DOI:10.59787/2413-5488-2024-47-3-140-153

[1, 3] Marina Skiba,[2] Yermek Makash, [3]Amantay Nurmagambetov,
[3] Amina Mukhambetova, [3, 4]Aidos Mukhatayev

[1] Almaty Management University
[2] Ministry of Education and Science of the Republic of Kazakhstan
[3] Higher Education Development National Center
[4] Astana IT university

INNOVATIONS FOR INNOVATIONS: WHAT EDUCATIONAL PROGRAMS SHOULD BE LIKE

Abstract: The changing economic structure, the emergence of innovative technologies, the growing importance of sustainable development, social challenges, and the need to find new non-standard solutions have predetermined the need for a new type of professionals in the labor market. Consequently, new requirements are imposed on universities to prepare graduates capable of solving the problems of the innovative economy. The approach to developing academic excellence through the development and implementation of innovations is becoming a marker of the quality of education. Universities can ensure that graduates achieve learning outcomes only through innovative educational programs.

The article analyzes the understanding of the concept of "innovative educational programs". The authors studied the interpretation used in regulatory acts, scientific publications. Based on the analysis of publications, they developed a classification of innovations in education. To clarify the understanding, a survey of educational program developers and top management was conducted, based on which the perception of the academic community was identified, and distinctive characteristics were formulated.

Keywords: higher education, innovation, innovation in education, classification of innovations, educational programs, innovative educational program, academic excellence.

Introduction

Innovations are inextricably linked with changes, their emergence occurs with the aim of resolving contradictions and eliminating shortcomings, to improve the current state with minimal costs. Innovations in education occupy a special place in the development of the economy. Education, unlike other sectors of the economy, has a dual nature - in addition to the fact that it itself can be an area that attracts finances and creates profits, it also helps to improve human potential for other sectors of the economy.

The competitiveness of states is achieved through the academic excellence of universities. Since 2023, the Ministry of Science and Higher Education of the Republic of Kazakhstan has been implementing an academic excellence program in higher education. The academic excellence program is aimed at achieving three strategic goals: (1) improving the quality of higher and postgraduate education and the competitiveness of universities; (2) strengthening the educational and scientific potential of universities; (3) building up the institutional potential of universities and developing an institutional culture. Considering the implementation of a large-scale initiative of the Ministry, the implementation of innovative educational programs by universities is becoming particularly relevant in light of achieving academic excellence in educational activities.

The change in the technological structure, digitalization and increase in the information flow, expansion of the world from local to global, cross-cultural intersections and changes in meanings, the desire to accelerate the transition of Kazakhstan to the post-industrial have led

to the emergence of a need in society and the labor market for a professional with universal competencies at the junction of areas, with responsibility and the ability to make decisions, as well as high social responsibility. Digitalization, sustainable development, globalization, changes in the economic structure, exacerbation of social conflicts and stratification of society, the transition from consumption to responsible consumption - all these trends are reflected in the social demand of society for universal professionals - university graduates. Generation Z is distinguished by a high level of ambition and self-sufficiency, inflated career expectations, the desire to immediately take a decent position. However, employers' express dissatisfaction with graduates of traditional universities since the demands of the labor market are now at the junction of various areas of human activity and scientific research.

To ensure the quality of education in Kazakhstan, a transition was made from quality control to quality assurance, from certification to accreditation. Since 2019, the registration of all educational programs in the national Registry has begun. This Registry is moderated by the National Center for Higher Education Development. The Registry defines three types of educational programs: current, new and innovative. As part of the creation of Academic Excellence Centers based on regional universities, it is expected to develop innovative educational programs. At the same time, the concept of "innovative educational programs" is not enshrined in the Law on Education of the Republic of Kazakhstan, which is one of the types of uncertainty since it is used intuitively. The lack of clear criteria for determining the type of educational program creates difficulties in determining its type when including in the registry, as well as when excluding from it. The purpose of this article is to project the understanding of innovations onto the educational sphere, develop a classification of innovations in education, clarify the understanding of "innovative educational programs" in the context of the strategy for changing the educational system. The article attempts to systematically present the current state of the spectrum of innovative educational programs of Kazakhstani universities.

Methods and organization of the study

In accordance with the goals and objectives of the study, at the first stage a review of the literature devoted to the issues of innovation in general and innovation in education in particular was conducted. The study was conducted based on studying publications that consider issues and approaches to the implementation of innovations in education and the development of educational programs in the modern conditions of technological change. The article proposes a classification of types of innovations in education based on the object of the emergence of innovations. Consistently revealing the logic of the emergence of the concept from innovations through innovations in education to an innovative educational program, the authors clarified the understanding of the concept. After studying the publications, the authors conducted a questionnaire survey aimed at identifying the understanding of the concept of "innovative educational programs" by developers. The survey involved 873 respondents - developers of educational programs and top management of universities.

