women's colleges play an important role in countries where cultural and religious traditions limit women's participation in coeducational institutions. (Koskinen Sandberg et al., 2017). Newman (2020) noted that hereditary social hierarchies and patriarchal attitudes limit women's educational and professional opportunities. Thus, expectations of early marriage and notions of "noble work" hinder further education and employment. Atria et al. (2020) found that despite formal equality of opportunity, de facto barriers related to background and network continue to play a decisive role. Women's access to economic, social, and cultural capital is critical for their educational and career opportunities (Didier, 2021). Kille et al. (2022) showed that even with high levels of education, women in rural areas face a lack of network connections and limited access to financial resources, which complicates

realizing their career ambitions. Saeed et al. (2023) and Aftab et al. (2023) found that key barriers include financial constraints, cultural norms such as a lack of female schools, absence of female teachers, poor quality of education, early marriage, and restrictions on women's movement, and lack of transport infrastructure. Even with institutional support, women face pressure from their families and society that limits their educational prospects.

Learning satisfaction depends on teaching methods, quality of teacher interaction, digital educational technologies, and student interaction. Teaching methodology plays an important role in shaping learning satisfaction, as gender differences can affect the perception of the educational process, and female and male students perceive the course structure differently: women are more focused on the course design, and men are more focused on emotions and interest in the topic (Chen et al., 2016). Also, different teaching methods have a significant impact on student satisfaction. Pedro et al. (2018) found that the perception of the quality of teaching and interaction with teachers and the adaptation of teaching methods to the different needs of students are key determinants of learning satisfaction. In addition, Li (2019) found that previous learning experience, age, and education level also affect course perception and student satisfaction. Thus, individual educational strategies can also influence the quality of online and traditional learning, which is especially important in the digitalization of education. Therefore, student satisfaction is influenced by teaching excellence, curriculum, and administrative services (Khan et al., 2022). Wong and Chapman (2023) highlighted student interaction in formal and informal settings as a key factor that universities should not only improve the quality of teaching but also create a favourable learning environment that promotes engagement and social inclusion. Simply providing access to technology is not enough to close the digital divide since, without the appropriate skills and motivation, people cannot take advantage of the benefits of digitalization. Digitalization of education is a complex process that can both reduce and increase social inequalities. The COVID-19 pandemic has exacerbated existing inequalities, making access to digital technology critical for work, education, and social interactions. Macevičiūtė and Wilson (2018) distinguish three levels of the digital divide: access to technology, digital skills, and the ability to benefit from digital content. Lack of digital literacy and limited access to the internet lead to increased social inequalities, which requires the development of digital skills and improved infrastructure (Beaunoyer et al., 2020; Sima et al., 2020; Umbara et al., 2020). Therefore, age, income, and education influence the digital divide (Durand et al., 2021). Including digital tools in the educational process requires a comprehensive approach, including teacher training, the development of students' digital competencies, and modernizing infrastructure (Timotheou et al., 2023).

The literature review showed that the quality of education plays a key role in shaping gender equality, but its impact is multilayered and depends on many factors. Four key indicators were identified: accessibility of higher education, satisfaction with education, the impact of digitalization, and the impact on wages. Access to higher education for women emerged as a fundamental factor, due to financial, cultural, and institutional barriers. Nevertheless, expansion of access to higher education or education overall does not always eliminate gender differences in employment and wages (Zheng & Weeden, 2023). Satisfaction with education turned out to be an important indicator, as the perception of the educational process affects the choice of a professional path, self-confidence, and career ambitions, which is reflected in their future career opportunities. Digitalization turned out to be a dual factor: on the one hand, it expands access to education, and on the other, it exacerbates digital inequality, creating new barriers for socially vulnerable groups. The impact of education on wages confirmed that even with higher education, women earn less due to labour market segregation, undervaluation of "female" professions, and glass ceiling effects.

### Methods

In recent years, the modernization of quality assurance systems in higher education has become increasingly reliant on data-driven methodologies and advanced analytical tools. This study adopts a structured four-step approach — data collection, current situation analysis, Principal Component Analysis (PCA), and regression analysis — to evaluate the factors influencing gender inequality and the impact of investments in education, information and communication technologies, and professional activities (Fig. 1).

