

RAPID FORESIGHT FOR ALIGNING REGIONAL EDUCATION WITH LABOUR MARKET NEEDS: EVIDENCE FROM THE MANGYSTAU REGION

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Abstract. This article examines the alignment between the labor market needs of the Mangystau Region and the capacity of the regional education system to provide targeted professional training. The main objective of the study is to integrate Foresight methodology into regional educational standards in order to enhance the quality, relevance, and practical orientation of workforce training, taking into account the dynamics of the region's socio-economic development. The study employed a mixed-methods design combining quantitative and qualitative approaches. At the preliminary stage, a comprehensive regional analysis was conducted, followed by a survey of more than 700 respondents and semi-structured interviews with representatives of key stakeholders. In addition, a Rapid Foresight workshop was organized with the participation of 79 experts representing various sectors of the economy and education. As a result, eight educational programs were analyzed and modernized, 46 key regional trends were identified, and prospective areas for competency development were determined. The study also initiated the development of an Atlas of New and Emerging Professions adapted to the specific characteristics of the regional economy. The findings demonstrate that systematic forecasting of human capital needs can be effectively integrated into regional education planning. In this regard, incorporating Foresight methods into educational benchmarking contributes to increasing the flexibility of educational programs and preparing highly qualified professionals who directly respond to the strategic needs of the regional economy.

Key words: foresight session, Atlas of New Professions, regional educational standards, career guidance, personnel, educational programs, Mangystau region.

Introduction

Kazakhstan is undergoing significant transformations in education, science, professional development, and its economic landscape. To enhance its global competitiveness alongside the world's foremost economies, a decision was made last year to split the existing Ministry of Education and Science of the Republic of Kazakhstan into two distinct entities. The Ministry of Science and Higher Education of the Republic of Kazakhstan now focuses specifically on promoting science, enhancing Kazakhstan's scientific and technological capabilities, managing the higher education system, and overseeing personnel training initiatives.

Foresight, originating from the English word «foresight», meaning to look into the future, is a collaborative technique. It empowers stakeholders to collectively formulate projections for an industry, region, or nation's advancement. Furthermore, it facilitates the alignment of strategies to realize the preferred future state, informed by these projections [1].

Originally successful in technological applications, Foresight subsequently gained traction within the business sector and eventually in the social domain, beginning in the 1990s. This text will explore the application of Foresight to provide long-term forecasting within the realm of education. The nature of the assessment of the future condition of the studied objects has some peculiarities in Foresight projects. First, there is variability in assessing the future, probability, and scenario, which is best reflected in the concept of «probing» the future [2]. The second important aspect of Foresight is its broad format of participation, which involves relying on the research and assessments of experts from various specialties and fields of activity. The system of experts' interaction reflects another feature of Foresight - its process nature, which allows us to figuratively define it as an «evergreen process» [3]. The openness of Foresight attracts all new participants to it, spreading ideas in the social

environment. The specifics of Foresight are also related to its fundamentally complex nature. This implies a high culture of modeling a complex, developing world, mastery of a unique methodology for working with complex objects, and the ability to make joint decisions in interdisciplinary projects and expertise. In Western countries, the number of experts in various specialties involved in Foresight projects is estimated in the tens and hundreds of thousands.

The dawn of the 21st century has witnessed a growing reliance on Foresight methodologies in examining social structures, events, and ongoing developments. This pattern resonates both globally and specifically within our nation. Currently, Kazakhstan faces considerable pressure to adopt innovation and navigate the transition to a knowledge-driven economy. Foresight tools offer the capacity to chart a strategic developmental course, spanning anywhere from 15 to 100 years. Nonetheless, even a 30-year outlook poses substantial challenges stemming from uncertainties inherent to Kazakhstan's future. Questions regarding the country's trajectory and global standing remain complex. While technologically advanced nations with robust, knowledge-intensive economies are tackling these issues with cutting-edge innovation, Kazakhstan, unfortunately, consistently lags in terms of innovation progress relative to developed nations [4].