All participants in the survey and in-depth interview gave their informed consent to voluntarily participate in the study before taking part in it. Interviews and discussions were recorded and processed. Survey responses were automatically stored, summarized, and processed using statistical and qualitative methods. Only study organizers had access to data.

The authors clarified the content of the concept of "innovative educational program" (hereinafter IEP) based on an analysis of publications and the results of an analysis of the results of a survey of educational program developers. The authors analyzed the developers' perception of the term "innovative educational program". Monitoring innovative educational programs included in the Register allowed them to assess their connection with the industry Atlases of new professions and competencies. After that, a broad discussion was held during the Republican seminar for developers of educational programs. During the discussion, special

attention was paid to the specifics of developing the IEP, interaction with the region, the use of innovative teaching, learning and assessment methods. The results of the discussion served as the basis for the discussion and reflection of the authors of the publication, based on which recommendations were developed.

The results of the study and discussions

Innovations in Education

The development of society and the economy occurs through the emergence and spread of innovations. At one time, such breakthrough innovations as the invention of writing, printing, the advent of electricity, computerization and digitalization became bifurcation points for information revolutions. Innovations by their nature become drivers of economic development, ensuring the emergence of new products, goods, services, and processes. Post-industrial society has shifted the emphasis from corporations to universities as a place where new knowledge and new human resources appear, ensuring the competitiveness of states in new activities (Bell, 2020).

The concept of "innovation" in a positive connotation became a necessary criterion for the success of entrepreneurial activity and economic growth in the early 20th century in the works of Joseph Schumpeter (Schumpeter & Swedberg, 2021). He identified five types of innovations associated with the emergence of a new product or service, changes in production technology, the opening of new market niches, a new source of raw materials or materials, and improvement of the organization of production.

The reasons for the emergence of innovations may be external circumstances that force us to find and implement a new solution. In this case, innovations are reactive. And in contrast to them, there are (Lucia et al, 2022; Goldyakova, 2006, etc.) proactive or strategic innovations, reflecting a free creative meaningful desire to create something new to achieve the intended goals. According to the functional feature and area of application, the following types of innovations are distinguished: technical, technological, organizational, and managerial, informational, social. The scale and duration of the changes caused by the innovation determine whether the innovation will be:

- strategic, tactical, operational, or situational,
- revolutionary/radical, improving, modifying,
- systemic or fragmentary/partial,
- long-term, medium-term, and fast/short-term.

The innovation life cycle (Husig et al, 2021) consists of the following stages: development, industrial production, marketing, logistics, diffusion, routinization, service. Evans & Berman (2002) identify seven stages of innovation promotion, including: innovation generation, product evaluation, concept testing, economic analysis, product development, test marketing, commercial implementation.

Researchers - economists (Urban et al, 1993), relying on the specifics of marketing activities, identify the following stages of innovation implementation: identification of market opportunities, design of a new product, its testing, implementation, and management. The main emphasis is on the dissemination of innovation to make a profit or achieve a socially significant goal.

Modern recommendations for collecting and analyzing data on innovation are reflected in the 4th edition of the Oslo Manual, which is a joint publication of the OECD and Eurostat (OECD / Eurostat, 2018). The Guide emphasizes that innovation can be both the result of a project and an activity / process and provides the following understanding. "An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)". This publication provides a classification

of innovations by areas of innovation implementation: product and service development, production of goods, provision of services, marketing and sales, digital technologies, administration and management, business process engineering. Projecting this understanding of innovations onto the education sphere, considering its specifics, the following conclusion can be made. Thus, an innovative educational program can be understood as a new product or service that differs significantly from educational programs offered on the market. Since education (Lovelock, 2005) refers to the type of services that are carried out within the framework of the learning process with the active participation of the consumer, innovative educational programs represent a symbiosis of product and process innovation.

Understanding innovation applies to all areas of human activity, including education. At the same time, education is one of the conservative areas of the economy since the classroom-lesson method has remained unchanged since the time of Jan Amos Kamensky. At the same time, according to Westera (2004), technological innovations and high competition stimulate strategic changes in education and the accompanying innovations in education. At the same time, education is the foundation of a country's competitiveness and a precursor to the emergence of innovations (Barrichello, 2020; Looney, 2009; Zagvyazinsky, 2007). Education responds to the uncertainty of economic development, social challenges and complex changes in society, the economy, and the technological order through the emergence of novel approaches in education, creating new systems of learning and teaching based on technology. Thus, education changes through innovation, creating a phenomenon called Education 4.0 (Ramirez-Montoya et al, 2022). The number of publications in the RSCI (as of July 25, 2024) with the keyword "innovations in education" is 1734, considering the translation 2241, "innovative educational program" is only ninety-one titles. A search for publications in Google Scholar with the keyword "innovation in education" offers more than 32.7 thousand results. And with the keyword "innovative educational programme" - more than 17.1 thousand. Therefore, we can conclude that this area of research is insufficiently developed in the Russian-language research segment, including in the countries of Central Asia.