Figure 1. Research methodology

*Note — compiled by the authors*

At the first step, data were collected through a survey method that provided quantitative insights into respondents' perceptions and attitudes towards gender equality in education. The survey was administered online and in person, depending on participants' preferences and accessibility. The study has involved 104 respondents from various regions of Kazakhstan. Participants were selected through a purposive sampling to ensure a representation from diverse socio-economic backgrounds, geographical locations, and educational levels (Table 1).

Table 1. Survey Components and Corresponding Questions

| Component | Quesstions |
|---|---|
| 1. Accessibility of Higher Education | How do you assess the accessibility of higher education in Kazakhstan? |
| | In your opinion, how significantly does an increase in tuition fees affect the demand for education? |
| | To what extent do you believe the government of Kazakhstan should prioritize the development of higher education? |
| | What should the education system change to make it more in demand? |
| 2. Impact on Wages | In your opinion, what is the impact of having a degree on employment and income in Kazakhstan? |
| | How important is having a degree for a successful career in modern Kazakhstan? |
| 3. Satisfaction with Education | Are you satisfied with the quality of education in Kazakhstan? |
| | Are you satisfied with the teaching methodology in Kazakhstan? |
| 4. Impact of Digitalization | How do you assess the impact of digital technologies on the quality and accessibility of higher education? |
| | Digital technologies (online courses, platforms, electronic libraries) make education more accessible and practical. Do you agree with this statement? |
| *Note — compiled by the authors* | |

The questionnaire's structure was developed based on a thematic synthesis of previous empirical studies that examined the relationship between education, gender equality, and socio-economic outcomes. The four components — accessibility of higher education, impact on wages, satisfaction with education, and impact of digitalization — were derived from the key dimensions identified in the literature.

The accessibility of higher education component reflects the influence of financial, institutional, and cultural constraints on women's access to education, as highlighted in the works of Renn (2017), Atria et al. (2020), Saeed et al. (2023), and Kille et al. (2022). The impact on the wages component was informed by studies such as Aikman et al. (2011) and Newman (2020), which underline the relationship between education and professional opportunities and persistent wage inequality despite educational attainment. The satis-

faction with the education component questions were developed based on the studies of Pedro et al. (2018), Li (2019), and Khan et al. (2022), who emphasized the importance of teaching methods, student-teacher interaction, and institutional services in shaping student satisfaction and future ambitions. Finally, the impact of digitalization was conceptualized based on research by Beaunoyer et al. (2020), Macevičiūtė and Wilson (2018), and Timotheou et al. (2023), which collectively describe the dual role of digital technologies in expanding access and reinforcing digital inequality.

These components were operationalized through structured questions to capture respondent perceptions using a five-point Likert scale. The questionnaire thus integrates theoretical insights and empirical indicators to assess how higher education contributes to gender equality in Kazakhstan.

The sample has comprised individuals of both genders, including students, parents, teachers, and educational policymakers, who have provided valuable insights into the quality of education and its impact on gender equality in Kazakhstan. Also, data from 2008 to 2024 were collected through the Bureau of National Statistics, Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Investments in fixed capital by areas of professional, scientific, and technical activities and education were collected. Moreover, it also included the share of the economically active population of working age, the proportion of mobile phone users by gender, and the gender inequality index.

In the second stage of the analysis, the flexplot method was used to visualize individual observations, smoothed regression dependence, and confidence intervals. Flexplot provided a representation of the data structure and variations within the time series to record possible non-linear changes in the gender inequality index.

In the third stage, the principal component analysis was used to reduce the multicollinearity of the original data set of 104 observations. PCA was used to eliminate multicollinearity between the variables and identify the key factors determining differences in the structure of responses.

In the final stage, multiple regression analysis was conducted to quantitatively assess the impact of investment in information and communication technologies, the level of Internet access, economic activity, and gender inequality. The methodology ensured a deep analysis of the degree of influence of each factor on changes in the inequality index and provided a basis for the subsequent interpretation of the results.

