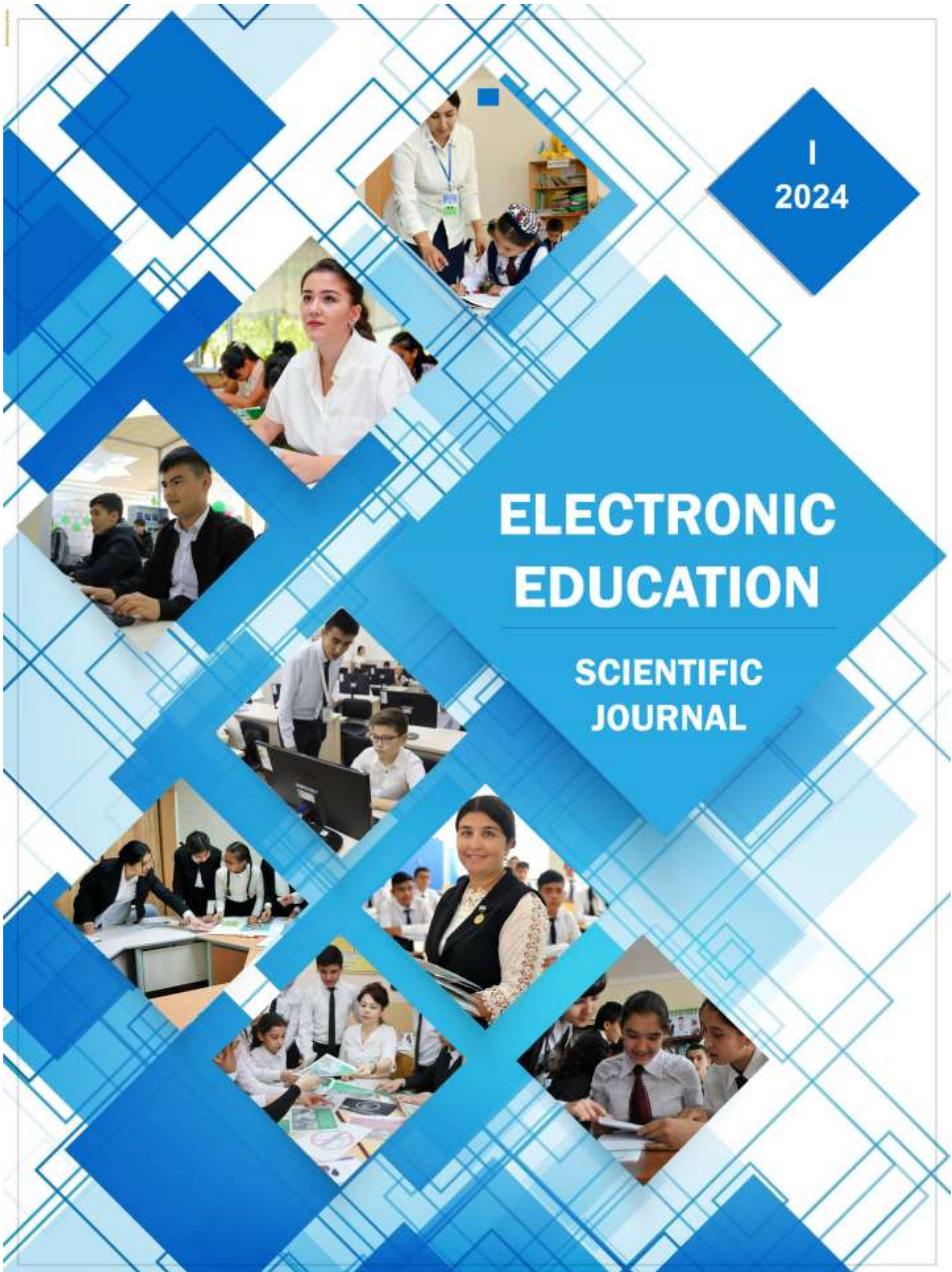


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## *Aniq fanlarda axborot texnologiyalari*

