

**Financial and economic approaches to pedagogical monitoring
in higher education: Quality assurance through green economy principles**

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Abstract. The purpose of this study was to cover the financial and economic approaches to monitoring for the green economy integration in the educational process. The study analysed the financial and economic aspects of pedagogical monitoring and their role in the implementation of green economy in higher education. The relationship between sustainable development and green economy was covered and the impact of green economy on the educational process was examined. The study defined the financial and economic methods of monitoring: cost and profitability analysis, resource optimisation, benchmarking, budgeting, calculation of key performance indicators, modelling. The study explored the degree of implementation of green economy principles in the educational process of Kyrgyzstan, Kazakhstan, and Uzbekistan. To assess the real practices in higher education institutions, the opinion of teachers and students at the Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, Tashkent State Economic University was analysed. The findings showed that the universities under study actively implement environmental projects and initiatives related to sustainable development and green economy. Furthermore, the principles of green economy are integrated into educational programmes. However, the effectiveness of monitoring the educational process was low. Financial and economic barriers in monitoring and implementation of green economy in the educational process were also found, namely: lack of material and technical support (45%), limited opportunities to use innovative technologies (35%), low motivation of students to implement the principles of green economy (32%). There are also barriers in the practical training of future specialists to implement the green economy principles. For more effective practical training of students and to improve the effectiveness of green economy, it was proposed to introduce into the educational process the cooperation with educational institutions and public organisations, project-based learning, to organise trainings and courses, as well as to leverage information and communication technologies. A monitoring model was proposed based on financial and economic approaches, which includes the stages of planning, diagnostics, and the stage of strategy development, which can influence the objectivity of evaluation of the educational process through the lens of green economy

Keywords: sustainable development; environmental initiatives; education program; innovative methods; training of specialists

Introduction

The key areas in the development of the state include the improvement of the quality of life and well-being of the population. The growth of economic efficiency of the state can contribute to the improvement of the quality of life by increasing the number of jobs, infrastructure development, and technological advancement. However, in some cases, economic development may be accompanied by a series of environmental problems: pollution and depletion of natural resources, ecosystems, and climate change. In the modern world, apart from economic development, a competitive state strives to preserve and conserve natural resources and ecosystems, which is also important for improving the quality of life. This necessitates the introduction of a new area - green economy - in all spheres of the state's activity.

Increasing the environmental responsibility of the population is possible through the educational sphere, particularly through training at the university (Onyshchenko & Serdiuk, 2023). The relevance of this study was determined by the fact that it is through education that the principles of green economy can become a way to promote environmental culture and a method of preparing future specialists for environmental and economic challenges of future activities. This indicated the need to search for new, specifically financial and economic, approaches to monitoring in the educational process. J.O. Odiyo *et al.* (2022) discussed the role of green economy in the system of higher education. The researchers investigated the need to pass on the existing knowledge to the next generations as a method of developing environmental culture. S. Dibra *et al.* (2022)

analysed the role of universities in training specialists to implement the principles of green economy.

Higher education is the social institution where future specialists of all sectors develop knowledge and skills necessary to advance their field of activity (Yevseiev *et al.*, 2020). Professionals familiar with the principles of green economy can contribute to sustainable development, well-being, and quality of life. To train environmentally responsible professionals, it is necessary to promote compliance with the principles of green economy by educators and students (Dolhikh, 2024). However, in the implementation of green economy principles in the educational process, there are such difficulties as ineffective educational programmes, lack of necessary skills of teachers and students to implement green economy principles. This requires regular assessment of the quality of the educational process and evaluation of compliance of educational programmes with modern requirements and principles of green economy. Such assessment can be performed through pedagogical monitoring, which will be more effective based on financial and economic approaches.

K. Sushil *et al.* (2024) analysed financial and economic approaches in higher education and sustainable development. The researchers investigated the concept of green finance in monitoring system. U.S. Ahmad *et al.* (2024) studied the relationship between financial aspects and sustainable development. X. Zhang *et al.* (2024) discussed the relationship between education and economy. Financial and economic approaches are essential to implement

the goals of pedagogical monitoring through the lens of green economy. These approaches can improve the quality of monitoring of the educational process. This can positively influence sustainable development and contribute to the balance between economic growth and environmental preservation. The use of financial and economic approaches in monitoring the quality of the educational process can help to evenly distribute resources aimed at its improvement. Thus, by channelling financial investments into environmental and economic projects, educational institutions create an environment for training competitive specialists who will be catalysts for the development of the state. Central Asian countries such as Kyrgyzstan, Kazakhstan, and Uzbekistan cooperate closely, particularly in the education sector. Furthermore, these countries, due to their location, face comparable environmental challenges that require the introduction of green economy principles.

Thus, B.K. Kaldybaev *et al.* (2022) investigated aspects of green economy in Kyrgyzstan. Kyrgyzstan's priority is to improve the health of the population and their quality of life, which can be achieved by preserving the environment. The government of Kyrgyzstan plans a phased restoration of ecosystems, which will ensure a higher quality of life and sustainable development. The transition to a green economy also affects the educational sphere of Kyrgyzstan. Higher education prepares specialists who can manage global environmental and economic challenges and fulfil their professional activities for the benefit of society. G.T. Shakulikova & S.S. Shakulikova (2021) covered the role of green economy in sustainable development of Kazakhstan. The government of Kazakhstan strives to meet international environmental requirements. The transition to a green economy is expected to improve the quality of life of the population, preserve natural resources, and build a sustainable society. A. Mikhailov *et al.* (2023) investigated the specific features of green economy development in Uzbekistan. The priority areas of Uzbekistan include the modernisation of economic and environmental sectors, which will preserve social stability and promote sustainable development.

Green economy is a major area of modern economic sector, which promotes the development of society and improves the quality of life of the population, while preserving natural resources and ecosystems (Kyfyak *et al.*, 2024). Introduction of green economy elements into the educational process is an essential part of preparing the younger generation for effective professional activity. Kyrgyzstan, Kazakhstan, and Uzbekistan are actively implementing the principles of green economy, but the role of higher education in this process is not sufficiently analysed. The quality of the educational process in the above countries through the lens of green economy has not been analysed and the financial and economic features of pedagogical monitoring have not been covered. Proceeding from this, the purpose of this study was to determine financial and economic approaches to monitoring to improve the quality of the educational process through the lens of green economy. Objectives of the study: to analyse the implementation of green economy

in the educational process of Kyrgyzstan, Kazakhstan, and Uzbekistan; to explore approaches to improving the effectiveness of green economy in higher education; to propose a model of pedagogical monitoring considering financial and economic approaches to effectively assess the implementation of green economy principles.

Materials and Methods

This study evaluated the educational process of Central Asian universities through the lens of green economy. The study included two stages: theoretical and empirical. The term 'green economy' was analysed, and its principles were explained, which was necessary to determine its role in all spheres of state activity. To confirm the relationship between the educational process and green economy, its influence on the training of specialists was analysed. Based on the information obtained, using synthesis, the relationship between the sustainable development, educational process, and economic growth was analysed.

The study covered the financial and economic approaches to pedagogical monitoring, as well as its role, stages, and methods in the system of higher education. At this stage of the study, regulations were analysed, including "On the Concept of the Transition of the Republic of Kazakhstan to a "Green Economy" (2013); the Concept of the green economy in the Kyrgyz Republic "Kyrgyzstan – A country of green economy" (2018); the Resolution of the President of the Republic of Uzbekistan "On Measures to Improve the Effectiveness of Reforms Aimed at the Transition of the Republic of Uzbekistan to a "Green" Economy by 2030" (2022). Analysis of these documents was used to synthesise the information obtained to assess the specific features of introducing the green economy in the countries of Central Asia. Analysis and synthesis of regulations helped to define the aspects requiring further research. To obtain more information regarding the monitoring of the educational process, the second stage of this study involved a survey among the educators and students of the Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, and Tashkent State Economic University. These educational institutions were selected based on the following criteria: implementation of the green economy principles in the education process and active international interaction, which was essential to organise such a study.