### Results and Findings

Updating the quality assurance system of higher education in Kazakhstan involves analyzing factors that determine the availability of educational services, the level of student satisfaction, the economic results of educational activities, and social conditions, including gender inequality. By integrating digital technologies and robust data analysis, this study explores:

1. The role of investments in education and professional activities.
2. The impact of digitalization on key indicators, such as economic equity and accessibility.
3. Public perceptions of education quality, collected through surveys, to align reforms with societal needs.

The combination of flexplot, PCA, and regression analysis enables the identification of critical patterns and relationships that inform policy recommendations for digital transformation in the higher education sector.
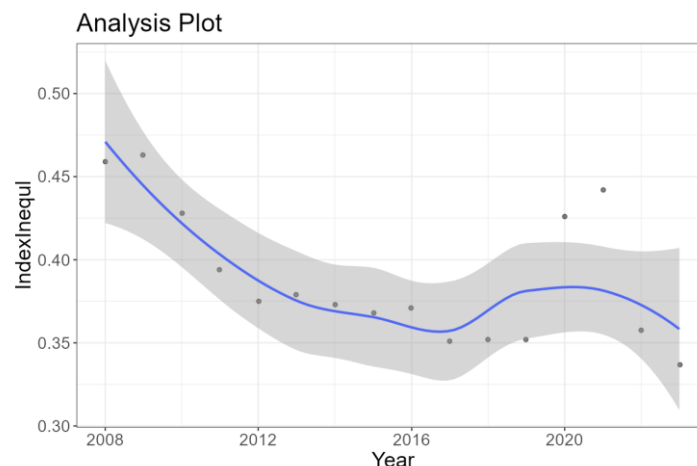


Figure 2. Flexplot of gender inequality index

*Note — compiled by the authors*

In Figure 2, the flexplot shows the relationship between the variable gender inequality index, which is shown as index inequality, and year (ranging from 2008 to 2024). From 2008 to approximately 2014, the inequality index shows a clear declining trend, indicating a consistent reduction in inequality over this period. Between 2014 and 2020, the trend stabilized, with some fluctuations around the midpoint. After 2020, moderate volatility in the gender inequality index's dynamic is observed, with a continuing downward trend. The recorded widening of the confidence interval at the extremes of the time series results showed an increase in the estimates' uncertainty. The smoothed trajectory reflects three stages of dynamics: a steady decline (2008–2014), stabilization (2014–2020), and subsequent volatility with a weak downward trend.

PCA was applied to survey data from 104 respondents to identify latent dimensions that summarize public perceptions of education quality, accessibility, and digitalization's impact on wages. The analysis's result is shown in Table 2.

Table 2. Principal Component Analysis

|  | Value | Df | P |
|---|---|---|---|
| Model | 16.038 | 2 | <0.001 |
| *Note — compiled by the authors* | | | |

This table shows the value of the test statistic corresponding to the number of parameters under study. At the same time, a p-value less than 0.001 indicates an extremely low probability that the observed effect is random, i.e., the result is statistically significant. Thus, components identified through the analysis are reliable, reflect the data's structural features, and contribute significantly to explaining the variation of the variables under study.

Next, in Table 3, the results for component loadings are presented.

Table 3. Component loadings

| Component | RC1 | Uniqueness |
|---|---|---|
| Accessibility of higher education | 0.846 | 0.284 |
| Satisfaction with education | 0.845 | 0.286 |
| Impact of digitalization | 0.826 | 0.318 |
| Impact on wages | 0.815 | 0.336 |
| *Note — compiled by the authors* | | |

