

EFFECTIVE UTILIZATION OF DIGITAL AND DIDACTIC TOOLS IN ORGANIZING
INDEPENDENT LEARNING

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Abstract. *This article presents an overview of the attention given by the Government of the Republic of Uzbekistan to the higher education system, as well as the Presidential decrees aimed at further developing this sector and the key ideas promoted within these documents. In addition, the paper discusses the implementation of the credit-module system in higher education institutions, the organization and forms of students' independent work, and the current state of its application. The views of various scholars regarding effective approaches to organizing students' independent learning activities are highlighted. The article also provides information on the organization of independent study tasks at the institute level and the application of these practices to a specific subject. The final section presents conclusions drawn from the conducted scientific research.*

Keywords: *higher education, student, credit-module system, independent study, motivation, didactic tool, technology, education, discipline, analysis*

Introduction. As is well known, Presidential Decree No. PF-5847 of October 8, 2019, "On the Approval of the Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030," outlines a number of priority tasks aimed at elevating the quality of higher education. In particular, the decree emphasizes the need to introduce higher education standards based on advanced international experience, to fundamentally modernize the content of higher education, and to gradually transition from theory-oriented curricula to practice-based learning models within academic programs [1].

To effectively address the tasks set by the government regarding the preparation of highly qualified future specialists, a comprehensive approach is essential. This includes the competent design of educational content, the use of modern teaching methods, didactic tools, and educational technologies, as well as continuous professional development of instructors. Equally important is the creation of necessary conditions for students to complete independent study tasks and the revision and improvement of academic processes within each educational program.

Today, students' independent work in higher education institutions should not be considered a supplementary component but rather one of the core forms of the educational process. Independent study plays a crucial role in helping students acquire the general cultural and professional competencies outlined in state educational standards and in preparing them for successful professional activity. Moreover, organizing independent learning in accordance with the principles of competence-based education facilitates the adoption of active learning methods, fosters students' creative abilities, and enables a shift from group-based instruction to individualized learning tailored to students' abilities and future professional requirements.

In this regard, the quality of teaching and the effectiveness of students' independent work are directly linked to the structure of the educational process, the didactic tools employed, and the teaching methods and technologies applied. Properly selected didactic resources, instructional approaches, and

organizational methods contribute to the development of students' creativity, support the formation of professional competencies, and enhance their learning activity. Bolonya jarayoni - bu Evropa mamlakatlari orasida oliy ta'limni uyg'unlashtirish jarayonidir. U tushunish oson bo'lgan va o'xshash oliy ta'lim darajalar tizimini yaratishni, ta'limda kredit-modul tizimiga o'tishni, ta'lim sifatini ta'minlashda erkin akademik harakatlanishni va Evropadagi ta'lim hamkorligini o'z ichiga oladi. Qisqa qilib aytganda, bu Evropa mamlakatlarining oliy ta'lim tizimlarini uyg'unlashtirish, har bir kishi uchun teng ravishda ta'limni ta'minlash, intellektual, madaniy, ijtimoiy, ilmiy va texnologik salohiyatni shakllantirish va mustahkamlash, ta'lim sifatini takomillashtirish jarayonidir.

In developing a national model based on the credit education system in Uzbekistan, it is advisable to select a reliable framework that ensures high-quality higher education and facilitates integration into global educational processes. This model draws on the strengths of both the European ECTS credit system and the American credit-hour system. The ECTS structure, taking into account the multinational traditions of Europe, enables the harmonization of various educational systems. The key issues emphasized within the credit-module system include the following [2]:

- ensuring students' independent learning;
- evaluating students' knowledge through a rating-based assessment system;
- developing and improving modular teaching technologies;
- enhancing the methodological support of academic disciplines to strengthen students' independent study.

The main objectives of the credit-module system can be summarized as follows:

- organizing the educational process on a modular basis;
- determining the credit value for each subject and course;
- assessing students' performance using a rating-based evaluation mechanism;
- creating opportunities for students to develop individualized study plans;
- increasing the proportion of independent learning within the educational process;
- adapting educational programs as required by labor market demands and ensuring their flexibility;
- enabling students to choose courses and instructors.