55 educators took part in the study – lecturers of the faculties of economy, as well as 160 students majoring in economy (60 students), digital economy (55 students), and finance (45 students). The age of the educators under study was within 30-35 years, while their professional experience was within 5-30 years. The age of the surveyed students was within 19-26 years, and their year of study was from 2nd to 5th. The sample of the survey subjects was formed randomly among those educators and students who had experience of interaction with green economy in the educational process. The study employed a specifically designed questionnaire aimed at analysing the quality of the educational process (Table 1). The participants of the study were informed

about the purpose of the survey, gave their consent to take part in it and to process their personal data. The participants were also informed that their answers would not influence their academic performance (for students) and pro-

fessional development (for educators), which increased the objectivity of the results obtained. The research complied with the ethical standards specified in European Commission on ethics and data protection (2021).

Table 1. Questionnaire to determine the quality of the educational process through the lens of green economy

No.	Statement	Answer	
		Yes	No
1	I am familiar with the term "green economy"		
2	I am familiar with the principles of green economy		
3	The green economy principles are being integrated into the educational process of my institution		
4	The educational process of my institution provides a quality <u>theoretical</u> basis for the green economy principles.		
5	The educational process of my institution provides a qualitative <u>practical</u> basis for the green economy principles.		
6	In the educational process of my educational institution practical projects based on the green economy principles are implemented		
7	Various environmental initiatives are supported within my educational institution		
8	The administration of my educational institution promotes the implementation of green economy principles in the educational process		
9	The quality of the educational process is regularly monitored at my educational institution		
10	Financial and economic aspects are considered in the monitoring process		
11	Modern methods are used in the monitoring process		
12	In my opinion, financial and economic approaches can influence the quality of the educational process		
13	In my opinion, financial and economic factors influence the integration of green economy principles into the educational process		
14	The administration of my educational institution facilitates monitoring of the educational process		
15	My educational institution regularly makes changes in the educational process based on the monitoring conducted		
16	My educational institution makes rational use of financial resources to improve the educational process		
17	International cooperation is being implemented within the framework of my educational institution		
18	My educational institution uses innovative information and computer technologies, particularly in the implementation of the green economy principles		
19	In my opinion, the green economy principles positively influence the educational process and the quality of training of future specialists		
20	The educational process of my higher education institution contributes to the development of ecological principles		

Source: created by the authors

The questionnaire included 20 statements to which teachers and students had to answer "Yes" or "No". To confirm or refute the results obtained, an additional interview with 25 experts in the field of green economy and educational process monitoring was conducted. These experts included representatives of environmental NGOs that cooperate with the studied higher education institutions, the management of higher education institutions, teachers who had experience in working with the concept of green economy. The interview included the following questions:

1. How effective is monitoring the quality of the educational process through the lens of the green economy?
2. Can financial investments improve the pedagogical monitoring process and how?
3. What financial and economic barriers exist in the pedagogical monitoring process?
4. What barriers exist in the implementation of green economy in the educational process?

The final stage was a comparative analysis of the findings of the study for each of the educational institutions.

This helped to understand the specific features of monitoring of the educational process, as well as aspects of introducing the principles of green economy in the educational process in each of the educational institutions. The criteria for comparative analysis included greening of educational programmes, availability of practical projects on sustainable development and environmental initiatives, availability of pedagogical monitoring, its quality and methods, the degree of involvement of educators and students in the implementation of green economy principles. The obtained information was used to identify key areas for improving the quality of the educational process and training of specialists.

Results

In modern society, the activities of the state and its branches are aimed at economic development, improving the well-being of the population, increasing life expectancy, and harmonious development of the younger generation. One of the areas for the fulfilment of these goals includes the use of an ecological approach in all sectors, which

implies saving natural resources and ecosystems by reducing emissions into the environment, creating green infrastructure, waste management, and switching to renewable energy sources. It is vital to introduce such an approach in the educational sphere, as the transition to new environmental and economic models requires the development of environmental culture and responsibility in the younger generation. Proceeding from this, it is advisable to use the principles of green economy, which is aimed at improving the quality of life of the population and the use of environmental approaches in all sectors. This study considered green economy as an ecological and economic concept, the implementation of the principles of which contributes to sustainable development. Green economy is based on the principles of rational use of natural resources, ecosystem conservation, as well as on the principles of “eco-inclusiveness” and “eco-adaptability”.

The principle of rational use of natural resources implies their preservation for the next generations by protection from pollution, by transition to a closed cycle of production (when all materials and resources are reused), by forming a responsible attitude towards natural resources among the population (popularisation of reusable goods and resources, popularisation of waste sorting). In the educational process, this principle can be implemented by improving energy efficiency (installation of energy-saving lamps, solar panels, automatic light switch-on/off systems); by switching to electronic documentation and e-learning materials; by reusing materials and equipment.

The principle of ecosystem conservation implies preserving those ecological systems that are necessary for the life of the population, for example: preserving water bodies and cleaning them; preserving clean air (e.g., by planting new green spaces); and preserving soil fertility. The principle of preserving ecosystems may include the preservation of biological diversity: flora and fauna. This is possible through the creation of nature reserves and protected areas, through the protection of endangered species. In the educational process, this principle can be implemented by sorting waste, creating “green” corners, and landscaping the educational territory; by interacting with public environmental organisations, which will initiate ‘green’ initiatives (cleaning parks and forest parks, cleaning water bodies).

The principle of eco-inclusiveness implies equal environmental opportunities for all segments of the population. For example, residents of large cities and residents of remote villages should receive the same quality of natural resources necessary for their livelihoods. Furthermore, all social groups, regardless of their economic status, place of residence and other criteria, should be provided with equal working conditions following ecological and health-saving principles. In the educational process, this principle can be implemented through equal access of students to environmental education; through equal access to the results of monitoring the educational process; through compliance with hygienic norms of the educational process organisation for all its participants; through the development of

“green” infrastructure in the educational institution (Mohamed *et al.*, 2024).

The principle of eco-adaptability implies sustainable development of all state sectors, regardless of external factors: climate change and natural disasters. Changes, especially in the modern world, where globalisation and modernisation processes take place, are inevitable, which requires the development of such approaches to environmental and economic challenges that will always be relevant. In the educational process, this principle can be fulfilled through regular monitoring; through the formation of students’ “flexible” knowledge and skills that they can apply regardless of the changes occurring in society. The principles of green economy demonstrate the need for responsible attitude towards natural resources, preservation of ecosystems and biodiversity, the need to create equal environmental and economic conditions for all and the significance of developing flexible environmental approaches. The implementation of these principles can improve the environmental situation and contribute to sustainable development. However, the implementation of green economy principles requires a comprehensive approach and involvement of all government sectors at all levels.

Thus, implementation of green economy principles in the educational process is part of sustainable development and preparation of specialists for environmental and economic challenges of professional activity. Higher education institutions train specialists in various sectors. Environmentally responsible specialists, who can apply the acquired knowledge and skills, will be able to implement the principles of green economy in their fields of activity, thus evenly developing the state and its sectors. Furthermore, higher education institutions can train representatives of new specialties necessary for ecological-economic and sustainable development, for example: environmental auditor, climate analyst, urbanist, environmental law specialist, closed-cycle production developer, etc. Research and development work in universities can become the basis for environmental innovations and innovative approaches to the implementation of green economy principles. The implementation of green economy principles in the educational process affects not only the quality of training of specialists, but also the overall atmosphere of the educational process. Thus, environmental projects and initiatives can influence the interaction of all participants of the educational process, improve their morale and health. This suggests that higher education and green economy are interrelated and complementary and affect sustainable development.