According to Table 2, the chi-squared test for the PCA model yielded a statistically significant result (**χ² = 16.038, Df = 2, p < 0.001),** indicating that the model effectively captures the underlying structure of the data. All variables demonstrated a strong relationship, as their coefficients exceeded 0.8, which indicates that they were correctly selected to form the latent indicator. Each variable separately makes a significant contribution, strengthening the overall effect, and, in particular, changes in the indicators of accessibility and satisfaction have a particularly noticeable impact on the perception of the effectiveness of higher education. However, the results showed that, according to respondents, the quality of higher education is closely tied to its accessibility. This suggests that improvements in accessibility may contribute to higher levels of overall satisfaction with the education system. Thus, accessibility and satisfaction indicated extreme interdependence. It is worth noting that the results also revealed the significance of the variable "Impact of digitalization" (0.826) in forming the perception of the economic results of higher education by society. Thus, the studies showed that digital tools and technologies significantly improve graduates' employment and income levels. Consequently, society suggests that the integration of technologies in education is crucial. Moreover, integrating digital technologies in modernizing the educational environment forms positive economic prospects. The variable Impact on wages (loading = 0.815) indicates that respondents view the value of higher education and digitalization through their economic benefits. This connection emphasizes the need to align educational reforms with labour market demands. The low uniqueness values for all variables indicate that most of their variance is explained by RC1. The low uniqueness values for all variables indicate that most of their variance is explained by RC1.

Data from 2008 to 2024, collected from the Bureau of National Statistics, includes investments, demographics, and technological adoption metrics, providing a macro-level context for the study. Before the regression was conducted, the assumptions for the suitable model were checked, as shown in Figure 3.
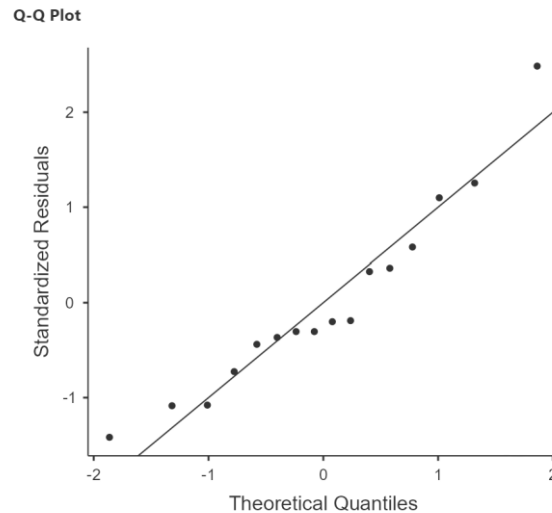
Figure 3. Q-Q plot of regression

*Note — compiled by the authors*

The Q-Q plot indicates that the regression model is well-suited for analyzing the factors influencing higher education quality and economic outcomes in Kazakhstan. The horizontal axis represents the theoretical quantiles expected if the residuals followed a normal distribution, whereas the vertical axis represents the observed standardized residuals from the regression model. The straight diagonal line represents the expected trend if the residuals are normally distributed. Since the points closely following this line indicate that the residuals approximate a normal distribution. The Q-Q plot supports the validity of the regression analysis, meaning the insights derived (e.g., the role of digitalization in improving education quality or reducing inequality) can be considered reliable. Policymakers can confidently use these findings to guide investments and reforms in higher education.

Investments in education and ICT play a critical role in reducing gender disparities, demonstrating the importance of digitalization in fostering equity. These findings support the argument that modernizing higher education quality assurance requires integrating investments with digital reforms. Regression analysis was conducted to evaluate how investments in education, ICT, professional/scientific activities, and demographic and technological factors influence the gender inequality index (IndexInequl) (Table 4).

Table 4. Result of regression analysis

| Predictor | Estimate | SE | T | P-value |
|---|---|---|---|---|
| Intercept | –22.67 | 18.62 | –1.217 | 0.251 |
| Prof_science | $4.91\,e^{-4}$ | $1.56\,e^{-4}$ | 2.681 | 0.023 |
| Education | $-7.19\,e^{-4}$ | $2.47e^{-4}$ | –2.911 | 0.016 |
| PeractiveW | –4.795 | 1.75 | –2.738 | 0.021 |
| Year | 0.0134 | 0.0098 | 1.377 | 0.199 |
| Prop of mobile users, Women | $-6.87\,e^{-4}$ | 0.0039 | –0.176 | 0.864 |
| *Note — compiled by the authors* | | | | |

In Table 2, the regression analysis examines the impact of investments and other factors on the gender inequality index (IndexInequl). Below is the interpretation of each predictor's result, its relevance, and justification for inclusion in the analysis.