As is evident, the preparation of competent specialists requires particular emphasis on students' independent learning activities.

Currently, various approaches exist regarding the organization of independent student work. Some researchers consider independent study as the process of students completing, comprehending, and independently interpreting tasks assigned by instructors. Others describe this phenomenon only by its external characteristics. Yet another group defines independent work as the process of acquiring new knowledge autonomously, mastering it on a deeper level, regulating one's own learning pace, and allocating time for exploring assigned questions.

Therefore, independent study is not merely a form of learning but also an essential instructional tool. In this regard, students must perform several key functions to acquire new knowledge and skills: developmental, informational-instructional, guiding, motivational, educational, and research functions [3].

The analysis of dissertations and scholarly-methodological works demonstrates that although various educational tools have been used to organize independent student work in the teaching process of higher education institutions, such activities have not been systematically documented and have not been regarded as an independent instructional tool. Long-term teaching experience shows that the

integration of diverse didactic tools into the educational process enables students to master subjects more effectively and contributes to the formation of competencies required of future engineers in accordance with state educational standards.

Literature Review and Methodology. Many scholars and researchers have examined various issues related to students' independent learning. In particular, S.I. Arkhangelskiy, M.N. Akhmetova, N.V. Bordovskaya, V.Ya. Lyadis, P.I. Pidkasisty, and A.P. Tryapitsyna have studied the organizational aspects of independent learning. The conditions necessary for developing the "individuality" of students' independent work have been explored in the research of E.H. Voronova and I.A. Ivanov. The development of students' creative activity is discussed in the works of S.N. Gayday and V.P. Ushachyova. Independent study as a factor contributing to students' individuality has been examined by A.K. Vorstera, I.A. Dubovets, and E.V. Ospennikova. In addition, V.Ya. Lyadis, P.I. Samoylenko, G.V. Shironina, and other scholars have conducted research on organizing students' independent work through various didactic learning tools, while A.E. Zhukova, N.V. Smetanina, L.V. Turkina, and several other researchers have investigated ways to increase the effectiveness of independent study. Significant contributions to the use of didactic learning tools in the effective organization of students' independent work have also been made by V.P. Bepalko, N.V. Bordovskaya, L.Ya. Zorina, Yu.G. Tatur, N.L. Shubina, N.E. Erganova, and others.

Among Uzbek pedagogical scholars, T.T. Shoimardanov, N. Sayidahmedov, P.T. Magzumov, O. Kh.To'raqulov, A.R. Khodjaboev, R. Mavlonova, U.N. Nishonaliyev, E.T. Choriyev, O.A. Qo'ysinov, and others have discussed the organizational and methodological foundations of students' independent learning in their research.

Independent learning as a pedagogical issue has been explored by T.R. Niyazmetova, R. Saidova, A.I. Akhmedov, B.M. Turdibaeva, U.Q. Tolipov, Sh.S. Sharipov, Z. Nishonova, J. Tolipova, N. Khalilov, S. Matchanov, and others.

International pedagogical practice demonstrates several key trends in the development of higher education:

- modern socio-cultural conditions require the implementation of the concept of lifelong learning, meaning that students must continuously update and expand their knowledge;
- in an information-oriented society, significant changes are required in the organization of the educational process: reducing classroom hours and replacing passive lecture listening with an increased share of students' independent work;
- the focus of education is shifting from teaching independent work to facilitating its meaningful mastery.

In contemporary conditions, the training of competent specialists requires instructors to systematically supervise and support students' independent activities as one of the primary tools of the instructional process.

Students' independent work may be classified according to the place and time of its implementation, as well as the degree of teacher supervision and assessment. These include:

- independent work conducted during classroom activities (lectures, seminars, laboratory work);
- teacher-supervised independent work, including planned consultations and preparation for tests and examinations;

- out-of-class independent tasks of academic or creative nature completed by the student individually.