Consequently, we are witnessing the emergence of a novel technological landscape where transformations occur with accelerating speed. The information acquired through conventional educational pathways, across a number of specialized fields, rapidly becomes outdated even during the process of earning formal qualifications. Simultaneously, the typical bachelor's degree programs span a duration of 3 to 4 years. Consequently, graduates may not align with market demands after graduation. Certain nations, along with major corporations, have taken the lead in developing emerging technologies. Thus, it becomes imperative to cultivate experts who will be sought after not just today, but also in a 5- to 10-year horizon. The employment of a forward-thinking HR model is critical to our unprecedented efforts to train personnel with skills for the future. Currently, 20 project offices have been established within regional universities to concentrate on addressing these critical concerns. It is crucial for us that certified specialists who are proficient in Foresight management become available across all regions. In this particular regard, the Mangystau region and Yessenov University have taken pioneering roles within Kazakhstan [5].

At the university, the first foresight school was conducted for employees. These specialists can analyze the region through surveys and interviews, foresight sessions, and demonstrate their first work in the form of the first atlas of new professions in the Mangystau region. To date, foresight sessions have been held in three industries. In the future, Yessenov University will cover even more branches of the Mangystau region. Atlases for each industry serve as the basis for the development of new educational programs. These programs are in line with regional educational standards, which we define as a set of specifications for the competencies, learning outcomes, and content of educational programs that were created taking into account the Mangystau region's labor market demands, strategic priorities, and socioeconomic needs. Leading industry experts have stated that these programs will be innovative and in demand in the labor market, and a need for these professions and competencies [6].

Materials and methods of research

This study employed a convergent parallel mixed-methods design to align the educational offerings of the Mangystau region with regional labor market demands. The mixed-methods framework integrated quantitative data (mass stakeholder surveys) and qualitative measurements (expert interviews and a Rapid Foresight session). Quantitative data served to identify broad baseline perceptions, socio-economic expectations, and career tendencies among local stakeholders, while qualitative data provided expert insight into strategic industry shifts, technological drivers, and emerging professional roles. Data integration occurred at the synthesis phase, where empirical survey findings and structural economic analyses informed the strategic foresight mapping and curriculum updating processes.

Participants and Sampling

The empirical sample was divided into two main categories: regional stakeholders and industry experts.

- **Regional Stakeholders (Quantitative and Qualitative Baseline):** A convenience sampling strategy was utilized to recruit over 700 respondents, comprising regional residents, applicants, students, higher education and vocational education (VET) faculty, and local employers. In addition, target secondary school students underwent professional orientation diagnostics (\$N = 13,863\$) utilizing the standardized EduNavigator.kz digital platform based on Holland's RIASEC framework.

- **Expert Panel (Rapid Foresight and Validation):** Purposive sampling was applied to select regional experts representing key economic drivers (oil and gas, chemical and petrochemical industries, transport and logistics, tourism, and education). A total of 96 experts participated across different stages: 79 specialists actively engaged in the intensive multi-sectoral Rapid Foresight workshop sessions, while an additional panel of 17 senior pedagogical and industry experts performed the subsequent validation and auditing of updated educational programs.

Data Collection was conducted through multiple complementary instruments:

Structured Questionnaires: Administered to the regional sample to assess current career guidance efficiency, perceived skill mismatches, and socio-economic expectations. The questionnaire utilized a 5-point Likert scale alongside structured categorical questions.

Semi-Structured Interviews: Conducted with key regional stakeholders to extract thematic insights into localized labor market challenges and industry transformation trends.

Standardized Career Diagnostics: Psychometric data on vocational inclinations were gathered via Holland codes processed through the EduNavigator platform.

Strategic Document and Economic Auditing: Secondary data, including regional economic development plans and statistical indicators, were benchmarked to identify core target sectors.

