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IMPROVING THE MECHANISMS FOR ORGANIZING INDEPENDENT LEARNING ACTIVITIES THROUGH CLOUD TECHNOLOGIES (ON THE EXAMPLE OF PRIMARY EDUCATION)

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Abstract: The article discusses the issues of improving the mechanisms for the effective organization and management of students' independent educational activities based on cloud technologies. The development of independent learning skills in a digital learning environment is one of the priority areas of modern pedagogy. In this regard, cloud technologies serve to organize independent education in an interactive, flexible and person-oriented way through their capabilities such as remote access, real-time updating of information, and simplification of interaction between teachers and students. The article analyzes existing scientific and theoretical views, foreign and national experiences, substantiates the role of cloud platforms in planning, monitoring and analyzing independent educational activities and the mechanisms for their implementation in practice.

Keywords: cloud technologies, independent learning, digital environment, distance learning, learning management, electronic resources, educational innovations, person-centered approach, learning monitoring, modern educational technologies.

INTRODUCTION

As modern information and communication technologies become deeply integrated into the education system, they are bringing significant changes to the content, forms, and methods of pedagogical processes. In particular, digital educational environments based on cloud technologies are creating new opportunities for organizing students' independent learning activities. Through such technologies, access to educational materials, assignments, assessment tools, and communication platforms from any place and at any time contributes to the individualized and flexible organization of independent learning.

Today, under conditions characterized by continuously changing knowledge systems, professional competencies, and skills, the need for personal self-development is steadily increasing within society. From this perspective, independent learning can be defined as a process in which students plan, implement, and evaluate their educational activities based on their personal goals. At this stage, improving the mechanisms for organizing education through cloud technologies is regarded as an important theoretical and practical issue.

At the international level, extensive research and practical initiatives aimed at supporting independent learning through cloud-based educational platforms—such as Google Workspace for Education, Microsoft 365 Education, and MoodleCloud—are being conducted in countries such as the United States, Canada, United Kingdom, South Korea, and Finland. For example, scholars such as J. Anderson, B. Lee, and L. Harper have emphasized in their studies that the interactivity, collaboration, and rapid updating of educational resources enabled by cloud technologies serve as important factors in improving the quality of independent learning.[1][2][3]

In the Republic of Uzbekistan, several important policy documents aimed at developing the digital educational infrastructure have also been adopted, including the "Digital Uzbekistan – 2030" strategy, the "Concept for the Digitalization of the Education System," and other regulatory

and legal frameworks. Within these processes, digital forms of education are expanding through platforms such as ZiyoNET, “Knowledge Base,” and “Electronic University.” However, the scientific and methodological foundations specifically aimed at improving independent learning activities through cloud technology-based mechanisms have not yet been sufficiently developed.[4][5]

From this perspective, within the framework of this article, it is considered highly relevant to identify the scientific foundations for integrating cloud technologies into independent learning activities, analyze international and local experiences, and develop approaches for their further improvement. Through this, it becomes possible to make an effective contribution to the innovative and continuous development of modern education.

LITERATURE REVIEW

Research conducted at both international and local levels on the effective organization of independent learning activities through cloud technologies in modern education systems demonstrates the relevance, pedagogical significance, and technological potential of this field. The issue of organizing independent learning based on cloud technologies has been extensively studied in foreign countries. In particular, J. Anderson, in his research, analyzes how the widespread accessibility of educational resources through cloud environments and their independent use contribute to increasing students’ motivation. He argues that the opportunity to acquire knowledge through flexible cloud-based platforms enhances learner engagement and activity [1].

B. Lee, within the framework of a learner-centered educational model, developed mechanisms for adapting independent learning processes through cloud services such as Microsoft Teams and Google Classroom. The researcher demonstrated that these systems contribute to the development of students’ time-management abilities, independent task completion skills, and analytical competencies [2].

In studies conducted by L. Harper, particular emphasis is placed on the development of students’ independent thinking and self-assessment skills within distance education environments organized through cloud technologies. The scholar analyzed the mechanisms of social and cognitive interaction in cloud-based Learning Management Systems (LMS) [3].