Methods. In any context, the effective organization of students' independent work requires, first of all, the development of its project framework, conditions of implementation, and the mechanisms through which it will be carried out. The organization of independent study must be based on well-defined requirements and expectations, and the reliability of the information provided is of critical importance. To achieve this, the use of several methodological approaches is recommended. The theoretical foundations of independent work and its assigned objectives, as well as the conditions and methods for conducting experimental research, must be clearly established. The following methods are typically employed in the process of implementing independent learning:

1. **Systems analysis methods** (including morphological and functional-parametric characteristics).
2. **Statistical methods** (normative, comparative, random evaluation methods, change-tracking methods, constructive-critical analysis, etc.).
3. **Survey methods** such as interviews, questionnaires, and sociological inquiry.

The use of a systems-based approach in engineering-related independent work enables the identification of numerous interacting elements within a given process, the determination of the most influential factors, and the development of effective strategies for influencing them. Statistical methods—such as normative, comparative, random evaluation, change-monitoring techniques, and constructive-critical analysis—are particularly essential when designing and implementing engineering projects within student independent work.

The normative method, in particular, serves to establish overall evaluation criteria for project activities. It relies on specific guidelines that address questions such as “how something should be done,” “how a system or subsystem should function,” or “how certain documents should be formalized.” As a rule, these standards are defined in the legal and regulatory framework through established models, templates, and formats, against which the actual level of project performance is assessed [4].

In modern higher education institutions, the most essential tool for enhancing students' professional preparedness under the guidance of instructors is the effective and well-structured implementation of independent learning.

The technological organization of students' independent work may include the following components:

- **Technology for selecting goals of independent learning.** These must be clearly defined in state educational standards, qualification requirements, professional frameworks, curricular goals, systems, and technologies.
- **Technology for selecting the content of independent learning.** This includes the content prescribed by state standards, educational resources (literature, practical experience, self-analysis), and students' individual psychological characteristics.
- **Technology for designing tasks.** Assignments must correspond to various levels of learning objectives, reflect the content of each subject, and encompass different types of student activities and levels of knowledge acquisition.
- **Technology for organizing assessment.** This involves selecting appropriate assessment tools, determining stages of assessment, and developing various forms of evaluation.

Independent work plays a particularly significant role in the study of specialized subjects, as it motivates students to engage with essential literature and fosters the development of decision-making skills. For this reason, designing case-based assignments for groups of students is considered a promising pedagogical approach, as it nurtures collaborative creativity. This form of activity teaches students to distribute roles within a team, complete individual assignments, and evaluate the outcomes of collective work. Consequently, students acquire new knowledge more easily and rapidly and gain a clearer and deeper understanding of processes in which they are directly involved.

The use of information technologies, educational platforms, and other digital tools in organizing independent study provides students with valuable opportunities, such as developing models based on real-world processes and incorporating probabilistic characteristics derived from real-life phenomena. The incorporation of computer technologies into the learning process undoubtedly requires both instructors and students to possess strong competencies in the field of modern information technologies.

Independent study is inherently activity-based, and therefore its structure incorporates several essential components characteristic of purposeful activity: motivational factors, task formulation, selection of appropriate methods for completing the task, and monitoring of the outcomes [5].

To ensure the successful completion of independent work, the following conditions must be met:

- stimulation of students' learning tasks;
- clear understanding of the assigned objectives;
- students' sufficient theoretical knowledge and skills to execute the task and follow the required algorithm;
- explicit definition by the instructor of the task volume, method of submission, reporting format, and deadlines;
- identification of consultation types (introductory, thematic, or problem-oriented);
- establishment of evaluation criteria, reporting procedures, etc.;
- determination of control methods and forms (seminars, assessment tasks, tests, practical sessions, and others).

Motivation plays a crucial role in the effective organization of students' independent work.

Three main types of motivation are distinguished:

1. External motivation – related to the student's understanding that academic results influence future professional career opportunities.
2. Internal motivation – associated with the student's personal interest, aptitude, and academic orientation. Before entering university, students' preferences can be identified through diagnostic tests and questionnaires.
3. Process (learning) motivation – expressed in the student's awareness of the usefulness of the task being completed. This requires psychological alignment with the significance of the activity in terms of professional readiness, broadening of worldview, and deepening of subject knowledge. Students should understand that independent work enhances their ability to grasp lecture content more thoroughly and serves as an integral part of course projects and graduation theses.