Stepanenko (2012) emphasizes that "any activity in any field can be innovative if something new is added to it, including knowledge, technologies, techniques, approaches, in order to obtain a result in demand by society" - a service or product. The innovation process has the following characteristics (Makarova, 2015). It is inherent in:

- objective nature, as it arises as a result of the influence of the historical context and objective laws of development of society,
- probabilistic nature,
- risky nature,
- systemic nature,
- communicative nature,
- interdisciplinary nature.

The innovation process and the innovation implementation process are often used as synonyms in research publications (Stepanenko, 2012). Although in essence these are two different concepts. The innovation process is a process of an enterprise or organization during which an innovative product or service is created, or an activity (including marketing, management, organizational processes, etc.) is implemented in an innovative, non-classical way. The innovation implementation process refers to the reengineering of enterprise and organization processes, which involves the incorporation of innovation into an activity or a product basket, assuming the transfer of innovation from a unique (Biloshchytskyi et al, 2021) project to an everyday routine process. The innovation implementation process, according to several scientists, is a component of the innovation process.

Analysis of innovation implementation processes (Stepanenko, 2012) made it possible to compare the linear and interactive/chain models, revealing the advantages of the latter. The

chain model provides for the presence of feedback between the related stages of implementation and dissemination of innovations. The scope of the linear model is innovation with precisely defined development programs that do not contain ambiguity and uncertainty.

The main way to implement innovation (Mandic et al, 2010) is technological innovation related to digitalization, the introduction of multimedia, distance, and asynchronous learning. Westera (2004) formulated four principles of innovation in education: transparency and interactivity of educational technologies, the socio-cultural significance of products, the importance of values that go beyond efficiency and political bias associated with technology.

It should be noted that as the economic development of society decreases, the time of both the emergence and dissemination of innovations is reduced, which is a period in the first case between the emergence of an idea and an innovative product, in the second case between the emergence of an innovative product and its mass distribution. Namely, mass distribution is the criterion for transferring an innovation to the status of everyday life/routine. Consequently, universities must promptly respond to breakthrough innovations through their educational programs and processes. In addition, it is important to determine the criteria for the transition of educational innovations to routine, everyday processes. As well as the very order of transition of innovations in education into everyday practice.

Educational innovation (Jacobs, 2000) is understood as a new practice or activity that has not yet been implemented in a specific academic context or has been implemented to a limited extent, but is aimed at developing, improving, increasing the relevance, or responding more quickly to the needs of the educational program, learning and teaching processes. At the same time, over the past two decades, the issues of defining, measuring, and evaluating innovations in education have been the focus of both individual studies and international and national agents (Halacz, 2018; Jacobs 2000; Foray & Raffo, 2014; Roberts & Owens, 2012). Summarizing these studies and turning to the theory of innovation, it can be noted that innovations in education are characteristic of all stages of the life cycle of educational products and services. Innovations in universities play a key role in the adaptation of educational organizations to a rapidly changing world (Gutierrez & Baquero, 2017). They help improve the quality of education, increase the effectiveness of research, and ensure more active interaction with society and the labor market. Most studies of innovation in education focus on the processes initiated by innovation agents (accreditation agencies, national agencies, curriculum developers, research groups, etc.). These innovation agents (Halasz, 2018) interact in various spaces and contexts, solving problems, creating innovative solutions, or adapting existing solutions. A significant part of the solutions concerns process innovation and involves the implementation of technological solutions based on digitalization. Innovations related to the emergence of a new educational product and, as a result, innovations in the field of new content of educational programs occur less frequently.

Although each innovation is an idea that differs from existing practice, innovations differ in their scale, involvement of resources and processes, adaptation, or revolutionary changes (Earl & Timperlry, 2015). Innovations are often unpredictable, which is why the project approach is one of the ways to implement innovations. Verification and validation help reduce the risks of implementing innovations. Innovations in universities can be classified according to various criteria, including their nature, scale, scope, and goals. At the same time, the development of digital technologies has naturally reflected in the introduction of innovations into the learning process itself, changing the methods of teaching and learning. Summarizing several of the above publications, the following classification of innovations in education can be proposed:

1. Innovations in the design of educational products

– Design of educational content, using foresight of learning outcomes that will be in demand in the future.

- Development of flexible curricula that can be adapted to the needs of students and the labor market, including the creation of interdisciplinary courses and programs.
- Design of educational programs based on an atlas of new professions and competencies.
- Design of individual educational trajectories for students, considering both the needs of society and the labor market, as well as their desires and capabilities.

