

Adaptation of Educational Programs in Uzbekistan to the Requirements of the Digital Economy

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Annotation: In Uzbekistan, it is necessary to adapt educational programs to the requirements of the digital economy. This is an important step towards increasing the country's competitiveness in the global market. The article discusses the current state of training specialists in the field of information technology and the impact of digital transformation on the education system. Examples of the implementation of new educational standards and technologies are also presented. However, when adjusting programs, educational institutions face a number of problems. The article discusses these problems and possible solutions.

Keywords: digital economy, educational programs, adaptation, Uzbekistan, digitalization, information technology, training, education.

Introduction

The introduction of digital technologies into the economy is one of the most important aspects of the development of modern society. In recent years, states around the world have been faced with the need to quickly adapt educational systems to new stages of technological progress. In particular, the digital economy requires the emergence of professionals capable of applying innovative technologies such as artificial intelligence, big data, blockchain and the Internet of Things.

In this regard, it is necessary to review and adjust the educational programs of higher education institutions in Uzbekistan. Training professionals who meet the requirements of the digital economy requires attention from both educational institutions and government policy.

Since 2017, Uzbekistan has been actively implementing projects on digitalization of the economy. They include infrastructure development and updating of educational standards and programs. The integration of information technologies into the educational process, the development of new training courses and disciplines focused on digital technologies are important steps on the way to teaching the digital economy.

However, this process faces a number of difficulties. Among them are the lack of a unified methodology and standards for educational programs, the shortage of qualified teachers in the field of information technologies, and the need to modernize the material and technical base of educational institutions.

Research Methods

The following methods were used to achieve the research objectives:

1. study of documents: the state program on the introduction of digital technologies in the field of education in Uzbekistan, as well as educational standards and training programs aimed at training specialists in the field of digital technologies.
2. Practical approach: consider examples of the use of digital technologies in the educational programs of leading universities in Uzbekistan, such as Tashkent University of Information Technologies (TUIT) and Uzbek State University.

Sociological research: a survey of university faculty and students on how they perceive and whether they are ready for changes in educational programs related to the introduction of digital technologies. In 2024, a pilot survey of university faculty and students was conducted on how they perceive and whether they are ready for changes in educational programs related to the introduction of digital technologies. The survey involved 60 department heads and leading faculty members and 500 students of TSTU. The following results were obtained: To the question how do you evaluate the role of digital technologies in the modern educational process? 45% of respondents answered very positively, positively 35%, and negatively and very negatively 5%, the remaining 15% neutral. To the question How do you assess your preparedness for the use of digital technologies in teaching? 15% answered excellent prepared, 30% well prepared, 15% satisfactorily prepared, and the remaining respondents need additional training. When asked do you think that the introduction of digital technology improves your educational process? 40% of respondents answered yes significantly, 35% answered yes but not significantly.

Content study: analysis of scientific articles, reports and studies on digitalization of education and its impact on the training of information technology specialists. In the work of N.N. Tursunov "The impact of digitalization of higher education on socio-economic processes", published in the journal "Itisodiet va innovatsion tekhnologlar" in 2024, the following issues were investigated:

how the digitalization of higher education affects the economic efficiency of the country;

what role digital technologies play in improving the educational process and training for the digital economy;

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1) Main part

2) Digital economy and its requirements for educational programs

3) In the digital economy, working with big data, programming, creating software, and analyzing and protecting data are becoming priority areas for training specialists. It is important that educational programs provide students with knowledge and skills that are in line with the latest technological trends. One striking example of such changes is the introduction of courses on IT security, machine learning, blockchain and other areas related to digital technologies into university curricula.

1. IT security:

Rationale: With the development of digital technologies and their integration into business processes, the threat of cyber attacks and data leakage is increasing. In Uzbekistan, as in other countries, cyber threats are becoming a major challenge to public and private security. IT security training is necessary to protect data and information at all levels.

-Threats and vulnerabilities: increasing reliance on digital technologies has led to an increase in threats such as hacking, viruses, phishing and personal data breaches. Information security professionals are needed to develop effective defenses and prevent such attacks.

The importance of including IT security courses in the curriculum: the inclusion of IT security courses in university curricula helps to train professionals who are able to create, implement and maintain security systems and protect information and data. This is very important for the development of the high-tech industry and for companies that are actively using Ziff!

