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METHODS FOR IMPROVING STUDENTS' INDEPENDENT LEARNING AND WORK IN BIOLOGY

IBODOVA MAHFUZA NAMOZOVNA

MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATION OF THE REPUBLIC OF UZBEKISTAN

Navoi State Pedagogical Institute

IBODOVA MAHFUZA NAMOZOVNA

Methods For Improving Students' Independent Learning And Work In Biology.

Monograph

UDC:57:371.3

Annotation

This monograph is intended for academic lyceum students, in-depth study of collected information on professional activity and independent training and biology of teaching, modern approach to the education system, professional activity, independent training, independent work, organizational form of independent training, type of didactic purpose and place of implementation, informative - communicative educational environment, method of organization of independent education, knowledge of didactic system - pedagogical analysis. In addition, improvement of the process of projecting independent educational activities with means of information resources and the basis of priority level diagnostic and organizational-technological compositional work in the electronic information environment.

Author:

Ibodova M.N. Navoi State Pedagogical Institute, Department of Doctor of Philosophy in Pedagogical Sciences, acting professor, (Ph.D).

Reviewers:

Umarova J.Q. Navoi State Pedagogical Institute, Department of Biology, acting professor, (Ph.D).

N.T.Hamrayeva Jizzakh State Pedagogical University, associate professor of the "Biology and its Teaching Methodology" department

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INTRODUCTION

In the world, special importance is attached to supporting the independent education of students through the widespread introduction of information and communication technologies into the educational process, creating a base of educational resources and increasing the efficiency of their use. The role of electronic information resources based on the visual and virtual capabilities of interactive software, as well as the development of student knowledge about biological processes, the formation of reflexive skills, has no equal in teaching biology in the natural sciences. In studies such as the international programs for assessing student literacy in mathematics and natural sciences (PISA, TIMSS), scientific research is being conducted around the world on the design of independent work of students in teaching biology, the creation of information resources focused on professional areas.

The theoretical significance of these studies is seen in the use of technologies such as updating methodological support for teaching natural sciences, including biology, increasing the possibilities of interdisciplinary communication and modular training, as well as the practical significance of introducing an online monitoring system. and assessment of self-study, virtual laboratory learning, and webquests.The reforms being implemented in our country in terms of strengthening the material and technical base of educational institutions, creating the necessary conditions for the teaching activities of teachers, supporting students in secondary schools and academic lyceums, increasing the efficiency of teaching natural sciences, including biology, represent advanced pedagogical and modern information technology, such opportunities as the use of multimedia educational resources create the need to improve methodological conditions for the use of information resources in teaching biology.

In the action strategy for the further development of the Republic of Uzbekistan, “in-depth teaching of important and in-demand subjects, such as chemistry, biology, physics, mathematics, computer science, foreign languages, improving the quality of secondary specialized education,” and development”1 is defined as a priority task. In academic lyceums, it is important to organize and carry out independent educational activities of students in biology and improve information resources. The reforms being implemented in our country in terms of strengthening

the material and technical base of educational institutions, creating the necessary conditions for the teaching activities of teachers, supporting students in secondary schools and academic lyceums, increasing the efficiency of teaching

natural sciences, including biology, represent advanced pedagogical and modern information technology., such opportunities as the use of multimedia educational resources create the need to improve methodological conditions for the use of information resources in teaching biology.

In the Action Strategy for the further development of the Republic of Uzbekistan, “in-depth teaching of important and in-demand subjects, such as chemistry, biology, physics, mathematics, computer science, foreign languages, improving the quality of secondary specialized education,” and development”1 is defined as a priority task. In academic lyceums, it is important to organize and carry out independent educational activities for students in biology and improve information resources.PF-4947 of the President of the Republic of Uzbekistan dated February 7, 2017 “On the strategy of action for the further development of the Republic of Uzbekistan”, PF-4947 dated January 25, 2018 “On measures to radically improve the system of general secondary, secondary special and vocational education” Resolution No. 5313 dated June 30, 2017 “On measures to radically improve the conditions for the development of information technologies in the republic” Resolution No. This dissertation research serves to a certain extent to implement the tasks defined in Resolution No. 997 “On organizational measures” and other regulatory documents.

1.1-§. The use of information resources as a pedagogical problem in organizing independent work of students in biology

It is important to adapt the educational process to modern requirements, modernize it on the basis of accumulated foreign experience, and organize independent activities of students to ensure its effectiveness. Creating the necessary conditions for independent learning of students, directing them to creative activities, and developing their professional competence is one of the main tasks of the continuous education system. As the head of our state stated: “We are mobilizing all the forces and capabilities of our state and society so that our youth can become independent thinkers, have high intellectual and spiritual potential, and become people in no way inferior to their peers.” field in the world, and be happy” [6;592-b]. During the study, in order to organize independent work of students when teaching biology, it was necessary to clarify the concept of the educational process.