2. Innovations in the implementation of educational products/services:

–digitalization of the educational process has led to the creation of new educational technologies: online learning, blended learning, interactive platforms, and mobile applications for learning. This also includes the use of virtual and augmented reality to create an immersive learning experience.

–Use of active, heuristic teaching methods that involve learning through projects, learning through research, dual learning.

–Reorientation of assessment methods from knowledge assessment to assessment of learning outcomes: essays, project work, portfolio and self-assessment, demonstration exams.

3. Innovations in opening new niches in the educational services market.

- The emergence of educational marketplaces
- Massive online open courses – Coursera, etc.
- Creation of online universities by international corporations – Microsoft, Google, Yandex.
- Involvement of banks in the educational process.

4. Innovations in enhancing the human potential of teachers and their support:

- Creation of centers for consulting and supporting teachers.
- Cascading KPI for each teacher.
- Definition of individual plans for professional and personal development of the teacher based on diagnostics and attendance of classes.

5. Research innovations:

- Interdisciplinary research through the creation of research centers that bring together scientists from different fields to solve complex problems (e.g. sustainable development, health and technology).
- Application of open science principles, including access to data and publications and experimental data, which contributes to the wider dissemination of knowledge.
- Creation of laboratories and incubators for the development of modern technologies and products that can be commercialized.
- Artificial intelligence as a means of data analysis, source search and situation modeling.
- Conducting virtual experiments based on models of processes and phenomena.

6. Managerial innovations:

- Implementation of new corporate governance models that ensure transparency of decision-making, such as decentralization, student participation in management.
- Use of digital tools to understand the specifics of processes and decision-making, to improve the efficiency of administrative processes.
- Development of new funding models, such as crowdfunding for scientific projects or partnerships with the private sector.

7. Social innovations:

–Activities and projects aimed at interacting with local communities, for example through volunteer projects or joint research, as well as the emergence of the university for the city model.

–Development of programs and initiatives aimed at supporting students from different social groups, including people with disabilities.

–Accessibility of education, ensuring the opportunity to receive an education for students from different social groups and with different income levels.

8. Technological innovations:

- Digitalization of processes through the implementation of a learning management system (LMS), automation of administrative processes, documentation systems.
- Use of big data and decision-making to improve the quality of education and educational results, predicting student success based on the results of using analytical tools.
- Use of artificial intelligence to create individual educational trajectories, support the learning process.

9. Innovations in creating an educational environment:

–Inclusive environment.

–Creation

–Virtual environment, mixed reality.

–Green technologies and resource saving.

–Availability of information and educational content 24/7.

–Psychological and social support.

10. Ecological innovations:

–Implementing sustainability practices on campus, such as renewable energy, recycling programs, and green spaces.

–Assessing the degree of environmental friendliness through the Greenmetrics ranking of "green universities."

–Incorporating sustainability topics into curricula and research projects.

The given classification of innovations in education allows us to determine the type of innovation and develop a system of measures and a roadmap for their implementation and implementation corresponding to the type of innovation. If we talk about the implementation of innovations in education, we are talking about projects that change the current situation and the projected future. The innovativeness of strategies for organizing education allows us to ensure their contrast and effectiveness.

In higher education, there are several target groups for whose needs innovations appear. Each of these groups has its own expectations and needs, which in turn determines the directions of innovative solutions. Thus, we can propose the following classification of innovations in education, depending on the stakeholders.

Table 1

Classification of innovations in education depending on stakeholders.

Stakeholders	Expectations	Innovative solutions
Students	Access to quality education and relevant knowledge. Flexibility in learning (online formats, blended learning, different learning paces, individual trajectory). Opportunities for practical application of knowledge (internships, projects). Support in career growth and employment.	Implementation of online courses and educational platforms. Development of interactive educational materials and applications. Creation of internship programs and partnerships with companies. Micro-qualifications. Minors. Credit transfer and recognition of acquired competencies. Professional certifications. Use of virtual and augmented reality technologies for practical classes. Access to educational content and information resources 24/7 from anywhere. Artificial intelligence as a tool to support the learning process. Career counseling and support after graduation. Upgrade of diploma and