Sustainable development is considered as a concept in which natural resources, economic reforms, and other governmental and societal processes are closely interconnected and form opportunities to meet the needs of society (Ponomarenko & Pysarchuk, 2024). Sustainable development affects economic processes as much as they affect it. Green economy also ensures the economic development of the state while preserving natural resources and

ecosystems. Thus, green economy cannot exist separately from sustainable development, as it forms part of the environmental management system, contributes to sustainable progress, and can promote sustainable (especially economic) development (Wang *et al.*, 2024). Hence, green economy is, arguably, a part of sustainable development. Thus, higher education, and the changes taking place in it, are closely interrelated with economic development and green economy, and are components of sustainable development. Quality training of future specialists considering the principles of green economy, implementation of eco-economic projects and initiatives in the educational process, introduction of ecological elements into the curricula will contribute to sustainable development, improve the quality of life of the population, and help to preserve the environment, natural resources and ecosystems, and pass them on to the next generations.

However, to support sustainable development and improve the performance of the green economy, it is necessary to conduct regular monitoring of the educational process. It demonstrates to what extent certain principles of green economy are implemented in the educational institution, how effective the educational programmes are, and how relevant the methods and approaches used are. Monitoring allows controlling the quality of the educational process, improving it based on the received information, changing methods and approaches, depending on the needs of its participants. Monitoring is cyclical and includes three stages: diagnostic, prognostic, and formative.

The diagnostic stage is aimed at identifying existing problems in the educational process, assessing the knowledge and skills of students regarding green economy and its principles. At this stage training programmes, methods, and approaches used are evaluated, and their effectiveness is assessed. Within the framework of the predictive stage, based on the obtained information, a strategy is developed, which is aimed at eliminating the identified problems or improving the effectiveness of the existing strategy. At this stage, the future results of students in the educational process are predicted, which are anticipated based on the changes introduced. The formative stage is aimed at developing the necessary knowledge and skills of students regarding the green economy and at implementing environmental initiatives. After the formative stage (at the end of the academic year/semester), the diagnostic stage is conducted again, which is aimed at assessing the updated/improved strategy for the implementation of green economy principles and, if necessary, its further adjustment according to the subsequent monitoring stages. Modern monitoring should be based on financial and economic approaches, as qualitative changes in the educational process require optimisation of resources and rationality of their use. Financial and economic approaches to pedagogical monitoring can include cost and profitability analysis, resource optimisation, and benchmarking.

Cost and profitability analysis is based on the assessment of the costs of the educational process and their cor-

relation with the results obtained. This approach assesses the costs that were necessary to implement educational programmes, projects, initiatives, and then analyses their effectiveness. This allows assessing the cost-effectiveness of the methods used and identifying the most effective approaches that required minimum costs. This approach to financial and economic monitoring helps to minimise unnecessary expenses and at the same time to introduce into the educational process only those methods that will be effective. Optimisation of resources is based on the maximum use of all available opportunities. It helps to effectively utilise existing resources to improve the quality of the educational process. This approach also aims to save natural resources and ecosystems, which is essential in the transition to a green economy. Benchmarking is based on the comparison of financial and economic indicators of an educational institution with equivalent educational institutions. This approach allows assessing how effective certain innovations are and calculating the cost-effectiveness of their use within the framework of the educational institution.

The analysed financial and economic approaches can help to avoid unnecessary expenses and direct existing resources to the implementation of effective educational programmes, practices, and initiatives. This can improve the educational process and increase the quality of training. However, to implement these approaches, the monitoring process should employ such economic tools as budgeting, calculation of KPIs (key performance indicators), and modelling. Budgeting is necessary to understand the financial and economic capabilities of an educational institution. It helps to control the costs necessary for the implementation of projects and initiatives, to determine which of them the university can afford to implement, and which will be financially unprofitable. Budgeting also influences the allocation of finances in the pedagogical monitoring process and in the implementation of changes based on it. KPI calculation is used to quantify the results of monitoring: time and resources spent on monitoring, total costs of implementing environmental projects and initiatives, and quantitative student learning outcomes. Modelling is necessary to consider all possible scenarios, which gives an understanding of the financial and economic consequences of monitoring and decisions taken during monitoring. Thus, modelling provides an insight into what losses an educational institution will incur in case of ineffectiveness of the chosen strategy and what the consequences may be. And conversely: modelling allows assessing what can be the positive results of the chosen strategies, specifically the financial and economic ones.

Financial and economic approaches to pedagogical monitoring allow making the assessment of the quality of the educational process more effective and increasing its efficiency in the conditions of implementation of the green economy. Transitioning to the principles of green economy, an educational institution should be based on the needs of its students, public demand, and the requirements of a modernised society. It is for the implementation of these

goals that higher education institutions should regularly monitor existing educational programmes. Furthermore, in implementing the principles of green economy in the educational process, the management of the educational institution should rely on the regulatory documents of the state. Thus, it is advisable to review the regulatory documents of Kyrgyzstan, Kazakhstan, and Uzbekistan for further consideration of the features of green economy in the educational process of these countries.

Kyrgyzstan's regulatory documents note that the old economic models are irrelevant and do not save natural resources, but on the contrary: they are based on their exploitation and depletion. Thus, Kyrgyzstan is striving for green thinking, green upbringing, and green education (Concept of the green economy..., 2018). In Kyrgyzstan, the greatest attention is paid to the introduction of the green economy in the educational sphere, which is aimed at the formation of environmental responsibility among citizens. Thus, Kyrgyzstan is aimed at the formation of 'green' thinking among the population, particularly students of higher education institutions, the use of the media to promote the principles of green economy among the population, the use of the 3R principle: Reduce, Reuse, Recycle. In terms of the 3R principle, "Reduce" means to reduce the consumption of natural resources; "Reuse" means to reuse goods/materials/resources; "Recycle" means to recycle household waste. This principle is aimed at saving natural resources and their conscious consumption, at preserving ecosystems.

To foster "green" thinking among the population, particularly students, Kyrgyzstan is actively introducing environmental courses that include learning about the environment (e.g., through excursions, environmental lessons, or entire environmental camps); developing specialised educational programmes; restoring conventional knowledge about nature, its resources, and ecology; publishing environmental literature (scientific, popular science, fiction, and methodological literature); and conducting and encouraging research activities. The use of the media includes the use of television, radio, newspapers, magazines, and social networks to promote the ideas of green economy and to develop knowledge and skills of the population regarding this concept.

Kazakhstan, for its part, is also committed to conserving the environment and natural resources. The government of Kazakhstan aims to transition to a new, more modern economic paradigm that can improve the quality of life of the population while preserving the environment. Kazakhstan's priorities include modernising infrastructure; reducing the use of natural resources while increasing the efficiency of the resources used; and creating public awareness of the principles of a green economy (On the Concept of the Transition..., 2013).

In Uzbekistan, approaches to promoting a green economy, as well as "eco-inclusiveness" and "eco-adaptability" are being implemented. Like Kyrgyzstan and Kazakhstan, Uzbekistan seeks to mitigate negative environmental impacts and to be more respectful of natural resources. The

key priorities of Uzbekistan include the introduction of green technologies and innovations in all state sectors; creation of conditions for compliance with the principles of green economy in all sectors; implementation of environmental-economic initiatives and projects, specifically international ones; ensuring adaptability of the methods and approaches used; development of green infrastructure; introduction of educational environmental-economic elements, namely: seminars, trainings, courses on the principles of green economy, development of new curricula, preparation of new educational programmes, training of specialists in the field of green economy and sustainable development, and encouragement of research and development activities (Resolution of the President..., 2022). Thus, the analysed regulatory documents indicate that the government of the countries strives to improve the quality of life, to save natural resources and ecosystems, and to increase the environmental responsibility of citizens. However, the specifics of monitoring the educational process in these countries through the lens of green economy are not covered. Moreover, there are no studies on real educational practices in higher education institutions in Kyrgyzstan, Kazakhstan, and Uzbekistan. To obtain this information, a survey of educators and students of Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, and Tashkent State Economic University was conducted.