Rapid Foresight Procedure. The Rapid Foresight methodology was structured into three sequential operational phases:

Phase 1: Trend Identification and Environmental Scanning: Analysts and experts mapped macro- and micro-trends affecting the region, categorizing technological, social, economic, and regulatory drivers over a 3- to 10-year horizon. Forty-six critical regional trends were identified.

Phase 2: Interactive Foresight Sessions: Working in sector-specific groups (oil and gas/petrochemistry, tourism, education/pedagogy), 79 sector experts engaged in moderated collaborative mapping. Participants projected future industry threats, skill requirements, and functional role transformations, resulting in the conceptualization and substantiation of 39 emerging professions relevant to the local economy.

Phase 3: Curriculum Benchmarking and Atlas Synthesis: Experts mapped identified emerging roles against existing educational frameworks, resulting in the evaluation and modernization of eight regional higher and vocational education programs and the formal structuring of the regional *Atlas of Emerging Professions*.

Data Analysis

Quantitative Analysis: Survey response data were processed using descriptive statistics (frequencies, percentages, mean distribution) to outline demographic tendencies and stakeholder perceptions.

Qualitative Analysis: Data derived from semi-structured interviews and Rapid Foresight session transcripts underwent thematic analysis. Qualitative responses were coded, categorized into overarching trend domains, and mapped against competence frameworks to establish new professional profiles and update educational standards.

Ethical Considerations. The study adhered to standard academic ethical practices. All survey and interview participants were informed of the research objectives and provided voluntary informed consent. Respondent anonymity and data confidentiality were strictly maintained; individual diagnostic results and survey answers were aggregated and anonymized before analysis [7].

Results and its discussion

For this purpose, a survey of educational workers was conducted, which was attended by 256 representatives of organizations of secondary, technical and vocational, higher, and postgraduate education [8].

An analysis of the opinions of education workers in the Mangystau region shows that the overwhelming number of respondents consider it necessary to acquire new professional skills, including the modernization of general and vocational education, the formation of a system of continuous updating of professional knowledge of working citizens and mastering competencies in the field of the digital economy (see Figure 1).

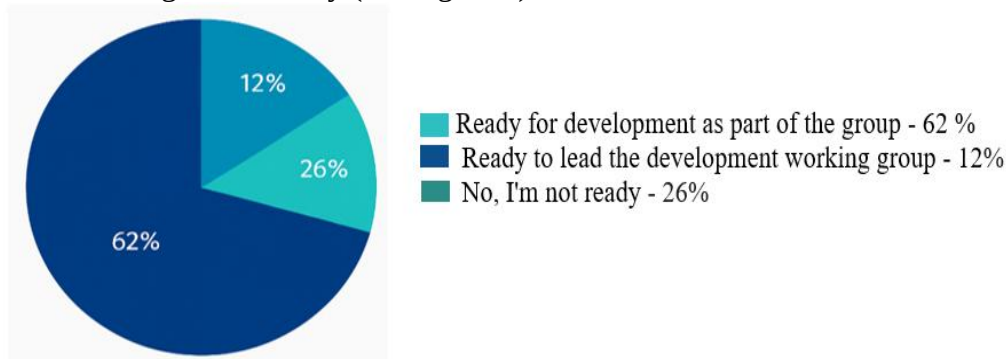


Figure 1. Willingness of participants to participate in the development of new courses/specialties

Thus, the pedagogical staff of the region is prepared to provide support and actively participate in the implementation of the Atlas of New Professions in the region's educational practice (Fig. 1). Overall, the favorable ratings totaled 73%. They expressed their willingness to coordinate and implement new directions: 61% and 12% of teachers agreed to work as part of working groups on the development of new educational programs. Due to the high current workload, 27% of respondents in the Mangystau region expressed a dissenting position.

In the course of the study, a rating of the most promising professions was determined based on regional characteristics and challenges in the labor market (Fig.2). The rating of selected professions according to this indicator is placed in the following order.