Within the Commonwealth of Independent States (CIS) region, the issue of organizing education through cloud technologies is also considered an актуальный scientific direction. For example, Russian scholar A. V. Khutorskiy, based on the concept of learner-centered education, emphasizes the importance of digital technologies—particularly cloud services—in enabling each learner to independently construct their own educational pathway [6].

Similarly, N. V. Andreeva developed technological solutions for managing independent learning in distance and blended learning formats based on the implementation of cloud-based educational environments in Russian universities [7].

Kazakh researcher A. Mukanov empirically substantiated how students’ self-monitoring skills are formed through educational practices organized using Moodle and Google Workspace [8].

In recent years, the number of studies conducted by Uzbek scholars aimed at developing distance and independent learning through cloud technologies has also increased. A. R. Yunusxo‘jayev, in his scientific work, analyzed the didactic capabilities of cloud technologies and developed mechanisms for their integration into the educational process [9].

Research carried out by D. K. Karimov focused on organizing students’ independent work through electronic platforms, monitoring learning activities, and evaluating educational effectiveness. The scholar proposed the use of Google Sheets, Google Forms, and Google Classroom functionalities in pedagogical monitoring systems [10].

Furthermore, X. M. Ortiqova analyzed the role of cloud technologies in the formation of digital competencies in education, particularly as a tool supporting independent learning processes [11].

ANALYSIS AND RESULTS

In the modern education system, independent learning activities are organized through various technological tools. Analyses indicate that alongside traditional forms of learning—such as written assignments and extracurricular reading activities—and electronic formats including PDF textbooks and online tests, Learning Management Systems (LMS) such as Moodle, Edmodo, and Blackboard have also been widely implemented. However, cloud technologies, due to their flexibility, collaborative environment, and automated assessment systems, significantly enhance the effectiveness of independent learning processes.

The table below presents a comparative analysis of independent learning effectiveness, academic achievement levels, and student engagement indicators based on different educational technologies.

Table 1

Effectiveness of independent learning based on various technologies

Technology Type	Effectiveness (%)	Student Engagement	Academic Achievement (%)
Traditional methods	45	Moderate	50
Electronic textbooks	58	Moderate–High	62
LMS systems (Moodle, etc.)	72	High	78
Cloud technologies	88	Very High	91

As can be observed from the table, independent learning activities organized on the basis of cloud technologies demonstrate the highest performance indicators. In particular, the significant differences in student engagement and academic achievement levels represent important factors influencing the quality of education. Although Learning Management Systems (LMS) show relatively high results, they are often limited by restricted integration capabilities and static learning tasks. In contrast, cloud technologies such as Google Workspace, OneDrive, Canva for Education, and Microsoft 365 stand out due to their real-time collaboration features, automated assessment systems, and opportunities for interactive communication and feedback exchange.

The main indicators presented in the table above can also be illustrated graphically. Such visualization allows for a clearer comparative analysis of the effectiveness of different educational technologies.