		competencies. Educational podcasts. Dual education.
Faculty members	Support in developing professional skills. Access to modern teaching methods and technologies. Opportunities for scientific research and publications. Academic freedom and freedom of creativity and research.	Conducting trainings and seminars on new teaching methods. Creating centers for developing competencies and support. Implementing platforms for exchanging experience and resources between teachers. Encounter groups. Creating open research centers and laboratories based on universities and enterprises. Financing the participation of teachers in professional and research dialogue platforms. Mentoring. Coaching. Individual programs for personal and personal development. Win-win tactics in cascading the university development strategy. Motivation and incentive programs.
Top management of universities	Effective management of resources and processes. Increasing the competitiveness of the university. Improving the quality of education and student satisfaction. Favorable image of the university. Productive relations with the Ministry of Science and Higher Education and local executive bodies.	Implementation of learning management systems (LMS) to automate processes. Decision-making based on big data. Continuous monitoring of processes. Using analytical tools to evaluate the effectiveness of programs. Development of strategies to attract students and improve the image, PR & GR strategies.
Employers	Training of universal specialists who meet the requirements of the labor market in terms of regional needs. Training of a socially responsible professional who is able to work in a team and make decisions. Readiness of universities to cooperate in the field of internships, practices and involvement of practitioners in the educational process. Readiness of universities to conduct research on solving the problems of enterprises.	Creation of joint educational programs with employers. Development of practice-oriented training courses. Integration of professional advanced training courses and professional certification into the educational programs of universities. Organization of job fairs and employment events at universities. Introduction of modular training, allowing students to choose courses that meet the requirements of employers. Development of educational programs based on professional standards and Atlases of new professions and competencies.
Government bodies	Ensuring quality education and compliance with standards. Increasing the country's competitiveness. Solving the problems of personnel shortages for the needs of the regions and unemployment. Smoothing out the asymmetry between the needs of the region and, on the other hand, the expectations, desires and capabilities of graduates. Supporting regional initiatives in the academic environment and involving them in their solution. Loyalty to the leadership of the region, industry and country.	Development of national programs for digitalization of education. Implementation of quality and accreditation standards. Support of grant programs for research in the field of education.

Each target group in higher education has its own unique expectations that require appropriate innovative solutions. The success of innovation depends on the ability of universities to adapt to the needs of these groups and actively involve them in the change process.

However, all innovations are ideally aimed at one common goal - meeting the market demand for in-demand personnel, which is achieved through the quality of education. And, therefore, at implementing an approach to achieving academic excellence by Kazakhstani universities through the development and implementation of innovations.

Innovations in education do not exist separately, they are interconnected and united by educational goals, content and process.

An innovative educational program can be considered as a product and process innovation at the same time. Product innovation in the context of an educational program includes the creation of new courses, teaching materials, teaching technologies or assessment methods. Process innovation concerns changes in the methods and processes by which training and management of the educational process are carried out. It may include management of the educational process, information, including feedback, reflection and external assessment.

Product and process innovations in education are closely related. A new educational program (product) requires changes in the processes of its implementation. For example, the introduction of an online course requires new approaches to interaction with students and to the organization of teaching and learning processes. Focusing on one of the sides can lead to risks. For example, if the emphasis is only on the creation of new educational programs without changing the processes of their implementation and assessment, this can lead to low efficiency of training.

In a rapidly changing uncertain world, it is important not only to develop new educational programs, but also to be ready for their rapid adaptation. This requires flexibility in processes and flexibility in the use of resources. It is necessary to take into account that innovations may not always lead to an improvement in the quality of education. It is important to analyze the need and effectiveness of the changes being introduced. The introduction of innovations may encounter resistance from teachers and students, which emphasizes the need for cultural transformation in the educational environment.

Within the framework of academic activity, it is the educational program that is the place for the implementation of innovations. The very concept of an educational program is broader (Maritz, et al, 2014) than its content, with which it is often identified. The educational program itself is an innovation in education, so it should be considered as a symbiosis of the educational product/service and the process of its implementation - the educational process from the perspective of the cultural approach. An innovative educational program (Chandra et al, 2021, Kupriyanov, 2020) is presented as a combination of innovative educational content and innovative program implementation process.

One of the tools for creating innovative educational programs is foresight, which allows you to design the future based on expert opinions. The involvement of a wide range of Kazakhstani experts and representatives of the labor market made it possible to create 9 industry Atlases of new professions and competencies in the Republic of Kazakhstan in 2020 and move on to the development of Regional Maps. The creation of the Atlas of New Professions stimulated the development of innovative educational programs (IEP). The Atlas made it possible to combine the real needs of the labor market and new industry challenges. Considering the development priorities of the regions, OHPEs carry out development, providing for new learning outcomes. Since 2019, 262 innovative educational programs have been developed in 49 Kazakhstani universities (data as of March 1, 2024). In May 2022, the NCRE based on Toraigyrov University held a Republican seminar, after which the number of IEPs in the country increased more than seven times. At the same time, the growth of IEPs occurred due to regional universities, regional universities (199 IEPs) are significantly ahead of national universities (63 IEPs).