The results obtained confirm that investments have a positive and statistically significant impact on reducing gender inequality, contributing to the expansion of opportunities for qualified specialists and the development of innovative potential. This contribution is particularly important in research and technology fields, as well as supporting equal access to high-skilled employment.

Additionally, investments have a negative impact on the Gender Inequality Index, which demonstrates the importance of higher education for increasing access to information and opportunities for women and underrepresented groups. Higher education is essential for economic mobility and social development, while at the same time, it is a crucial tool. The presence of a negative correlation between the share of the working-

age population and the level of gender inequality indicates that increased labor force participation helps to reduce the gender gap. This confirms the importance of involving both men and women in economic activity.

The optimistic estimate suggests a slight increase in gender inequality over time, but the non-significance indicates that this trend is not strong enough to draw firm conclusions. Including the year allows for tracking long-term trends and capturing potential systemic changes affecting gender inequality, even if not statistically significant in this case.

The proportion of mobile users among women shows no significant effect on gender inequality in this model. This suggests that, on its own, mobile usage does not directly influence the gender gap. Including mobile usage helps assess the role of digital connectivity in addressing inequality. While it is not significant in this analysis, it remains a relevant factor in broader digital access and equity discussions.

This regression analysis demonstrates that investments in education, professional activities, and workforce participation significantly contribute to reducing gender inequality. The empirical results have shown the need to strengthen the role of certain areas in modernizing higher education in Kazakhstan. Although individual variables such as mobile device usage and timeframe have shown little statistical significance in isolation, their inclusion demonstrates the importance of digital processes and institutional transformation in the long term. Based on these findings, this paper identifies modernization approaches, mechanisms, and data platforms based on data analysis to promote equality and improve educational quality. The results obtained correspond with the goals of reforming higher education to achieve socially significant outcomes, such as ensuring gender equality. As noted earlier, investments in education and professional development play a significant role in training human potential, promoting social mobility, and eliminating institutional barriers. While the impact of digital access, as measured by the use of mobile devices, may be limited, its integration into educational practices has the potential to contribute to increased inclusivity through improved access to knowledge.

Therefore, the modernization of higher education in Kazakhstan should focus on a differentiated approach that combines the development of educational programs with the integration of digital technologies in order to support social inclusion.

While digital access (as measured by mobile users) was insignificant, its integration with education systems could still play an important role in fostering inclusivity through improved access to resources and knowledge.

*Conclusion*

The study results showed that significant changes had been made. Thus, Kazakhstan has made significant progress in ensuring access to higher education. However, gender inequality persists, especially in employment and digital access. According to the analysis, access to education was a key factor influencing gender equality, confirming its importance. Notwithstanding, some negative results were observed, which showed the real state of actions toward gender equality. First, investment in education showed a negative relationship, indicating inefficient allocation of funds or maintaining educational programs that do not contribute to eliminating the gender gap. Future studies should consider regional approaches and analyze the differences within regions of Kazakhstan. Therefore, the study results showed that targeted funding for programs to achieve gender equality is required to expand opportunities for women in high-paying sectors. Satisfaction with education also plays a significant role. Despite broad access to higher education, women often experience limitations in choosing professions and career opportunities, which decreases their satisfaction with the educational process (Abbas et al., 2021). Thus, a reform of curricula is required. One of the directions may be the introduction of mentoring initiatives and changes in ideas about gender roles in the professional sphere. Despite being an important factor in the analysis, digitalization of education did not show a significant relationship between the share of women using mobile technologies and gender equality. Thus, access to digital resources alone does not eliminate barriers. Consequently, digital inequality in Kazakhstan is associated with infrastructure and insufficient digital literacy among women, especially in rural areas. One of the key approaches is access to online education.

The impact of education on wages has also confirmed its significance, but the data show that even with women's high economic activity, a significant income gap remains. Women face difficulties in career growth, the "glass ceiling" effect, in which women receiving an education do not have equal opportunities to advance to high-paying positions.