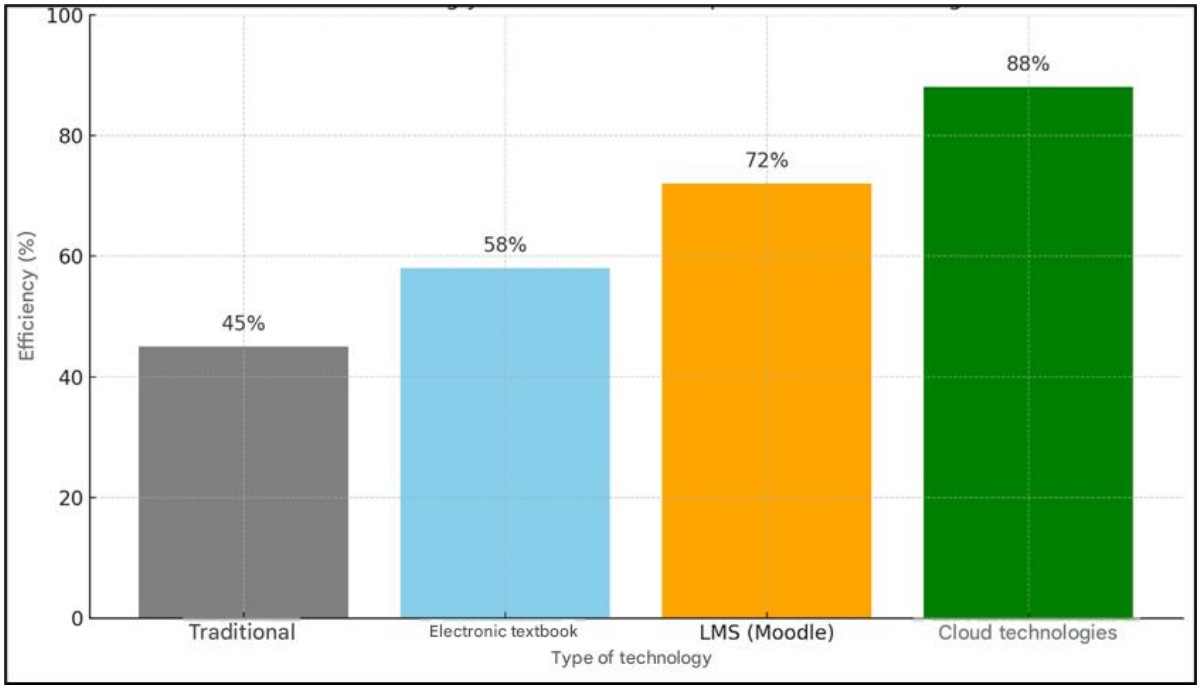


Figure 1. Effectiveness of Independent Learning Based on Various Technologies

An empirical analysis of the impact of various technologies on the organization of independent learning activities demonstrates that educational processes organized within digital environments-particularly through cloud technologies-significantly enhance students' knowledge acquisition, academic achievement, and analytical thinking skills.

As illustrated in the diagram above, the effectiveness of independent learning within the traditional approach remains around 45%. When electronic textbooks are utilized, this indicator increases to 58%, while the use of Learning Management Systems (LMS), such as Moodle, raises the effectiveness level to 72%. The highest result was observed in educational activities organized through cloud technologies, where the effectiveness indicator reached 88%.

These findings confirm that cloud-based educational environments provide broader opportunities for interactive learning, collaborative activities, continuous access to educational resources, and automated assessment processes. As a result, learners become more active participants in the educational process, their motivation toward independent learning increases, and the overall quality of education improves significantly.

This can be explained by the following advantages of cloud technologies:

– Flexibility: users are able to access educational resources anytime and from any device;

– Collaborative environment: opportunities for real-time interaction and communication are available;

– Self-monitoring capabilities: cloud systems provide opportunities for automatic assignment submission, assessment, and performance analysis;

– Up-to-date educational resources: cloud environments allow rapid updating and seamless integration of educational materials and resources.