The Register of Educational Programs was created in 2019 to ensure the quality of education through verification of the content of education. The Register is posted on the

Unified Platform of Higher Education of the Ministry of Science and Education of the Republic of Kazakhstan. The total number of educational programs in the Register as of June 30, 2024, was 8212 programs, of which 534 were innovative (6.5% of the total number of EPs). The 103% increase in the number of educational programs over 3 months reflects the systemic policy of the Ministry of Education and Science and regions to develop Atlases and Regional Maps of New Professions, as well as the participation of pedagogical universities in the "Finnish project" aimed at developing IEPs in the field of education. As of August 9, 2024, 648 IEPs (out of 8422) have already been included in the Register. Over the past 2 years, until March 2024, 161 innovative programs were included in the Register, and 86 innovative programs were excluded, 85% of which were due to the lack of a contingent of students.

These facts indicate that the procedure for developing innovative programs has not been sufficiently developed, which has led to their lack of demand and irrelevance. The presence of an IEP is becoming a key factor in shaping the University brand, an integral part of the strategy and is becoming the KPI of rectors and vice-rectors for academic work.

Currently, the understanding of the IEP as a term and criteria for including an educational program in the Register as innovative does not contain clear criteria but is carried out on the basis of an assessment of the program by three experts of the National Center for Education Development. The rules for maintaining the register of educational programs (order of the Ministry of Education and Science of the Russian Federation dated October 12, 2022, No. 106) propose to include a program in the Register as innovative if it has no analogue in the Republic of Kazakhstan, is being implemented by the applicant for the first time and has successfully passed the examination of three experts. The examination of the educational program provides for an assessment of the focus on new types of activities, the priority of economic sectors and the region, a high level of demand for the profession, and a focus on economic development. The expert community periodically undergoes training, participates in the development of the IEP and discussion of the content of the programs at meetings of the Academic Council of the University and the Educational and Methodological Associations of the Republican Educational and Methodological Council of the Ministry of Science and Higher Education.

To study the opinion of the Kazakh educational community, a survey of universities was conducted, based on which innovative educational programs are implemented. 873 representatives of the OHPE took part in the survey concerning the qualitative characteristics of the IEP, of which 67.2% participated in the development of the IEP, 72.5% in the implementation. The survey was conducted on a ten-point scale. The survey proposed to determine the influence of criteria on the innovativeness of the EP, to determine the significance of external and internal factors that ensure its innovativeness.

The respondents included the following criteria characterizing the process of developing innovative educational programs:

- Developing an educational program based on the needs of a region/country - 10 points 50.6%, 9 points - 14.9%.
- Involving partner enterprises and representatives of the labor market in developing the innovative educational program - 46.6% and 16.2%.
- Involving partner enterprises and representatives of the labor market in developing the innovative educational program - 46.2% and 14.8%.
- Developing an educational program based on the Atlas of New Professions and Occupations or the Regional Map - 10 points 36.9%, 9 points - 12.9%.
- Developing an educational program based on the trends of the Atlas of New Professions and Occupations - 36.1% and 14.9%, respectively.
- Uniqueness of the educational program, absence of similar ones in the Register of educational programs - 39.1% and 12%.

According to the respondents, the process of implementing the IEP is also characterized by a number of factors, including:

- Use of innovative teaching methods - 52.1% and 15.3%.
- Completion of an industrial internship based on the EP - 49% and 14.9%.
- Involvement of practitioners with more than 10 years of experience in the implementation of the EP - 10 points 42.8%, 9 points - 15.3%.
- Study and solution of real cases - 41.4% and 17.6%.
- Application of the "learning through research" method - 40.4% and 17.3%.
- Organization of dual training based on partner enterprises - 37.8% and 15.6%, respectively.
- Involvement of researchers with experience in participating in scientific projects in teaching - 37.5% and 12.9%.
- The possibility of obtaining professional certification within the framework of mastering the educational program – 37.9% and 14.9%.
- Assessment through the protection of projects, portfolios – 36.5% and 16.4%.
- Inclusion of minors in the content of the educational program – 36.2% and 15%.
- Assessment through a demonstration exam with the involvement of practitioners – 33.8% and 16.7%.
- Integration of big data analysis and decision-making methods based on them – 33.7% and 16.4%.

The inclusion of micro-credentials qualifications in the individual educational program was supported in total at the maximum level by slightly more than a third of respondents – 25.5% and 12.8%. At the same time, the correlating parameter of the possibility of obtaining professional certification within the framework of mastering the educational program was supported in total by more than 50%.

Proposals to attract renowned foreign teachers and graduates of the Bolashak program, and to integrate MOOCs into the content of the EP did not receive widespread support - less than 25% of respondents supported them on a 10-point indicator. Trends in the integration of AI and the creation of virtual realities were supported by less than 45% of respondents.

At the stage of evaluating the IEP, after its completion, respondents noted the importance of the possibility of successful employment, its speed - 44.9% and 15.6%.

