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USE OF BLOCKCHAIN TECHNOLOGIES IN EDUCATION AND SCIENCE

Education, being in its essence a purposeful process of innovative learning of a person, should contribute to the development of his creative abilities, the formation of professional competencies, and self-improvement. It is for this reason that the process of introducing innovations in education must be constant. According to experts [1, 2], the blockchain will have a strong impact on education, providing such advantages as transparency, security, optimization and simplification of routine processes.

Blockchain technologies have significant advantages in education, including high security, low cost, objective assessment of student knowledge, identity authentication, access control to educational information resources, ensuring the efficiency of student records management, and others. Their strengths are features that provide decentralized storage, immutability of stored information, traceability and transparency. In addition to providing secure transactions, these benefits enable complex ecosystems where users openly collaborate, share data, enter into agreements, and are incentivized to perform better.

Several blockchain applications have been developed for educational purposes. These applications can be divided into the following categories:

– document management (diplomas, certificates, etc.), ensuring transparency of financial flows;

– management of competencies and student learning outcomes;

– formation of a database for potential employers;

– providing an environment for collaborative learning, increasing the interaction of students in digital learning;

– copyright management, stratification of scientific publications by the impact factor of the publication, citation index;

– support for Life Long Learning and others.

Thus, the most common use of blockchain technologies is to manage academic credentials, certificates, or other forms of record of achievement. This application allows universities and employers to provide formal certificates to students with a high level of information privacy.

The use of blockchain in education reduces its cost by decreasing unnecessary costs associated with transactions and data storage. Blockchain

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is used to increase user interactivity, in particular, as a system of rewards for educational and scientific achievements. Creating additional incentives for learning through gamification and rewards are among the achievements of universities using blockchain technology.

Although more and more blockchain-based applications are being developed for educational purposes, only a few have been launched for general use. In general, there is enough theoretical information on the use of blockchain in education, but there are no any practically specific solutions.

The use of blockchain technologies in education is still at an early stage of development. Only a small number of institutions have started using them to verify and exchange academic certificates and/or learning outcomes that their students have achieved.

Although the benefits of blockchain implementation in education are obvious, experts are in no hurry to implement these technologies for the following reasons:

− scalability of blockchain technologies – the more blocks of data are added to the blockchain, the slower it works;

− high initial costs for software development, employee training, etc.;

− outdated solutions and overcoming conservatism in the innovative educational process - many universities rely on autonomous systems for managing documents and storing educational materials.

The State Biotechnological University (Ukraine, Kharkiv) has implemented a pilot project to introduce blockchain technologies in the educational process. The prerequisites for the implementation of the project were industry requests for training specialists for specific companies. So, recently, due to various reasons (intensive development of the food industry, production of products for export, opening of offices and production sites of multinational companies), the university received applications for the training of business-oriented specialists, namely the head of the development department (R&D), the head of the HACCP group , technologists for the development of food products, project managers.

Mutual responsibility, the immutability of stored information, the need for qualitative and quantitative assessment of learning outcomes, traceability and transparency have become mandatory requirements for the implementation of the project. They were solved using blockchain technologies. The main ones were:

− the ability to store data on personal achievements of students in digital form,

− guarantee their constancy and reliability,

− provide access to data through a single platform to all participants in the process;

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− reliable information about the ratings, reviews and assessments of students;

− the possibility of training, when students have certain milestones, upon completion of which they are guaranteed employment in the company.

The project participants (stakeholders) were the State Biotechnological University, companies specializing in the production of food products, companies producing food ingredients, technological equipment and packaging materials, the State Food Service of the Kharkiv region, etc., which placed a request for training specialists (fig. 1).

Figure 1 - The main participants in the pilot project on the use of blockchain technologies in the training of business-oriented specialists for the industry.

The use of blockchain in the implementation of the pilot project allowed:

- the company-customer to receive business and practice-oriented specialists for the company's operational activities and its development;

– State Biotechnological University to update the training programs for specialists, to confirm a positive image among employers;

- students to get a guaranteed job, the opportunity for professional and career growth;

– companies involved in the educational process to receive a new formation of specialists for their needs.

Transparency, trust, traceability and storage of student learning outcomes, security are the main advantages of using blockchain in this project.

Information sources

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