The results showed that 90% of surveyed educators (49 people) and 80% of students (128 people) are familiar with the term 'green economy'. 86% of surveyed educators (47 people) and 60% of students (96 people) are familiar with the green economy principles. This demonstrated that while the majority of educators and students know what green economy is overall, not all are familiar with its principles. This may affect the training of future specialists, as educators and students who are not fully informed about the green economy principles cannot qualitatively implement them in their activities and follow them. 75% of surveyed educators (41 people) considered that their educational institution integrates the principles of green economy into the educational process. Among students, 65% of the respondents (104 people) mentioned the integration of green economy principles into the educational programmes. Such findings could indicate that environmental and economic elements are not fully integrated into the educational process. This requires revision of educational approaches and methods of implementation of green economy principles. The distribution of integration of green economy principles into the educational process by educational institutions is presented in Figure 1. Among the surveyed students, 65% (104 people) concluded that they received a qualitative theoretical basis regarding the principles of green economy. Quality practical skills were received by 55% of the surveyed students (88 people). Educators, on the other hand, considered that students of their higher education institutions receive both qualitative theoretical and qualitative practical base.

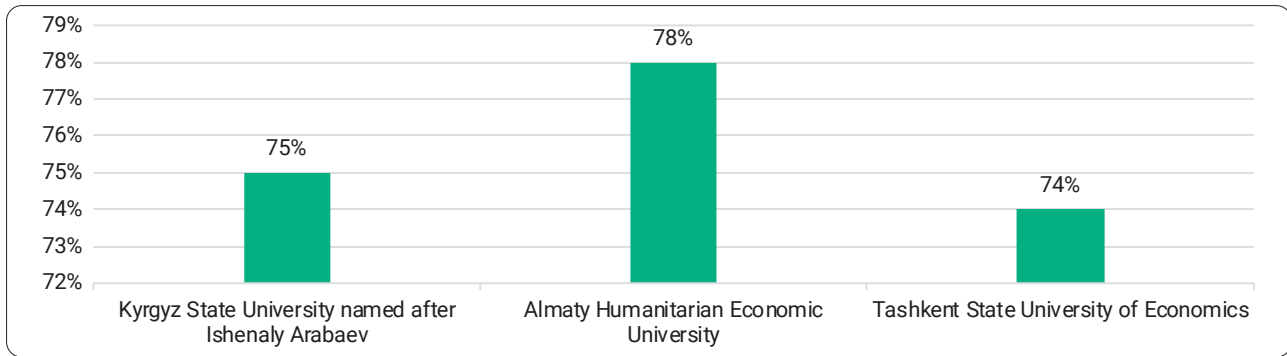


Figure 1. Degree of integration of green economy principles into the educational process

Source: created by the authors

Such findings may suggest that practical skills are not being practised at a sufficient level in the educational process. Such findings may also indicate irrelevant teaching methods, as educators believed that their students receive

quality practical skills, while students do not fully agree. The distribution of the quality of theoretical and practical skills regarding the principles of green economy by educational institutions is presented in Figure 2.

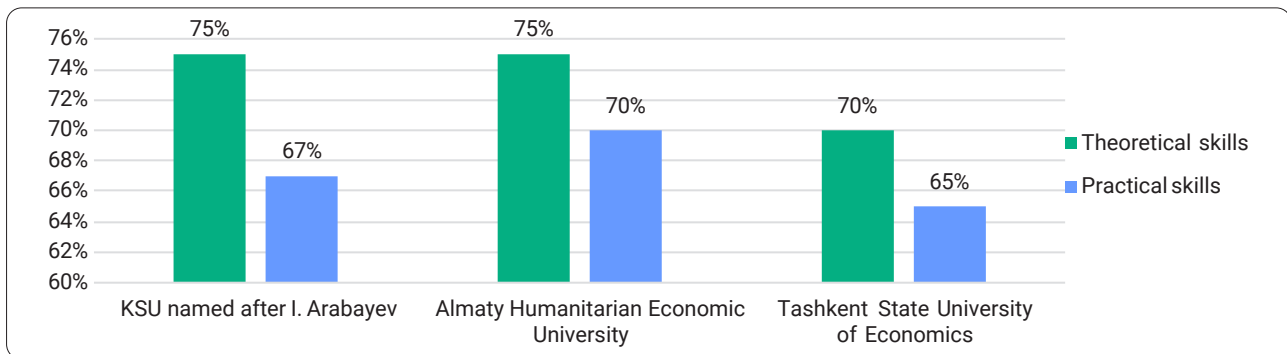


Figure 2. Level of development of theoretical and practical skills regarding the green economy principles

Source: created by the authors

Among the surveyed students, 65% (104 people) indicated that environmental projects are implemented at their institution, but only 50% of students (80 people) felt that various environmental initiatives are implemented at their institutions. Such findings may suggest that students have not formed a correlation between green economy and environmental problem solving. This may demonstrate the need for classes/seminars/trainings to develop environmental responsibility among students. Among the educators, 87% of the respondents (48 people) indicated that the administration promotes the implementation of green economy principles in the educational process, the same opinion was held by 85% of students (136 people). This demonstrated the strong involvement of the administration of educational institutions in the implementation of green economy principles and their promotion of environmental projects and initiatives. 76% of teachers (42 people) and 65% of students (104 people) noted that innovative information and computer technologies are used within their educational institutions. 95% of teachers (52 people) and 87% of students (139 people) considered that international interaction is implemented within their educational

institution. Such findings indicated that Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, and Tashkent State Economic University factor in the green economy principles in the educational process. Both educators (80% or 44 people) and students (74% or 118 people) concluded that environmental principles are implemented in the educational process. The distribution of opinions on this issue by educational institutions is presented in Figure 3.

80% of educators (44 people) noted that their educational institution regularly monitors the quality of the educational process, but only 70% of educators (38 people) thought that the monitoring process considers financial and economic aspects. 75% of educators (41 people) noted that modern methods are used in the monitoring process in their educational institution. This may suggest the need to revise monitoring methods and search for new financial and economic approaches to their implementation. 80% of educators (44 people) considered that the administration of the educational institution facilitates monitoring, which indicates that the university administration is involved in improving the educational process. However, only 60% of

surveyed educators (33 people) noted that their educational institution regularly makes changes in the educational process based on the monitoring. Such findings could suggest that the monitoring of the educational process is

insufficiently effective and does not cover the needs of teachers and students, which requires a revision of approaches to it. Distribution of opinions on this issue by educational institutions is presented in Figure 4.