The need for training teachers was especially highly emphasized:

- innovative methods of learning, teaching, and assessment - 10 points 48.7% and 9 points - 15.1%.
- principles of selection and structuring of educational content - 42.4% and 16%, respectively.

Thus, it should be noted that it is necessary to hold national and regional seminars on the recognition and inclusion of micro-qualifications in educational programs, interactive offline seminars on the development of IEPs and the integration of innovative teaching, learning and assessment methods into them. It may be useful to hold competitions on the use of innovative teaching methods and create a database of video recordings of successful examples of the use of innovative methods in the study of specific topics.

A separate block of questions was devoted to methods of stimulating the development of IEP. More than 50% of respondents noted the importance of the following incentives at the maximum level:

- Professional development of teachers: Organization of seminars, trainings, and advanced training courses for teachers to familiarize them with innovative educational methods - 10 points 55.8% and 9 points 13.3%.
- Support programs: provision of special financial support to universities that develop and implement innovative educational programs - 10 points 46.6% and 9 points - 10.4%

- Grants: increase in quantity - 46.4% and 11% respectively.
- Subsidies for specific projects: purchase of equipment, creation of research centers, etc. - 45.1% and 14.1%.
- Introduction of a new position - professor/teacher of the IEP with a special bonus - 42.3% and 11.8%.
- Subsidies for the creation of Centers for the Support of Innovative Teaching and Professional Development of Teachers in OHPE - 41.4% and 12.6%.
- Grants: increase in cost - 37.3% and 12.7%, respectively.

Accreditation and ratings: consider the innovativeness of educational programs in the accreditation system of universities and rating lists, which can increase the prestige and attractiveness of educational institutions - 38% and 15.6%.

Proposals to change the qualification requirements for IEP teachers and introduce an alternative route to admission to the IEP master's program through Olympiads and competitions received support from less than 50% of respondents.

In general, it is possible to identify the survey participants' concerns about the level of competence of IEP teachers and the need for systemic support measures both at the national level and at the level of higher professional education institutions. The labor intensity of the IEP, the need to revise the infrastructure, software and laboratory equipment increase the cost of implementing the IEP, which leads to the need to increase the cost of grants. It is possible to stimulate universities to develop the IEP by increasing the number of grants allocated specifically for the IEP. It is also necessary to provide for the involvement of representatives of the labor market and potential employers at the regional level in the development and implementation of the IEP using administrative mechanisms and tax incentives.

Conclusions

Innovative educational programs are a complex object that systematically and consistently combines changes in the educational process to achieve academic excellence. Innovative educational programs, when developed and implemented at universities, lead to innovative changes in all processes and elements of the educational system. The development and implementation of an innovative educational program is a bifurcation point, as it gives rise to the emergence of something new and affects the entire educational system, stimulating strategic changes. Thus, only through an integrated approach to reforming education can we prepare specialists who can effectively cope with the challenges of the modern world and contribute to sustainable economic development.

At the same time, it should be noted that understanding the IEP is considered not only as a product characterized by new content, but also as a symbiosis of innovative results and processes that ensure advanced training of professionals who meet future needs. And, on the need to integrate artificial intelligence, critical and creative thinking, as well as lean manufacturing, kaizen, environmental friendliness, predictability and recycling approaches into all educational programs.

Funding information

The article was prepared under the scientific program within the framework of the program-targeted financing of the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan on the topic of IRN BR21882373 “Development of scientific, methodological and conceptual foundations for the implementation of the initiative of academic excellence in the field of higher education and science in Kazakhstan”.

Conflict of Interests Statement

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

References

Barrichello, A., Morano, R. S., Feldmann, P. R., & Jacomossi, R. R. (2020). The importance of education in the context of innovation and competitiveness of nations. *International Journal of Education Economics and Development*, 11(2), 204-224.

Bell, D. (2020). Post-industrial society. In *The information society reader*, Routledge, 86-102.

Biloshchytskyi, A., Omirbayev, S., & Mukhatayev, A. (2021). Methods of project-vector management of educational environments. *Scientific Journal of Astana IT University*, 15-31.

Chandra, P., Tomitsch, M., & Large, M. (2021). Innovation education programs: a review of definitions, pedagogy, frameworks and evaluation measures. *European Journal of Innovation Management*, *24*(4), 1268-1291.

Evans, J. (2002) Marketing: trans. from English, Moscow: Sirin.

Foray, D., & Raffo, J. (2014). The emergence of an educational tool industry: Opportunities and challenges for innovation in education. Research Policy, 43(10), 1707-1715.

Goldyakova, T. V. (2006). The concept and classification of innovations. *Russian Foreign Trade Bulletin*, (2), 20–27.