First of all, the professional community of educators identifies such specialties as «coordinator of inclusive education» (60%); «organizer of project training» (59%), «IT librarian» (52%) and «head of IT modernization» (51%) as the most in demand (Atlas of new professions and competencies of Mangystau region, 2023).

In the second place in the rating, according to the respondents, there were less promising specialties: «Creative Writing tutor» (26%), «online meeting coordinator» (25%), «online course producer» (24%). The rating of the most promising specialties for the Mangystau region is presented in Figure 2.

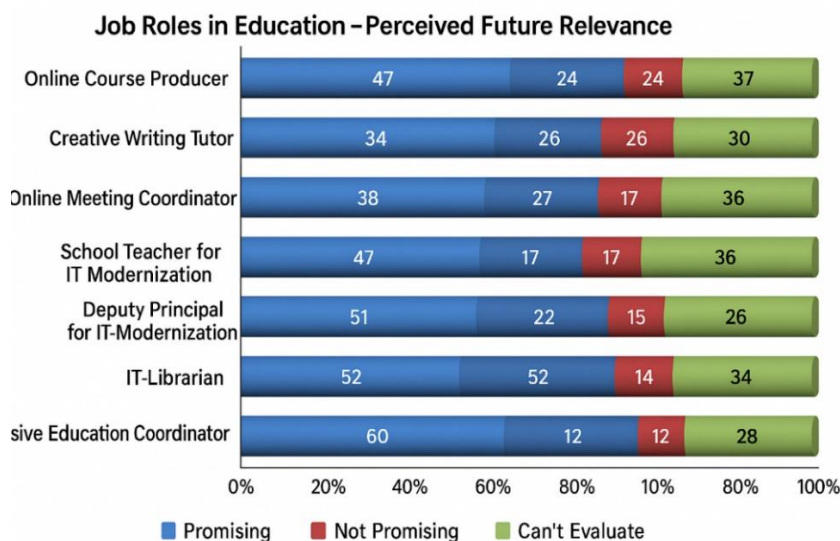


Figure 2. The rating of the most promising specialties for the Mangystau region (%)

It is worth noting that these professions create certain difficulties for the survey participants in assessing their future in the ranking of professional preferences in the region. In our opinion, this indicator does not mean a complete abandonment of specialties, but indicates the minimum priority for implementation in the first place and the need for more thorough research for further inclusion in the educational program [9].

Mangystau teachers consider the need to develop and introduce new specialties appropriate for the following reasons: to receive new grants (41.3%), to increase the influx of new students and schoolchildren (29.8%), to develop pedagogical technologies and skills (53.3%), to increase the overall rating of the educational institution (NPP Atameken) (27.7%), for better interaction with the business of the region (26.4%), for the business of the region - To reduce the outflow of talented students from the region (30.2%) and increase the number of business contracts for the implementation of educational and research projects (24%), graduates need to engage in business in the region (37,2%) [10].

Conclusion

Thus, the analytical work carried out to study the opinion of the teaching community on the atlas of new professions showed a high willingness of representatives of Mangystau educational institutions to participate in the work on the formation and promotion of a map of regional personnel needs. A promising area of competence in education will be the use of digital tools, the development of technologies for personalizing and personalizing the learning process, etc. Using the «quick wins» change implementation model, proposals have been made to launch pilot projects in the most sought-after professions immediately.