### METHODOLOGICAL AND TECHNOLOGICAL ASPECTS OF THE USE OF CLOUD TECHNOLOGIES IN THE EDUCATIONAL PROCESS

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**Abstract:** *In the context of the rapid development of computer tools and their introduction into the educational process, its participants not only acquire new capabilities and skills, but also the development of the implementation of new approaches is considered the main criterion for the level of effectiveness of lifelong education. This article presents recommendations and conclusions regarding the analysis of the results of research conducted to improve students' independent learning by studying cloud technologies in education, the types of their applications and the possibilities of using cloud products.*

**Keywords:** *digital technologies, education, cloud technologies, computer network, platform, model, software, cloud applications.*

### TA'LIM JARAYONIDA BULUTLI TEXNOLOGIYALARDAN FOYDALANISHNING USLUBIY VA TEXNOLOGIK JIHATLARI

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**Annotatsiya:** *Kompyuter vositalarining jadal rivojlanishi va ularning ta'lim jarayoniga joriy etilishi bilan uning ishtirokchilari yangi imkoniyatlarga va malakaga ega bo'libgina qolmay, yangicha yondashuvlarni amaliyotga tatbig'ining rivojlanishi uzluksiz ta'lim samaradorligi darajasining asosiy mezonini hisoblanmoqda. Ushbu maqolada ta'limda bulutli texnologiyalarni, ularni qo'llash turlarini va bulutli mahsulotlaridan foydalanish imkoniyatlarini o'rganish orqali talabalarning mustaqil ta'limini takomillashtirish bo'yicha olib borilgan tadqiqot natijalarining tahlillari yuzasidan tavsiya va xulosalar keltirilgan.*

**Tayanch so'zlar:** *raqamli texnologiya, ta'lim, bulutli texnologiyalar, kompyuter tarmog'i, platforma, model, dasturiy ta'minot, bulutli ilovalar.*

### МЕТОДОЛОГИЧЕСКИЕ И ТЕХНОЛОГИЧЕСКИЕ АСПЕКТЫ ИСПОЛЬЗОВАНИЯ ОБЛАЧНЫХ ТЕХНОЛОГИЙ В ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ

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**Аннотация:** *В условиях стремительного развития компьютерных средств и внедрения их в образовательный процесс его участники не только приобретают новые возможности и навыки, но и развитие реализации новых подходов считается основным критерием уровня эффективности непрерывного образования. В данной статье представлены рекомендации и выводы относительно анализа результатов проведенных исследований по совершенствованию самостоятельного обучения студентов путем изучения облачных технологий в образовании, видов их применения и возможностей использования облачных продуктов.*

**Ключевые слова:** *цифровые технологии, образование, облачные технологии, компьютерная сеть, платформа, модель, программное обеспечение, облачные приложения.*

**Introduction.** The most important aspect of the use of digital technologies in education is that they not only perform the functions of tools used in solving pedagogical problems, but also create qualitatively new opportunities for learning and studying. At the same time, it develops the individual's independent educational activity skills, stimulates the development of methodology and contributes to the creation of new forms of education. Also, today, with the rapid development of computer tools and their introduction into the educational process, its participants not only have new opportunities and skills, but also implement new approaches.

In addition, as a result of the increase in the level of efficiency of digital technologies, today cloud technologies are actively used in all areas, providing new, cost-effective opportunities for business, management, education and scientific research.

It is known that cloud technologies are data processing technologies in which computer resources are provided to the Internet user as an online service. Here, the word "cloud" exists as a process representing a complex infrastructure that hides all the technical details[1]. Technologies based on cloud computing are one of the popular and actively developing areas in the information world.

Therefore, it is an urgent problem to study cloud technologies in education, the basic information about their application types and fields, as well as the possibilities of using cloud products [9].

**Literature analysis.** Improvement of digital technologies occupies an important place among many new directions of education development. It is aimed at the development of the information environment of the educational institution and provides for the introduction of new information services and their effective use. Including the use of information technologies, first of all, is related to pedagogical needs in increasing the effectiveness of educational development, in particular, the need to develop the skills of independent educational activities O.M. Goreva[2], T.P. Barinova, V.N .Kazakova, S.V. Karyukina [3], O.Z. Imangozhina [4], T.A. Korepina[5] and B.B. Yarmakhov, L.V. Rozhdestvenskaya[6], A.M.