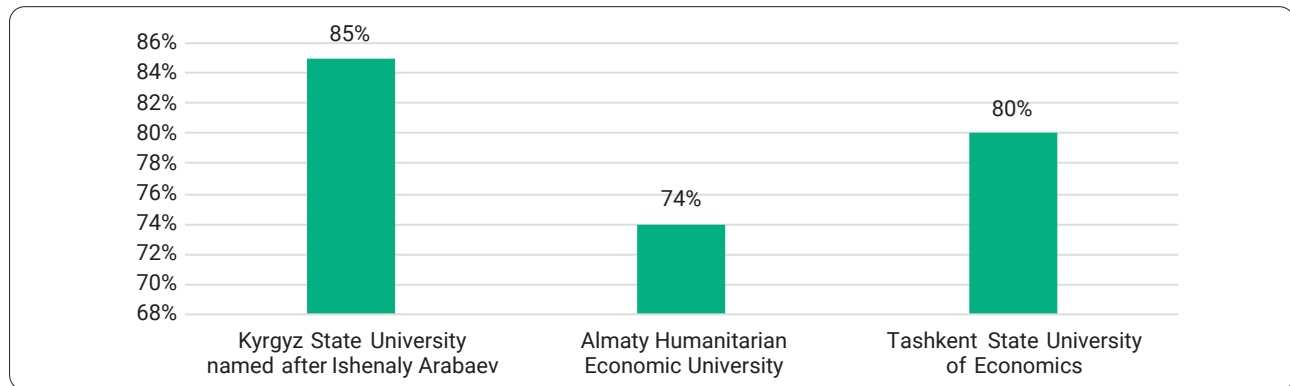


Figure 3. Level of promotion of environmental principles by educational institutions

Source: created by the authors

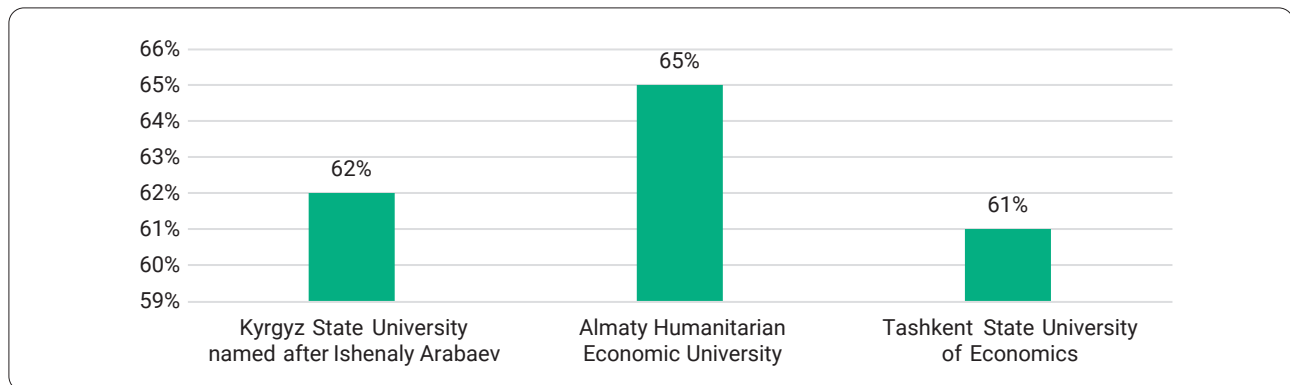


Figure 4. Evaluation of monitoring performance by educational institutions

Source: created by the authors

Thus, in all the higher education institutions under study, the principles of green economy are implemented at approximately the same level, but in different areas. In the Kyrgyz State University named after Iskenaly Arabaev, projects related to sustainable development and, specifically, green economy are implemented; in Almaty Humanitarian and Pedagogical University green economy principles are actively integrated into the curriculum; in Tashkent State Economic University, environmental-economic and environmental-pedagogical initiatives and projects are implemented. In terms of pedagogical monitoring mechanisms in the higher education institutions under study, educators at all universities note the presence of monitoring and its considerable effectiveness. However, the factual results showed that pedagogical monitoring is insufficiently effective, because based on its results, no changes are introduced into the educational process, or these changes are insignificant. Furthermore, the low level of use of financial and economic approaches and modern technologies was noted in the monitoring process, which

reduces its effectiveness. The findings of the study also showed that in all the higher education institutions surveyed, theoretical knowledge of green economy and environmental challenges is formed more qualitatively than practical knowledge, which may indicate barriers in the educational process and lack of methods for practical development of knowledge. In the future, this may affect the ability of graduates to implement green economy principles in their professional activities. To confirm or refute these findings, interviews were conducted with experts in the field of green economy at each of the universities under study. The interviews demonstrated that the principles of green economy in the higher education institutions surveyed are implemented mainly through the introduction of environmental projects and initiatives and by encouraging research and development work in this area.

According to all interviewed experts, financial and economic approaches and investments can improve the quality of pedagogical monitoring and, as a result, the quality of the educational process through the lens of green economy.

The experts attributed the effectiveness of monitoring in the implementation of green economy principles to the ability to predict the results of environmental initiatives and projects, selected strategies, and financial and economic approaches in monitoring will help to avoid unnecessary

costs and irrational use of existing resources. Based on the interviews, a comparative analysis of the quality of implementation of green economy principles in the educational process and the quality of pedagogical monitoring was performed (Table 2).

Table 2. Comparative characterisation of the quality of green economy implementation in the educational process and the quality of pedagogical monitoring, based on the conducted interview

Criterion	Kyrgyz State University named after Iskenaly Arabaev	Educational institutions Almaty Humanitarian-Economic University	Tashkent State Economic University
Greening of curricula	Ecological elements are introduced into the teaching of disciplines, subjects directly related to green economy are taught. Courses and trainings on the topic of green economy are organised.	Disciplines directly related to green economy are taught, interdisciplinary approaches exist, but environmental elements are not introduced in the teaching of all disciplines.	Disciplines directly related to green economy are taught, but environmental elements are not introduced in the teaching of all disciplines. Courses, trainings on the topic of green economy are organised.
Implementation of practical projects on sustainable development and environmental initiatives	Practical sustainable development projects and environmental initiatives are being implemented.	Practical sustainable development projects and environmental initiatives are being implemented.	Practical projects on sustainable development and environmental initiatives are being implemented, as well as environmental-economic and environmental-pedagogical initiatives.
Pedagogical monitoring methods and its quality	Financial and economic methods and monitoring tools: cost and profitability analysis, benchmarking, budgeting, modelling. Changes introduced based on the monitoring results do not always affect the educational process.	Financial and economic methods and monitoring tools: cost and profitability analysis, resource optimisation, benchmarking, budgeting, KPI. Changes introduced based on the pedagogical monitoring results do not always affect the educational process.	Financial and economic methods and tools of monitoring: cost and profitability analysis, benchmarking, budgeting, KPI. Changes introduced based on the pedagogical monitoring results do not always affect the educational process.
Role of educators and students in the implementation of green economy principles	Educators take part in the implementation of the principles of green economy, the management of the educational institution promotes the implementation of these principles, but the motivation of students in this process is low.	Educators and students are actively involved in the implementation of the principles of green economy, the management of the educational institution contributes to the implementation of these principles.	All participants of the educational process implement the green economy principles.

Source: created by the authors

The results of the comparative analysis demonstrated that, although the studied universities actively implement the principles of green economy, practical projects, and environmental initiatives, there are problems in the quality of monitoring. Universities do not use all possible financial and economic methods and tools of pedagogical monitoring, and changes based on its results are not always tangible. Furthermore, the results of the interviews demonstrated that there are some barriers in the monitoring and implementation of green economy in the educational process, namely: lack of material and technical support, inability to use innovative technologies, low motivation of students to implement the green economy principles.

Lack of material and technical support was noted by 45% of the interviewed experts (11 people). They

considered that methodological materials and technical means are not always sufficient for proper fulfilment of green economy principles. 35% of the interviewed experts (9 people) noted that one of the barriers is the inability to use innovative technologies, which can be explained by both the inability of educators and students to use them and the lack of technical support. This affects both the quality of monitoring and the effectiveness of the educational process. 32% of the interviewed experts (8 people) noted low motivation of students to implement green economy, as there is no formed environmental responsibility, specifically, there is no formed understanding of the need to save the environment for the next generations. This could indicate the insufficient effectiveness of the ongoing monitoring, as based on the obtained data, strategies to increase students' motivation should have been developed.