To illustrate this motivational framework, let us consider the example of a specific discipline:

The goal of teaching the subject "Computer Systems and Networks" is to equip students with the knowledge and skills required for designing local and global networks. Students learn to base network design on the OSI model, select appropriate IP addressing schemes for network devices,

and ensure reliable data transmission across the network. Furthermore, the course develops competencies related to network security, enabling students to design systems that preserve data integrity, confidentiality, and availability.

The course consists of 150 total hours, of which 60 hours are allocated to classroom instruction and 90 hours to independent study. The subject is assigned 5 credits, and student performance is assessed in accordance with the credit–module system.

To enhance the effectiveness of independent work within this subject, students may be assigned case-based tasks involving the development of network topologies, simulation of data flow across multi-layered architectures, or configuring network devices using industry-standard tools (e.g., Cisco Packet Tracer, GNS3). Such assignments reinforce theoretical knowledge through practical application and promote problem-solving skills essential for modern IT specialists.

Additionally, integrating learning analytics tools enables instructors to monitor student performance in real time, identify learning gaps, and tailor guidance to individual needs—thus ensuring a more personalized and competency-based educational experience.

Results and Discussion. In our practical work, we implemented a set of measures aimed at organizing independent learning and increasing student engagement in the subject “**Computer Systems and Networks.**” These measures included:

- Developing questions and tasks related to each topic covered in the classroom to reinforce and consolidate students’ understanding;
- Preparing both individual and group-based assignments to encourage collaborative learning and teamwork skills;
- Creating instructional guidelines for using the *Cisco Packet Tracer* software application to enhance laboratory and practical training in the course;
- Providing students with various educational resources—textbooks, scholarly publications, online materials, video and audio content—to support independent study and project-based submissions;
- Preparing additional topics for independent learning based on the qualification requirements of the educational program, ensuring that students acquire the competencies necessary to become qualified engineers;
- Creating opportunities for students to upload and submit their independent work through an online educational platform;
- Involving volunteer specialists from industry to evaluate the completeness and quality of the independent work submitted by students.

In conclusion, students’ independent work plays a crucial role in the preparation of future competent specialists, as it enriches learners with new knowledge, encourages them to find solutions in non-standard situations, and fosters their decision-making skills. To increase the effectiveness of independent work, it is essential to provide students with appropriate organizational methods, formats, and the necessary instructional and methodological resources. Equipping students with modern laboratory environments, technologies, and instructional tools is vital for developing their professional skills, enhancing their competencies as specialists, and elevating their research activities to a new level.

Moreover:

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- the scope of each assignment should be designed in such a way that students can thoroughly apply their theoretical and practical knowledge and provide written responses to all questions within the allotted time;
- all tasks within the discipline should ideally be developed with a uniform level of complexity;
- each assignment should contain questions that require precise and well-structured answers;
- educational materials should include questions that guide students toward independent exploration of the relevant content;
- questions or tasks based on lecture material should not replicate one another in content, ensuring diversity and comprehensive assessment of learning.

It is important to emphasize that the development of students' self-regulation competencies plays a significant role in the process of independent learning. Students who are able to plan, monitor, and evaluate their own learning activities become better prepared for future professional practice, as they develop the ability to make independent decisions, act responsibly, and continuously update their knowledge.

Furthermore, the integration of digital resources into independent learning substantially enhances the effectiveness of students' academic activities. Online platforms, simulators, educational software, and virtual laboratories enable students to acquire deeper understanding of course topics and engage in problem-oriented tasks that reflect real-world challenges. This approach fully corresponds to the requirements of modern pedagogy.

Another important aspect is that independent work fosters the development of critical thinking, analytical skills, problem formulation, creative problem-solving, and research readiness—all of which are essential for the completion of final-year projects and scientific research activities. Therefore, independent learning should be viewed not merely as a form of academic activity but as a pedagogical tool that contributes to students' professional maturity.

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