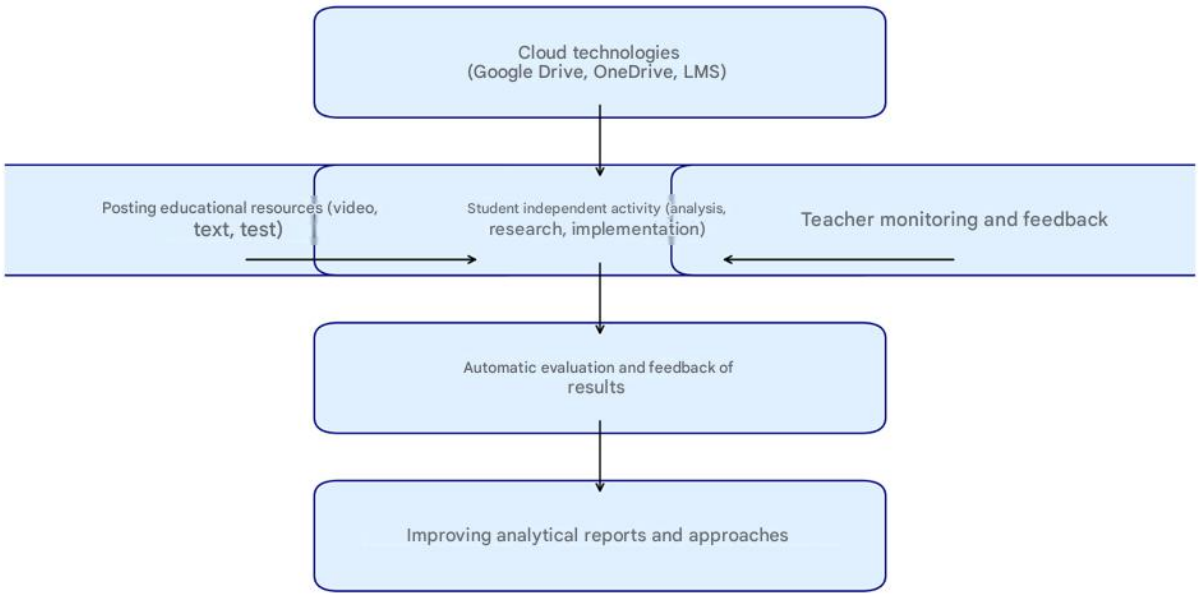


Figure 2. Mechanism for Organizing Independent Learning Activities through Cloud Technologies

The diagram presented above illustrates the step-by-step mechanism for organizing independent learning activities through cloud technologies. The mechanism consists of the following stages:

1. Cloud technologies – platforms such as Google Drive, OneDrive, Moodle, and Microsoft Teams serve as the primary digital infrastructure for organizing the educational process.
2. Placement of educational resources – video lectures, textual materials, assignments, and test resources are uploaded and provided through open cloud-based platforms.
3. Student independent activity – students independently engage in learning activities, including research, analysis, task completion, and information processing.
4. Teacher monitoring – instructors supervise the learning process through cloud platforms, provide feedback, and guide students when necessary.
5. Automatic assessment of results – the system automatically evaluates tests, assignments, and completed tasks through integrated digital assessment tools.
6. Analytical reporting – based on the obtained results, analytical reports are generated to identify shortcomings and implement further improvements in the educational process.

Conclusions

In the modern educational environment, cloud technologies are emerging as an effective tool for supporting students' self-development, research activities, and motivation toward independent learning. Based on the analyses, comparative tables, and graphical data presented in this article, it can be concluded that the unique capabilities of cloud platforms—such as free access to educational resources, real-time communication, automated assessment and monitoring, and self-control opportunities—are elevating independent learning to a qualitatively new level. Therefore, the necessity of systematically integrating these technologies into the educational process on the basis of pedagogical objectives is steadily increasing.

Independent learning activities organized through cloud technologies are more effective than other technological approaches and are distinguished by higher levels of student motivation and improved quality of learning outcomes.

Cloud platforms such as Google Workspace, Microsoft 365, and MoodleCloud engage learners in active learning processes through their integrated functionality across all stages of education, including planning, implementation, monitoring, and assessment.

1. Within educational environments organized through cloud services, students independently manage their learning activities, which contributes to the development of digital competencies, critical thinking skills, and self-assessment abilities.
2. International experience demonstrates that cloud technologies have become effective instruments not only for distance education but also for the modernization of traditional educational systems.
3. In our country, the reforms being implemented within the framework of the "Digital Uzbekistan – 2030" strategy are creating favorable conditions for integrating cloud technologies into independent learning activities.
4. For the effective organization of independent learning based on cloud technologies, additional efforts are required in developing methodological guidelines, improving teachers' digital literacy, and adapting educational platforms in terms of language and content accessibility.

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