The findings demonstrated the need to introduce changes in the pedagogical monitoring process, specifically the need to consider financial and economic aspects, and to update approaches to improve the effectiveness of the green economy in higher education. Based on the stages of pedagogical monitoring, a model for evaluating the educational process through the lens of the green economy was compiled (Fig. 5). This model includes 3 stages: planning, diagnostics, and strategy development. At the planning stage, the goals and objectives of monitoring and its criteria are defined. Thus, the purpose of pedagogical monitoring through the lens of green economy can be to assess the quality of implementation of green economy principles in the teaching of non-economic disciplines, to determine the

level of students' readiness to implement green economy principles, to assess the level of environmental responsibility of students. The criteria of pedagogical monitoring in this area can include the degree of greening of curricula, the presence of practical projects and environmental initiatives, the level of students' awareness of environmental challenges and methods of their elimination. At the planning stage, the methods of information collection are also selected, which can include questionnaires, surveys, interviews, observation of the educational process. At this stage, the budgeting tool is also used: the resources required for monitoring are determined, as well as the financial and economic capacity of the educational institution, which will be useful in the next stages.

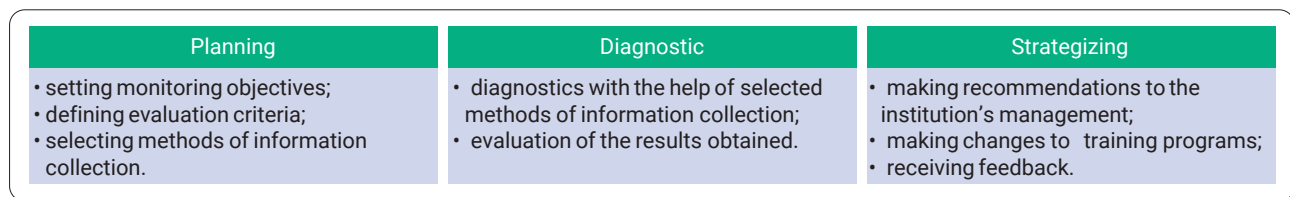


Figure 5. Model of educational process evaluation through the lens of green economy

Source: created by the authors

The next stage is diagnostics. At this stage, diagnostics is performed using the selected methods of information collection (questionnaire, survey, interview, observation). This stage also includes evaluation of the obtained data: analysing the results of the questionnaire/survey/interview/observation, determining whether the results meet the necessary criteria, collecting other elements relevant to the study. It is advisable to evaluate the obtained data using innovative technologies, specifically, using artificial intelligence. Its use at the stage of diagnostics enables a more accurate assessment of the results obtained and a more detailed evaluation of the advantages and disadvantages of existing training programmes. It also minimises errors in the assessment of pedagogical monitoring results and levels out the influence of the "human factor". At this stage, it is advisable to use such financial and economic approaches and tools as KPI and benchmarking. The KPI can be used for quantitative assessment of the obtained results, while benchmarking can be applied to compare the monitoring results in different educational institutions.

Based on the results obtained at the diagnostic stage, during the development of the strategy recommendations are formed for the management of higher education institutions: what needs to be changed for better implementation of green economy principles in the educational process, what methods and approaches should be modernised or completely changed. Changes are introduced in the curricula: new disciplines are added, or existing ones are modernised, trainings, webinars, courses, and other activities necessary to achieve the goals of the educational process are organised. At this stage, such financial and economic approaches to monitoring as optimisation and modelling are used. When

developing new educational strategies, all possible variants of their implementation and their consequences are modelled in two scenarios: positive and negative. The existing resources are optimised to minimise financial costs and to conserve natural resources and ecosystems. This stage also provides the opportunity to receive feedback on the implemented changes and to plan the date and goals of the next pedagogical monitoring. While introducing changes in the educational process, it is important to regularly analyse costs and profitability and, if necessary, to adjust the existing strategy. This will affect both the quality of monitoring of the educational process and the effectiveness of training specialists through the lens of the green economy.

Such a model can be implemented by teachers with experience in monitoring, experts in the field of green economy, specially invited monitoring specialists, local government and education authorities, representatives of public organisations (representatives of environmental organisations). If all the above options are unavailable, the described model can be implemented by the management of the educational institution. Based on the obtained information, the approaches that can affect the effectiveness of the implementation of the principles of sustainable development and green economy in the educational process were proposed. The approaches were divided into three groups, each of which is aimed at resolving certain barriers in the educational process. In case of lack of material and technical support: cooperation with other educational institutions (specifically with international ones); partnership with public organisations; implementation of environmental projects and initiatives that do not require material and technical investments.

Cooperation with other educational institutions may include organisation of joint environmental events (excursions, quests, flash mobs), exchange of practices, holding joint open classes, where students will develop environmental responsibility and understanding of the role of green economy in preserving the environment. The same advantages of cooperation with public organisations that can contribute to environmental events, demonstration lessons, and provide any resources for the implementation of environmental initiatives. Implementation of environmental projects and initiatives that do not require material and technical investments may include sorting waste, saving natural resources (electricity, water), organising a 'green corner' in the educational institution or joint landscaping of the territory of the higher education institution with students, educators, and environmental NGOs. In case of inability to use innovative technologies, approaches to improve the efficiency of the educational process can include project-based learning, organisation of trainings and courses, use of social networks.

Project-based learning can include individual or group projects on environmental and economic topics using innovative technologies. For example, students can be given such tasks as: to make a presentation on environmental and economic topics, to make a short video, to propose possibilities of using artificial intelligence and virtual reality to increase environmental responsibility and save the environment. This will help students not only to develop skills in using modern technologies, but also to form environmental responsibility and understanding of the role of green economy principles in the educational process and in the development of society. It is expedient to create trainings and courses, in the framework of which educators and students will develop the ability to use modern technologies for teaching, specifically for environmental and economic purposes. The use of social networks, which are often used by modern youth, can be effective. Information about existing environmental projects and initiatives can be published in social networks, and separate groups can be created to discuss these projects and initiatives, where students and teachers can interact, express their opinions and propose their ideas. In case of low motivation of students to implement the green economy principles, effective approaches can include elements of competition; environmental initiatives "by special interest".

In terms of competitive elements, it is possible to introduce a certain reward for those students/groups of students who sort more waste, take part in more environmental initiatives, etc. Environmental initiatives "by special interest" could include making posters on environmental challenges for those who like creativity; shooting environmental videos for those who like modern technology; "green" marathons for those who like sports; writing articles on environmental topics for the university newspaper or the university website/blog for those who can and want to work with text; conducting research in the environmental field for those who are engaged in science. Such approaches will

increase the motivation of students to implement the green economy principles into the educational process and increase their effectiveness.

Thus, green economy and higher education are closely interrelated: as green economy affects the educational process and the quality of training of future specialists, so the educational process can affect the green economy and the possibility of implementing its principles in society. An essential stage in this process is monitoring, which can affect the quality of implementation of green economy principles in the educational process and, consequently, the quality of their implementation in various public sectors. The most effective pedagogical monitoring can be based on financial and economic approaches (cost and profitability analysis, resource optimisation, benchmarking) and tools (budgeting, KPI calculation, modelling). To assess the educational process and quality of monitoring through the lens of green economy, a study was conducted among students, educators, and experts of Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, and Tashkent State Economic University. The study demonstrated that educational institutions are actively implementing green economy principles by introducing environmental, economic, and pedagogical initiatives and by integrating green economy principles into educational programmes. However, the findings of the study also demonstrated such problems as lack of practice of the obtained environmental knowledge, insufficient effectiveness of pedagogical monitoring, low level of application of financial and economic approaches to it, lack of material and technical base and skills of interaction with modern technologies, as well as low motivation of students. To solve these problems, a new model of educational process evaluation through the lens of green economy was proposed, which is based on financial and economic approaches and includes three stages: planning, diagnostics, and strategy development. Approaches to improve the effectiveness of green economy principles in higher education were also proposed, namely: cooperation with other educational institutions (especially international ones), partnership with public organisations, implementation of environmental projects and initiatives that do not require material and technical investments, project-based learning, organisation of trainings and courses, use of social networks, introduction of elements of competition and environmental initiatives "by special interest" into the educational process. Only comprehensive monitoring based on financial and economic approaches and the development of new strategies for the implementation of green economy principles in the educational process can affect the quality of training of future specialists and their ability to implement these principles in their field of activity.