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RAPID FORESIGHT ТЕХНОЛОГИЯСЫН АЙМАҚТЫҚ БІЛІМ БЕРУ СТАНДАРТТАРЫ МЕН ДАЯРЛАУ БАҒДАРЛАМАЛАРЫН ӘЗІРЛЕУДЕ ҚОЛДАНУ

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Андатпа. Мақалада Маңғыстау облысы еңбек нарығының қажеттіліктері мен өңірлік білім беру жүйесінің мақсатты кәсіптік даярлықты қамтамасыз ету мүмкіндіктерінің өзара сәйкестігі зерттеледі. Зерттеудің негізгі мақсаты – өңірдің әлеуметтік-экономикалық даму динамикасын ескере отырып, кадрларды даярлаудың сапасын, өзектілігін және практикалық бағыттылығын арттыру мақсатында Foresight әдіснамасын өңірлік білім беру стандарттарына енгізу. Зерттеу сандық және сапалық әдістерді үйлестіретін аралас зерттеу дизайны негізінде жүргізілді. Алдын ала кезеңде өңірге кешенді талдау жасалып, 700-ден астам респондент арасында сауалнама жүргізілді және мүдделі тараптардың өкілдерімен жартылай құрылымдалған сұхбаттар ұйымдастырылды. Сонымен қатар, экономика мен білім берудің түрлі секторларынан 79 сарапшының қатысуымен Rapid Foresight семинары өткізілді. Зерттеу нәтижесінде сегіз білім беру бағдарламасына талдау жасалып, олар жаңғыртылды, өңірлік 46 негізгі тренд анықталды, құзыреттерді дамытудың перспективалық бағыттары белгіленді, сондай-ақ өңірлік экономиканың ерекшеліктеріне бейімделген жаңа және перспективалы кәсіптер Атласын әзірлеу бастамасы қолға алынды. Зерттеу нәтижелері адами капиталға қажеттілікті жүйелі түрде болжауды өңірлік білім беруді жоспарлау үдерісіне тиімді интеграциялауға болатынын көрсетті. Осыған байланысты Foresight әдістерін білім беру бенчмаркингіне енгізу білім беру бағдарламаларының икемділігін арттыруға және өңір экономикасының стратегиялық қажеттіліктеріне тікелей жауап беретін жоғары білікті кадрларды даярлауға ықпал етеді.

Түйін сөздер: форсайт сессиясы, жаңа мамандықтар Атласы, аймақтық білім беру стандарттары, кәсіптік бағдар беру, кадрлар, білім беру бағдарламалары, Маңғыстау облысы.

ПРИМЕНЕНИЕ RAPID FORESIGHT В РАЗРАБОТКЕ РЕГИОНАЛЬНЫХ ОБРАЗОВАТЕЛЬНЫХ СТАНДАРТОВ И ПРОГРАММ ПОДГОТОВКИ

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Аннотация. В статье исследуется соответствие между потребностями рынка труда Мангистауской области и возможностями региональной системы образования в обеспечении целевой профессиональной подготовки. Основная цель данного исследования заключается во внедрении методологии Foresight в региональные образовательные стандарты для повышения качества, актуальности и практической направленности подготовки кадров с учетом динамики социально-экономического развития региона. Исследование проведено с использованием смешанного дизайна, сочетающего количественные и качественные методы. На предварительном этапе был осуществлен комплексный региональный анализ, проведено анкетирование более 700 респондентов и полуструктурированные интервью с представителями заинтересованных сторон. Кроме того, был организован семинар Rapid Foresight с участием 79 экспертов из различных секторов экономики и образования. В результате исследования были проанализированы и модернизированы восемь образовательных программ, выявлены 46 ключевых региональных трендов, определены перспективные направления развития компетенций, а также инициирована разработка Атласа новых и перспективных профессий, адаптированного к особенностям региональной экономики. Результаты исследования демонстрируют, что систематическое прогнозирование потребностей в человеческом капитале может быть эффективно интегрировано в процесс регионального планирования образования. В этой связи внедрение методов Foresight в образовательный бенчмаркинг способствует повышению гибкости образовательных программ и подготовке высококвалифицированных кадров, непосредственно отвечающих стратегическим потребностям региональной экономики.

Ключевые слова: форсайт-сессия, Атлас новых профессий, региональные образовательные стандарты, профориентация, кадры, образовательные программы, Мангистауская область.