Thus, despite Kazakhstan's achievements in providing educational opportunities for women, barriers remain in the labor market, the digital space, and professional development.

Investments in education are not a sufficient solution since the distribution of funds requires a targeted approach and monitoring.

### References

(2017). United Nations Development Programme. *Gender and employment in the South Caucasus and Western CIS. undp.org.* Retrieved from https://www.undp.org/sites/g/files/zskgke326/files/migration/eurasia/GenderandEmploymentin-theSouthCaucasusandWesternCIS.pdf

(2022). International Monetary Fund. *Tackling gender inequality: Definitions, trends, and policy designs* (IMF Working Paper No. 2022/232). *imf.org.* Retrieved from https://www.imf.org/en/Publications/WP/Issues/2022/12/16/Tackling-Gender-Inequality-Definitions-Trends-and-Policy-Designs-525138

**(2025). UNESCO.** *Gender equality in education. unesco.org.* Retrieved from https://www.unesco.org/en/gender-equality/education

Abbas, F., Abbas, N., & Ashiq, U. (2021). Glass Ceiling Effect and Women Career: Determining factors in Higher Education Institutions. *SJESR,* 4(1), 1–8. https://doi.org/10.36902/sjesr-vol4-iss1-2021(1-8)

Aftab, M.J., Ali, H.H., & Bashir, R. (2023). The Cultural Barriers Faced by Women in Acquiring Higher Education in Tribal Areas of Pakistan: A Case of Dera Ghazi Khan. *IUB Journal of Social Sciences,* 5(1), 82–94. https://doi.org/10.52461/ijoss.v5i1.1500

Aikman, S., Halai, A., & Rubagiza, J. (2011). Conceptualizing gender equality in research on education quality. *Comparative Education,* 47(1), 45–60. https://doi.org/10.1080/03050068.2011.541675

Atria, J., Castillo, J., Maldonado, L., & Ramirez, S. (2020). Economic elites' attitudes toward meritocracy in Chile: A moral economy perspective. *American Behavioral Scientist, 64*(9), 1219–1241. https://doi.org/10.1177/0002764220941214

Beaunoyer, E., Dupéré, S., & Guitton, M.J. (2020). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in human behavior, 111*, 106424. https://doi.org/10.1016/j.chb.2020.106424

Bolotnyy, V., & Emanuel, N. (2022). Why do women earn less than men? Evidence from bus and train operators. *Journal of Labor Economics, 40*(2), 283–323. https://doi.org/10.1086/715835

Chen, S.C., Yang, S.J., & Hsiao, C.C. (2016). Exploring student perceptions, learning outcome and gender differences in a flipped mathematics course. *British Journal of Educational Technology, 47*(6), 1096–1112. https://doi.org/10.1111/bjet.12278

Chigbu, B.I., & Nekhwevha, F. (2023). Exploring the concepts of decent work through the lens of SDG 8: addressing challenges and inadequacies. *Frontiers in Sociology, 8,* 1266141. https://doi.org/10.3389/fsoc.2023.1266141

China Briefing. (2025). *Gender equality in China's labor market 2025. china-briefing.com.* Retrieved from https://www.china-briefing.com/news/gender-equality-in-chinas-labor-market/

de Matos Pedro, E., Leitão, J., & Alves, H. (2020). Bridging intellectual capital, sustainable development and quality of life in higher education institutions. *Higher Education Institutions and Sustainable Development, 217.* https://doi.org/10.3390/su12020479

Didier, N. (2021). Does the expansion of higher education reduce gender gaps in the labor market? Evidence from a natural experiment. *International Journal of Educational Development, 86*, 102467. https://doi.org/10.1016/j.ijedudev.2021.102467

Durand, A., Zijlstra, T., van Oort, N., Hoogendoorn-Lanser, S., & Hoogendoorn, S. (2021). Access denied? Digital inequality in transport services. *Transport Reviews, 42*(1), 32–57. https://doi.org/10.1080/01441647.2021.1923584

International Labour Organization. *Breaking barriers: Unconscious gender bias in the workplace.* ILO. *webapps.ilo.org.* Retrieved from https://webapps.ilo.org/infostories/en-GB/Stories/Employment/barriers-women#women-preference