Discussion

In the world today, where the modernisation and globalisation processes are actively taking place, the issue of introducing ecological approaches becomes relevant, as most of

the natural resources and ecosystems are non-renewable. Economic development, which is essential for the state, is impossible without green economy, a concept that promotes sustainable development and preservation of the environment. This made the problem of introducing green economy in all state sectors, particularly in the educational sector, relevant, while testing the quality of implementation of green economy principles in the educational process is significant for shaping environmental responsibility in future generations.

In this study, green economy was considered as an ecological-economic concept, the implementation of the principles of which contributes to sustainable development. T. Jackson & P.A. Victor (2024) investigated green economy as a new trend, considered it as a concept of improving the life of the population. K. Manisha & I. Singh (2024) conducted a bibliometric analysis of green economy, defined it as a concept that allows the competent allocation of natural resources, their preservation, and based on this, improve the quality of life. C. Wang *et al.* (2024) analysed environmental regulation and green innovation within the framework of the green economy, considered it as an economic model that is based on environmental principles and contributes to the economic development of the state. J. Jędrzejczak-Gas *et al.* (2024) studied the green economy from a regional perspective, defined it as an economic sector that affects the improvement of the quality of life by reducing environmental risks. The experts' definitions are consistent with the one used in this study and confirm the relevance of green economy in modern society.

A.C. Tippa & K. Amodekar (2024) investigated the relevance of green economy, revealing the role of green economy and the specific features of implementing its principles. The findings of A.C. Tippa & K. Amodekar confirmed that the transition of the modern world to the green economy principles is vital considering the ongoing changes. Green economy, as part of sustainable development, not only promotes economic growth, but also solves environmental problems, which can ensure sustainable development for future generations. W. Ma (2022) also revealed the necessity of green economy, investigating the relationship between green economy and higher education. The researcher concluded that green economy in the modern world is one of the methods to develop all state industries and a method of preserving the environment, which correlates with the findings of the present study. Furthermore, the researcher noted that higher education directly affects the development of green economy and, conversely, green economy affects all educational processes. This demonstrated the relevance of the present study and the impact of implementing green economy principles in the educational process on the development of all government sectors.

W. Gao *et al.* (2019) covered the impact of higher education on the development of green economy. The researchers concluded that higher education influences the economic development of the state and its other industries. The experts also noted that through higher education, it is

possible to train such professionals that will foster technological and environmental innovation, which was also identified in this study. Z. Kilasonia (2023), and A.B.A. Avelar & M.L. Pajuelo-Moreno (2024) reached the same conclusions, revealing the role of higher education institutions in promoting sustainable development goals. Researchers believe that the purpose of the educational process is to prepare such professionals who will become catalysts of environmental-economic change in the future. Furthermore, the green economy is a part of sustainable development, the goals of which are also fulfilled in the educational process.

This study considered sustainable development as a concept that ensures the interconnection of natural resources, economy, and other social processes to meet the needs of society, is instrumental in the development of the state, as well as in higher education. Green economy was considered as an element of sustainable development. T. Trinh & V. Huong (2024), as well as J. Jędrzejczak Gas *et al.* (2024) covered the interrelation of sustainable development and green economy. The researchers concluded that green economy is focused on sustainable development, particularly economic development, and includes environmental protection, implementation of green technologies and projects, which determines their interrelationship and correlates with the findings of the present study. Furthermore, sustainable development, like green economy, plays a vital role in higher education.

R.H. Sebire & S. Isabelles-Flores (2023) emphasised the necessity of introducing the sustainable development principles in the educational process of higher education institutions, which will contribute to the preparation of future professionals to promote these principles in their respective fields of work, which correlates with the findings of the present study. K.M. Mahesh *et al.* (2024) noted the significance of an interdisciplinary approach: introducing the principles of sustainable development into the teaching of unrelated disciplines. Such an approach was also discussed in the present study, which confirms the need to integrate the principles of sustainable development, specifically the principles of green economy, into the curricula. M.S. Bharti (2024), revealing aspects of the European Union's green economy policy, concluded that apart from educational objectives, sustainable development ensures the resolution of such problems as the availability of natural resources and their purity, decent working conditions, economic growth, reduction of inequality, responsible consumption, equitable access to resources, climate change, etc. This corresponds to the concepts of "eco-inclusiveness" and "eco-adaptability" introduced in this study and demonstrates that sustainable development, particularly the green economy, is not only directed at economic growth and environmental sustainability, but also at solving a series of other societal problems.

Exploring the experience of sustainable development in higher education in Albania, A. Kunčič & A. Işık (2024) found that only a small percentage of educational stakeholders (37%) are involved in "sustainable" initiatives and projects. The present study showed more positive results: in

the higher education institutions studied in this research, both educators and students take an active part in various environmental projects and initiatives, which demonstrates the readiness of Kyrgyzstan, Kazakhstan, and Uzbekistan to implement the principles of green economy in the educational process.

In terms of the countries studied in this research, Sh.Zh. Rakhmetullina (2016) investigated the specific features of the implementation of green economy principles in Kazakhstan. The researcher concluded that the green economy will positively affect the development of all sectors and will lead to a more careful use of natural resources, environmental improvement, changes in infrastructure, improving the well-being of the population, and enhancing national security. This requires training of future specialists and introduction of new educational programmes, development of students' environmental responsibility, dissemination of environmental culture, which correlates with the findings of this study. G.N. Berdiev (2024) studied the aspects of green economy in Uzbekistan. The researcher noted that the modernisation and globalisation processes require innovative approaches to the economy, specifically the development of a green economy, and success in this process depends on the environmental responsibility of citizens and the quality of implementation of innovative "green" developments. This requires quality training of students. The present study also highlighted the crucial role of higher education and environmental responsibility in the implementation of green economy principles in the analysed countries. This may indicate that Kyrgyzstan, Kazakhstan, and Uzbekistan have effective strategies for implementing green economy principles, and their activities in this area are promising. The effectiveness of the introduction of green economy principles in the educational process can be assessed through monitoring. However, this study found that approaches to pedagogical monitoring are not always effective and do not always provide an adequate assessment of the quality of the educational process. This study proposed a model of pedagogical monitoring based on financial and economic approaches, which includes planning, diagnostics, and strategy development.

A. Chen (2024) investigated the financial and economic approaches to education, revealing the effect of economic development on the educational environment. The researcher concluded that education and financial and economic factors are closely interrelated: as financial investments in the educational process affect its quality, so the training of specialists in universities affects the further economic well-being of the state. This demonstrates the effectiveness of using financial and economic approaches in the monitoring and improvement of the quality of the educational process. The present study proposed approaches to improve the effectiveness of green economy in higher education, namely: cooperation with other educational institutions (specifically, with international ones), partnership with public organisations, implementation of environmental projects and initiatives that do not require

material and technical investments, project-based learning, organisation of trainings and courses, use of social networks, introduction of elements of competition, and environmental initiatives "by special interest" in the educational process.