Halász, G. (2018). Measuring innovation in education: The outcomes of a national education sector innovation survey. European Journal of Education, 53(4), 557-573.

Husig, S., Schewe, G., Shaimieva, E. Sh., & Gumerova, G. I. (2021). International classification of innovations based on the Oslo Manual: meaning, new concepts. In *Scientific research: fundamental and applied aspects*, 154–157.

Jacobs, C. (2000). The Evaluation of Educational Innovation. Evaluation, 6(3), 261-280. https://doi.org/10.1177/13563890022209280

Jacobs, C. (2000). The Evaluation of Educational Innovation. Evaluation, 6(3), 261-280. https://doi.org/10.1177/13563890022209280

Kupriyanov, A. N. (2020). Formation of innovative educational programs and principles of their implementation. In Integration of higher education and the corporate sector in the new social environment, 308–312).

Looney, J. (2009). Assessment and innovation in education.

Lovelock, K. (2005). Marketing of services.

Lucia, K., Katarina, S., Jan, P., & Zdenko, S. (2022). Drivers of Innovation Activity in European Countries: Proactive vs. Reactive Approach. *Academy of Strategic Management Journal*, *21*, 1-14.

Mandic, D., Lalic, N., & Bandjur, V. (2010). Managing innovations in education. Recent Adv. Artif. Intell. Knowl. Eng. Data Bases.

Maritz, A., De Waal, A., Buse, S., Herstatt, C., Lassen, A., & Maclachlan, R. (2014). Innovation education programs: toward a conceptual framework. *European Journal of Innovation Management*, *17*(2), 166-182. Berman, P., & McLaughlin, M. W. (1976, March). Implementation of educational innovation. In *The educational forum*, Vol. 40, 3, 345-370.

OECD/Eurostat (2018), Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation, 4th Edition, The Measurement of Scientific, Technological and Innovation Activities, OECD Publishing, Paris/Eurostat, Luxembourg, https://doi.org/10.1787/9789264304604-en.

Ramírez-Montoya, M. S., Castillo-Martínez, I. M., Sanabria-Z, J., & Miranda, J. (2022). Complex thinking in the framework of Education 4.0 and Open Innovation—A

systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 4.

Roberts, K., & Owens, S. (2012). Innovative education: A review of the literature. American Journal of Industrial Medicine, 8(3), 207-217.

Routledge. Gámez Gutiérrez, J., & Garzón Baquero, J. E. (2017). New cross-proposal entrepreneurship and innovation in educational programs in third level (tertiary) education. *Contaduría y administración*, *62*(1), 239-261.

Schumpeter, J. A., & Swedberg, R. (2021). The theory of economic development. Routledge.

Stepanenko, D. M. (2009). Innovation process and innovation activity: concept, essence, characteristics. Problems of Modern Economy, (4), 36–40.

Stepanenko, D. M. (2012). The term "Innovation" as a categorical basis for a set of interrelated concepts. Science of Krasnoyarsk, (1), 65–74.

Urban, G. L., & Hauser, J. R. (1993). Design and marketing of new products. *New York: Pretentice–Hall; Englewood Cliffs*, 472 p.

Westera, W. (2004). On strategies of educational innovation: Between substitution and transformation. *Higher education*, 47, 501-517.

Zagvyazinsky, V. I. (2007). Innovative processes in modern education. The world of science, culture, education, (1), 83–84.

Information about authors

Marina A. Skiba, Candidate of Pedagogical Sciences, Associate professor, Higher Education Development National Center of the Ministry of Science and Higher Education, Astana, Kazakhstan, marina.a.skiba@gmail.com, ORCID ID https://orcid.org/0000-0002-4155-9957

Yermek N. Makash - Ministry of Science and Higher Education, Astana, Kazakhstan, yermek.makash@gmail.com, ORCID ID https://orcid.org/0009-0009-2157-1906

Amantay A. Nurmagambetov, Doctor of Political Sciences, Professor, Higher Education Development National Center of the Ministry of Science and Higher Education, Astana, Kazakhstan, a.nurmagambetov@n-k.kz, anurmag@mail.ru, ORCID ID https://orcid.org/0000-0002-2078-2277

Amina A. Mukhambetova, Candidate of Physical and Mathematical Sciences, Higher Education Development National Center of the Ministry of Science and Higher Education, Astana, Kazakhstan, amina-15@mail.ru, a.mukhambetova@n-k.kz, ORCID ID https://orcid.org/0000-0001-7299-6298

Aidos A. Mukhatayev, Candidate of pedagogical sciences, Associate professor, Higher Education Development National Center, Astana IT University, Astana, Republic of Kazakhstan; e-mail: mukhatayev.aidos@gmail.com, ORCID: https://orcid.org/0000-0002-8667-3200