Khan, S., Zaman, S.I., & Rais, M. (2022). Measuring student satisfaction through overall quality at business schools: a structural equation modeling: student satisfaction and quality of education. *South Asian Journal of Social Review, 1*(2), 34–55. https://doi.org/10.57044/SAJSR.2022.1.2.2210

Kille, T., Wiesner, R., Lee, S.Y., Johnson Morgan, M., Summers, J., & Davoodian, D. (2022). Capital factors influencing rural, regional and remote women's entrepreneurship development: An Australian perspective. *Sustainability, 14*(24), 16442. https://doi.org/10.3390/su142416442

Koskinen Sandberg, P., Törnroos, M., & Kohvakka, R. (2017). The institutionalized undervaluation of women's work: The case of local government sector collective agreements. *Work, employment and society, 32*(4), 707–725. https://doi.org/10.1177/0950017017711100

Li, K. (2019). MOOC learners' demographics, self-regulated learning strategy, perceived learning and satisfaction: A structural equation modeling approach. *Computers & Education, 132*, 16–30. https://doi.org/10.1016/j.compedu.2019.01.003

Little, A.W., & Green, A. (2009). Successful globalization, education and sustainable development. *International Journal of Educational Development, 29*(2), 166–174. https://doi.org/10.1016/j.ijedudev.2008.09.011

Macevičiūtė, E., & Wilson, T.D. (2018). Digital means for reducing digital inequality: Literature review. *Informing science: the international journal of an emerging transdiscipline, 21*, 269–287. https://doi.org/10.28945/4117

Mensah, J. (2019). Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent social sciences, 5*(1), 1653531. https://doi.org/10.1080/23311886.2019.1653531

Mogensen, F., & Schnack, K. (2010). The action competence approach and the "new" discourses of education for sustainable development, competence and quality criteria. *Environmental education research, 16*(1), 59–74. https://doi.org/10.1080/13504620903504032

Newman, A. (2020). Honour, respectability and "noble" work: descent and gender-based obstacles to the education and employment of young Haalpulaar women in northern Senegal. *Children's Geographies, 18*(6), 654–666. https://doi.org/10.1080/14733285.2020.1743820

Pedro, E., Mendes, L., & Lourenço, L. (2018). Perceived Service Quality and Students' satisfaction in Higher Education: the Influence of Teaching Methods. *International Journal for Quality Research, 12*(1), 165.

Renn, K.A. (2017). The role of women's colleges and universities in providing access to postsecondary education. *The Review of Higher Education, 41*(1), 91–112. https://doi.org/10.1353/rhe.2017.0034

Saeed, S., Ahmad, S., Mushtaq, F., & Samiullah, M. (2023). Barriers and Challenges Faced by Rural Females in Accessing Higher Education in Punjab, Pakistan. *Harf-o-Sukhan, 7*(3), 661–668. Retrieved from https://harf-o-sukhan.com/index.php/Harf-o-sukhan/article/view/947

Sima, V., Gheorghe, I.G., Subić, J., & Nancu, D. (2020). Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review. *Sustainability, 12*(10), 4035. https://doi.org/10.3390/su12104035

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S.V., Giannoutsou, N., Cachia, R., Martínez Monés, A. & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and information technologies, 28*(6), 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

Umbara, I.A.A.P., Sujana, I.W., & Negara, I.G.A.O. (2020). Model Pembelajaran Problem Based Learning Berbantuan Media Gambar Seri Berpengaruh Terhadap Kompetensi Pengetahuan IPS Siswa. *Mimbar Ilmu, 25*(2), 174–186. https://doi.org/10.23887/mi.v25i2.25154

Wong, W.H., & Chapman, E. (2023). Student satisfaction and interaction in higher education. *Higher education, 85*(5), 957–978. https://doi.org/10.1007/s10734-022-00874-0

Zheng, H., & Weeden, K.A. (2023). How gender segregation in higher education contributes to gender segregation in the US labor market. *Demography, 60*(3), 761–784. https://doi.org/10.1215/00703370-10653728