A.K. Abdallah *et al.* (2024) covered project-based learning as a method of increasing the effectiveness of green economy principles in the educational process. N. Nikoloudakis & M. Rangoussi (2024) investigated the implementation of green economy principles in vocational education. A.K. Abdallah *et al.* concluded that there may be a possible lack of logistics for the implementation of green economy principles, which was also revealed in the present study. This calls for finding approaches that will not require additional provision, specifically project-based learning can be such an approach. This approach can be used to build practical skills in students as it involves the use of real-life examples and working with them. N. Nikoloudakis & M. Rangoussi also concluded that project-based learning develops students' environmental responsibility and ability to apply the principles of sustainable development and green economy. Building practical skills is important for students as the results of the present study showed a lack of practical skills. This makes project-based learning an effective approach to the educational process.

F.A.N. Zulfa *et al.* (2024), who investigated the impact of technological advancement on the economy, covered the use of modern technology. The researchers noted that green economy is connected with innovation, as its implementation requires the use of new, modern approaches. Thus, the introduction of innovations in the educational process, where the green economy principles are implemented, can contribute to the development of this concept and the formation of students' ability to interact with it. C. Maheshkar *et al.* (2024), who investigated the digitalisation of higher education to achieve sustainable development goals, concluded that the integration of information and communication technologies in the educational process can contribute to sustainable development and the promotion of green economy principles, which correlates with the findings of the present study. Innovative technologies provide a wide range of opportunities for the implementation of green economy, introduction of sustainable development principles, opportunities for the formation of students' necessary knowledge and skills (Shahini, 2024). Furthermore, innovative technologies can be used in monitoring the educational process, which can increase its efficiency and effectiveness of financial and economic approaches to it.

The digitalisation of the educational process has been generally underexplored in this study. Thus, X. Meng & C. Wu (2024), discussing the transition to a green economy through digitalisation, concluded that the introduction of information and communication technologies in all sectors contributes to the transition to a green economy. Innovative technologies provide opportunities to develop fresh approaches to the development of green economy, particularly in the educational environment. X. Shi (2024) reached

an analogous conclusion, investigating the integration of digital economy and green economy. The researcher noted that digitalisation of government industries can contribute to economic growth and sustainable development, which can also be applied to the education industry. According to X. Shi, economic development and environmental protection should not contradict each other but should be interrelated, which is the leading idea of the present study.

The implementation of the green economy principles is a priority in modern society, where there is a need to save the environment and natural resources. It is within the framework of higher education that it is possible to train such specialists who will be able to rise to the environmental and economic challenges. This requires greening of curricula and quality monitoring to assess the effectiveness of the educational process. To improve the effectiveness of pedagogical monitoring, it is necessary to use financial and economic approaches and innovative methods. The analysis of scientific sources confirmed that the methods of improving the quality of the educational process proposed in this study are effective and can develop students' practical skills. The analysis of other studies also confirmed that Kyrgyzstan, Kazakhstan, and Uzbekistan adhere to effective strategies for implementing green economy and strive to maintain a balance between sustainable development, ecology, and economic sector.

Conclusions

The present study uncovered financial and economic approaches to pedagogical monitoring and their effect on improving the quality of the educational process. Green economy is an ecological-pedagogical concept, which is based on the principles of rational use of natural resources, saving ecosystems, as well as on the principles of 'eco-inclusiveness' and 'eco-adaptability'. As the principles of green economy affect the educational process, so it affects the effectiveness of the implementation of 'green' principles, which determines their interrelation. In synergy, they form part of sustainable development, which aims at economic and social changes contributing to the development of society. To effectively introduce and implement the green economy principles in the educational process, it is necessary to conduct regular monitoring, which can contribute to positive changes in curricula. However, established approaches to monitoring may not be relevant, which may provide incorrect information about the quality of the educational process. This requires the introduction of innovative technologies (artificial intelligence) and financial and economic approaches such as cost and profitability analysis, resource

optimisation, benchmarking, budgeting, KPI calculation, and modelling into pedagogical monitoring.

The study was conducted among students and educators of Kyrgyz State University named after Ishenaly Arabaev, Almaty Humanitarian-Economic University, and Tashkent State Economic University. Additionally, interviews with experts in the field of green economy were conducted. The findings of the study showed that all the universities under study implement the principles of green economy, while the participants of the educational process and the management of higher education institutions contribute to this endeavour. For example, the Kyrgyz State University named after Ishenaly Arabaev implements environmental projects and projects aimed at sustainable development. In Almaty Humanitarian-Economic University, the focus is on the greening of educational programmes. Tashkent State Economic University implements environmental, economic, and pedagogical initiatives. However, in the educational and monitoring process, there may be such challenges as the lack of material and technical support, limited opportunities to use innovative technologies and approaches, as well as low motivation of students to follow environmental principles.

To resolve these challenges, a model of pedagogical monitoring was proposed, which is based on financial and economic approaches and includes the stages of planning, diagnostics, and strategy development. The study also proposed methods to improve the effectiveness of the educational process through the lens of green economy, specifically, cooperation with educational institutions and public organisations, project-based learning, organisation of trainings and courses, and use of innovative technologies. Together, these methods can improve the quality of the educational process of preparing future specialists for environmental and economic challenges they may face.

Limitations of this study include the random sampling of the surveyed educators and students, as well as the study of several higher education institutions in different countries, which may have affected the accuracy of the findings. The findings of this study could be improved by conducting a questionnaire survey with a non-random sample. The prospects for further research may include experimental testing of the proposed monitoring model and evaluation of the effectiveness of financial and economic approaches.

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Conflict of Interest

None.

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Фінансово-економічні підходи до педагогічного моніторингу у вищій освіті: забезпечення якості через принципи зеленої економіки

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Анотація. Метою цього дослідження було розкрити фінансово-економічні підходи до моніторингу для інтеграції зеленої економіки в освітній процес. Проведено аналіз фінансово-економічних аспектів педагогічного моніторингу та їхню роль у впровадженні зеленої економіки у вищу освіту. Розкрито взаємозв'язок між сталим розвитком і зеленою економікою, проаналізовано вплив зеленої економіки на освітній процес. Визначено фінансово-економічні методи моніторингу: аналіз витрат і рентабельності, оптимізація ресурсів, бенчмаркінг, бюджетування, розрахунок ключових показників ефективності, моделювання. Розкрито ступінь впровадження принципів зеленої економіки в освітній процес Киргизстану, Казахстану та Узбекистану. Для оцінки реальних практик у вищих навчальних закладах, проаналізовано думку педагогів і студентів Киргизького державного університету імені Ішенали Арабаєва, Алматинського гуманітарно-економічного університету, Ташкентського державного економічного університету. Результати засвідчили, що в досліджуваних університетах активно реалізуються екологічні проекти та ініціативи, пов'язані зі сталим розвитком і зеленою економікою. Крім того, принципи зеленої економіки інтегрувалися в навчальні програми. Однак, результативність моніторингу освітнього процесу низька. Виявлено й фінансово-економічні бар'єри в процесі моніторингу та впровадження зеленої економіки в освітній процес, зокрема: брак матеріально-технічного забезпечення (45 %), обмежені можливості використання інноваційних технологій (35 %), низька мотивація студентів до реалізації принципів зеленої економіки (32 %). Існують бар'єри і в практичній підготовці майбутніх фахівців до реалізації принципів зеленої економіки. Для ефективнішої практичної підготовки студентів та для підвищення ефективності зеленої економіки, запропоновано впровадити в освітній процес співпрацю з навчальними закладами та громадськими організаціями, проектне навчання, організувати тренінги та курси, а також використовувати інформаційно-комунікаційні технології. Було запропоновано модель моніторингу на основі фінансово-економічних підходів, яка містить у собі етапи планування, діагностики та етап розроблення стратегії, що може вплинути на об'єктивність оцінювання освітнього процесу через призму зеленої економіки

Ключові слова: сталий розвиток; екологічні ініціативи; програма навчання; інноваційні методи; підготовка фахівців