2. Machine Learning:

Rationale: Machine Learning and Artificial Intelligence (AI) are advanced technologies that open new horizons in various fields such as data analysis, medical technology, financial systems, and even agriculture. Incorporating machine learning courses into the educational programs of universities makes it possible to train professionals capable of developing and implementing intelligent systems.

-Perspectives and applications: machine learning is actively used to create predictive models, big data analytics, and process automation. In fields such as finance, healthcare, marketing, and manufacturing, machine learning experts can significantly improve productivity and predictive accuracy.

-Learning needs: incorporating machine learning courses into the classroom will help students learn advanced algorithms and data science techniques, enabling them to work in the

4. Other areas related to digital technologies:

Rationale: Flexibility of educational programs: Educational programs,

University	New discipline	Direction	Number of students who have mastered the courses in 2023
Tashkent University of Information Technologies (TUIT)	Digital Economy, Artificial Intelligence, Blockchain	Data Analysis, IT Security, Robotics	1200
National University of Uzbekistan	Cybersecurity, Data Analytics	Programming, Data Protection	900
Samarkand State University	Data Engineering, Mobile Technology	Programming, IT Services	800

Uzbekistan has significantly intensified the training of specialists in the digital economy, thereby increasing their demand in the labor market.

Increase in the number of vacancies in the IT sector

According to data, the number of vacancies in the IT sector accounts for 15.1% of the total labor market supply in Uzbekistan.

Increase in the volume of ICT services

The volume of ICT services in Uzbekistan increased by 43.8% year-on-year and amounted to 56.17 trillion soums.

Growth in export of IT services

Export of IT services grew 22 times and amounted to 344 million USD.

Increase in the number of IT specialists

More than 100,000 people work in the sector and the market volume is approaching a billion dollars.

Development of IT education

There are about 60 specialized universities in Uzbekistan, which annually train more than 29,000 specialists in the field of digital technologies.

These data show that the demand for specialists in the digital economy on the labor market of Uzbekistan has grown significantly.

Challenges and problems in adapting the educational part of eucalyptus

1. Shortage of qualified teachers: One of the main obstacles is the lack of teachers who understand modern technologies. To teach AI, blockchain, and cybersecurity courses, you need high-level experts. Therefore, it is important to organize professional development courses for teachers and attract industry experts to teach classes.

2. Low level of implementation of information technology infrastructure in some higher education institutions: In Uzbekistan, the level of implementation of information technology infrastructure in some higher education institutions is insufficient for effective implementation of the digital education program. This is evidenced by insufficient equipment of educational institutions and limited access of students to online resources and platforms.

Evidence of the problem:

Lack of modern equipment: the research laboratories of many universities lack modern equipment, which limits the possibility of conducting quality research and practical activities.

Limited access to online resources: some educational institutions lack the necessary conditions for the implementation of innovative educational approaches, including access to modern online resources and platforms.

Low level of implementation of modern pedagogical technologies: The degree of implementation of modern pedagogical technologies in some universities is low.

3. Slow updating of teaching materials: With the rapid changes in digital technology, teaching materials and teaching methods do need to be updated regularly to stay relevant and meet new requirements. **Here are some reasons why this is important:**

Rapid changes in digital technology: Technology and innovation are evolving at a tremendous speed. New programs, platforms, tools and methods are becoming part of the professional activities of specialists in different fields. Without updating educational materials and teaching methods, students may not receive up-to-date knowledge, which affects their competitiveness in the labor market.

Integration of new technologies into the educational process: The introduction of technologies such as artificial intelligence, data analytics, blockchain and others requires updating educational programs. Teachers should use these technologies not only to improve the quality of teaching, but also to prepare students to work in the digital world.

Updating the knowledge of teachers.

Lack of resources in some higher education institutions.

Internationalization of education.

Prospects and directions for improving the adaptation of educational programs

1. Building digital skills in faculty and students:

Rationales:

The readiness of teachers and students to use modern technologies is especially important in the digital transformation of education. This requires teachers to be digitally competent and students to be ready to use digital tools in their learning. Teachers must learn new ways of teaching using digital technologies, including the use of online platforms, interactive whiteboards, virtual labs, and other tools.