Shaikhutdinov[7], A.S. Khajieva[8] researches have been conducted on the gradual use of cloud technologies in the educational process to be a necessary component of the educational process, and the formation of curiosity skills.

Currently, as a result of the rapid increase in the volume of information, knowledge by itself becomes a condition for the successful implementation of a person and his professional activity.

In this regard, today the issues of studying cloud technologies are of particular importance, including:

- if a person has several computers (laptop, tablet), he always thinks about the compatibility of software at work, at home, constantly transferring files between them, opening and editing documents;

- limited capacity of the hard disk or flash card of the means for data storage;

- the need to have a software license;

- the need for several people to work on one document at the same time.

For example, problems related to joint projects, programs in which each member of the working creative team is responsible for his department can be solved with the help of cloud technologies, and therefore we should think about the relevance of research in this area.

Thus, the future prospects of cloud technologies are inevitable, so current or future knowledge of these technologies is essential for any user who connects with their digital technologies.

**Research methodology.** Currently, digitization of education is a necessary condition for the consistent development of society. Among them, the improvement of many new directions of digital technologies occupies an important place.

Also, it is becoming commonplace in the world to depict computer communication networks and long-distance connections, including through the Internet, as clouds in the block diagrams that originally depicted telephone networks.

According to sources, the idea of "Cloud computing" was first mentioned in 1960 by D. Licklider. According to him, every person on earth is connected to the network, and he receives not only various information, but also programs.

Over time, in the 90-s, the global network that influenced the development of cloud technologies became the Internet. The network capacity has increased significantly and its geographical coverage has expanded. Along with the development of computer networks, they were morally improved, multi-core processors appeared, and the amount of information storage increased to a certain extent[6,7].

As a result, the emergence of the first technology close to today's understanding of the term "Cloud computing" is associated with Salesforce.com, founded in 1999. In 2002, Amazon developed a cloud-based web service that enabled data storage and computing. In 2006, Amazon launched a web service called Elastic Compute cloud (EC2) that allowed its users to run applications. In 2006, Google offered SaaS services, first called Google Apps, and later a platform-as-a-service (PaaS) model called Google App Engine. In 2008, Microsoft presented its service model called "Azure Services Platform" [9,10].

So, the biggest deals to date come from Amazon, Google, and Salesforce.com, and they're adding new features to their services almost every day. This shows that cloud technologies are becoming a common and everyday phenomenon.

**Analysis and results.** Cloud computing technology is one of the fastest growing fields in the modern world based on cloud based technologies. Cloud computing technology combines the resources of different hardware platforms to provide users with a local network or the global Internet means innovative technology that provides access through Various providers offer cloud services that provide access to their resources over the Internet for free or through public cloud applications, without requiring users to have high-performance computers with high demands on hardware and software resources [6,7].

Currently, there are three main models of cloud creation: software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (Infrastructure as a Service -IaaS). Let's analyze these cloud models to determine the possibility of using them in the educational process.

- Software as a Service (SaaS) is a "software as a service" cloud service delivery model in which users run within a cloud infrastructure, accessible to customers through a web interface or an application interface. uses services.

- Platform (PaaS) "infrastructure as a service" provides the user with the ability to manage virtual servers and network infrastructure. This model allows the user to manage stored data, system administration and remote tools.

- With IaaS services, the user rents the computer platform with the operating system, software and other fundamental systems, which reduces its consumption and costs.

Thus, we can say that four models of cloud system deployment are used in practice today:

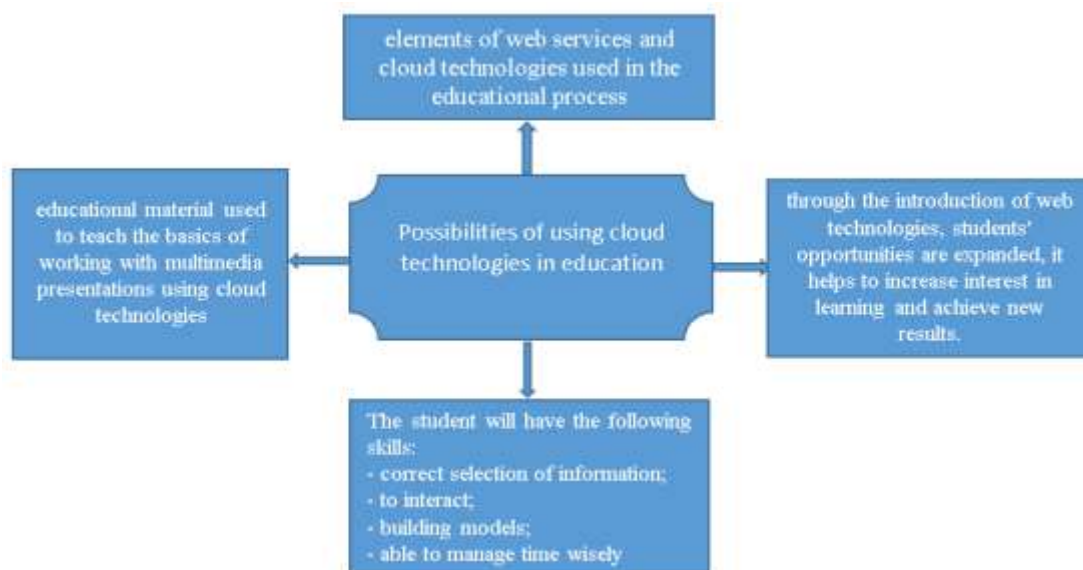
A private cloud is an infrastructure that includes multiple units for use by a single organization. In this case, the private cloud can be owned or managed by the organization itself or by a third party.

A public cloud is infrastructure designed for free use by the general public and may be owned and operated by commercial, academic, and government organizations, or a combination thereof.

A hybrid cloud is a combination of two or more different cloud infrastructures interconnected with standardized or proprietary technologies for data transfer and applications (e.g. , for short-term use of cloud resources).

A community cloud is a type of structure that is designed for use by a specific group of consumers of a division or organization with common goals and can be jointly owned and managed by one or more organizational teams.

Thus, based on the studied resources and analysis, the following advantages of using cloud technologies in the educational process can be expressed (see the table).



Based on the above-mentioned services, we develop the didactic capabilities of cloud technologies, confirm the feasibility of using them in the educational process:

- organization of cooperation between a large group of teachers and students;
- the ability to exchange and edit various types of information for students and teachers;
- quick inclusion of the created products in the educational process, if the user of the service does not have a local connection to the place of its provision;
- organization of educational lessons based on interactive technologies;
- to create opportunities for students to present their projects and individual works. Advantages of using cloud technologies.

Thus, the main didactic advantage of using cloud technologies in the educational process is the organization of cooperation between students and teachers.

Of course, cloud technologies have some disadvantages, which are mainly technical and technological in nature and do not affect their didactic opportunities and advantages, limited functionality compared to local analogues, local cloud service providers (Amazon, Goggle, Salesforce, etc.) absence is explained by the lack of local and international standards[10].

However, the introduction of cloud technologies into the educational process in continuing education ensures:

- effective use of the classroom;
- to have the opportunity to acquire modern knowledge at any time (being in the learning process at any distance);
- effective interactive educational process;
- the ability to quickly adapt to the educational process and repeat;
- the ability to give feedback to the teacher by evaluating and commenting on educational services;
- centralized management of software and information resources used in the educational process.

Another advantage of using cloud services is to transfer learning management systems to the cloud. Outsourcing such systems to external providers makes sense for educational institutions that are unable to provide and maintain software and support.

**Summary.** So, we can say as a conclusion: digital technology tools, web services and cloud technologies serve well for many programs installed on the computer.

As a result, with the help of such technologies, the teacher can create, edit, and place his educational materials for use in the course of the lesson, send them to students, and store them safely in the global network. Today, through computers connected to a single educational network, you can run training programs and simulators at all stages of continuing education, and you will once again be confident in its capabilities.

Therefore, it is very important and necessary to use the capabilities of cloud technology methods in the educational process, because they improve the work of students and teachers makes it much easier. The use of such cloud services allows teachers to use modern approaches to teaching, and students to expand opportunities for independent education and independent learning.



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