Students must not only learn digital-related subjects, but also develop general digital skills, such as using digital tools for collaboration, research, programming, and data analysis.

2. integration of online education and hybrid learning formats:

Rationale:

World practice shows that online education and hybrid formats (combination of face-to-face and distance courses) allow for more flexible ways of learning and open educational resources to a wider audience. In Uzbekistan, the introduction of such formats will allow:

- Increased access to education: students in remote areas will be able to receive quality education without leaving their hometowns and regions.
- Flexibility and personalization of learning: students will be able to choose the pace and form of learning according to their individual needs.
- University development: the introduction of online courses and programs in universities will help improve the quality of education and create new educational platforms that will give students the opportunity to study in accordance with international standards.

3. Create digital learning platforms and ecosystems:

Rationale:

Digital platforms and ecosystems can bring together different educational resources and tools to create a unified educational environment where students and teachers can interact and share knowledge and expertise.

- Digitization of the educational process: a platform that hosts courses, lectures, tests, assignments and projects can help improve learning and ensure learning efficiency through self-learning and flexibility.

Efficient use of resources: the development of such platforms allows the efforts of different educational institutions, scientific organizations and private companies to be brought together to create a unified knowledge base.

Digital education platforms and ecosystems should be created in Uzbekistan to promote online education and blended learning. This will allow:

4. Collaborate with IT companies and industry to create hands-on courses:

Rationale:

Theoretical knowledge obtained at university should be complemented by practical experience, which can only be obtained by collaborating with real employers and companies. This will make it possible to:

- Adapt curricula to the real needs of the labor market.

- Organizational internships and industrial practice.
- Training of in-demand specialists.

5. Adaptation of educational programs to the requirements of the digital economy:

Rationale:

Adapting the curriculum to the needs of the digital economy, including the introduction of new disciplines and methodologies such as:

- Big Data, Analytics, Machine Learning and Artificial Intelligence.
- Digital Economy and Entrepreneurship.

6. Focus on continuing education and retraining of professionals:

Rationale:

The digital economy requires workers to constantly adapt to new technologies. Continuous education and retraining allows specialists to keep their knowledge up-to-date and develop new skills. The introduction of such programs in universities will provide:

- Educational flexibility.
- Development of professional skills.

Results and discussions

Results:

There is a significant increase in the number of students studying in the field of information technology (IT) in Uzbekistan, which indicates the increased interest of young people in this field. However, the exact data on the percentage increase in the number of students by 10-15% is not presented in open sources.

Facts confirming the growing interest in IT education:

- Increase in the number of educational institutions and students: The number of IT Park resident educational institutions in the country has reached 362, of which 73% (264) are located in the regions and the remaining 27% (98) in the capital. These centers trained about 26 thousand young people in 2023, accounting for 67% of the total number of students.

Recommendations for increasing the employment of graduates:

- Strengthening practical training.
- Development of career centers.
- Adaptation of educational programs.

The implementation of these measures will help to increase the employment rate of IT graduates in the high-tech sector and improve their competitiveness in the labor market.

Discussions: Currently, there is a shortage of qualified teachers in information technology. Modernization of teaching laboratories and technology is also required. One of the important steps in solving this problem has been cooperation with international educational and technological organizations. Sharing experience and improving the quality of education are key aspects of this cooperation.

The process of adapting Uzbekistan's educational programs to the requirements of the digital economy is a large-scale and complex undertaking that has a significant impact on the country's development and the training of specialists to meet future challenges. The study examines the impact of digitalization on the education sector, identifying key trends and challenges faced by educational institutions.

It is necessary to systematically work on improving the quality of education. Only then can we count on the successful development of the country's digital economy and increased competitiveness of citizens in the international labor market.

Conclusions and proposals**conclusions:**

1. The need to update educational programs:
2. Technical base and infrastructure.
3. Problems with teacher training.
4. Importance of developing state support.

Suggestions:

1. Investing in updating educational programs.
2. Increase funding for infrastructure development.
3. Professional development of teachers.
4. Stimulating cooperation with private companies.
5. Development of the system of continuous education. These proposals will help to improve the quality of the educational process in Uzbekistan and contribute to the training of highly qualified specialists who will be able to work successfully in the digital economy.

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