In the methodological textbook of biology, published for students of pedagogical universities of our republic, the learning process is as follows: the learning process is aimed at mastering specific educational material, mastering teaching methods and teaching activities of the teacher, based on the Organization and management of this process is defined as a process. Since the educational process is an organized and controlled process, the question arises, in what forms is it organized?

In the sources of methodology for teaching biology, the learning process and its forms are organized by students in various conditions (biology class, excursion, wildlife area, nature) used by the teacher in the educational process, these are lessons, homework, independent work. in teaching activities, manifested in the form of extracurricular activities, excursions and extracurricular activities. It should be noted that the above forms of training are organized comprehensively and interdependently.According to the objective of the study, the successful organization of independent work of students is a new topic studied in class, homework and independent work depending on its content, observations and experiments related to the content of the topic, that is, the organization of extracurricular activities for For this purpose, excursions according to the program with the topics being studied will be directly related to the organization of

extracurricular activities in order to realize coherence and satisfy the interest and need of students in learning the basics of biological science. The decisions taken to modernize the education system in our republic and the measures specified in

them create the need for a new approach to organizing students' independent work.

Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated December 8, 2018 No. 997 "On measures to organize international research in the field of assessing the quality of education in the public education system" provides for the modernization of the education system, improving the quality and efficiency of education.In this decision, assessment of the quality of education in the continuing education system should be adapted to the requirements of today, the development of students' literacy levels in reading, mathematics and natural sciences, the development of innovative methods and technologies for the use of international assessment programs in teaching practice, international relations in the field of assessment of the quality of education with educational institutions in developed countries of the world, creation, development and implementation of international projects, participation in the organization and conduct of international scientific conferences and symposiums, conducting fundamental and applied research in the field of assessing the quality of education, scientific and methodological support for these studies, successful participation of institutions of general secondary education in international research, ensuring comparison of the results obtained with the results of other countries, conducting systematic monitoring of the implementation of international assessment programs in the educational process, popularizing the best experience in this area and developing recommendations and manuals for educational institutions based on it, reading using innovative teaching methods, mathematics and such tasks as the preparation of educational and methodological recommendations for improving the qualifications of teaching staff in the field of natural sciences.The implementation of these tasks requires the activation of the pedagogical activities of teachers and students in order to improve the quality of educational services, modernize the educational process, and achieve a high level of education quality indicators.

One of the international assessment programs specified in this Resolution is PISA - Program for International Student Assessment - which is designed to assess the level of literacy of students in our Republic in the field of reading, mathematics and natural sciences, as well as for the independent application of acquired knowledge, skills and skills. abilities acquired by students of mathematical and

natural sciences in life and problem situations. One of the international assessment programs, PISA, evaluates students' independent learning and testing tasks using information resources.

Based on the above, the use of information resources when organizing independent work of biology students becomes a pedagogical problem.

This pedagogical problem requires the creation of pedagogical conditions. JOE. In Tolipova's study on the theory and practice of increasing the level of scientific and methodological training of biology teachers, pedagogical conditions related to the research problem were divided into the following groups:

1. Social and pedagogical conditions.

2. Didactic conditions.

The socio-pedagogical and didactic conditions for organizing independent work of biology students have been determined. In the course of the study, based on these two groups, the conditions for organizing the use of information resources when organizing independent work of biology students were considered and recommendations were prepared. The following factors influencing the creation of social and pedagogical conditions have been identified: individualization of the process of using information resources when organizing independent work of biology students; formation of educational motives and level of knowledge among students; availability of information resources and scientifically and methodologically advanced material and technical base; equipping the biology classroom with modern computers

Factors influencing the creation of didactic conditions are: clarification of the didactic target stages (reproductive, productive, research, creative) of organizing students' independent work in biology according to B. Bloom's taxonomy, based on the grouping of independent learning activities. elements; improving the process of designing independent educational activities using information resources based on the priority of the levels of diagnostic (preparation, readiness, practice) and organizational and technological (stage, method, conditions, form) components of work in the electronic information environment; improving the method of organizing students' independent work (situation analysis, hypothesis, application, proof, verification) based on the use of information resource tools aimed at comparative comparison of the structure and properties of various biological organisms; It was decided to develop proposals and recommendations for the virtual design of educational materials related to

biological processes in the form of verbal, graphic, animated and tactile information resources aimed at independent study of laboratory work.

Independent work - many modern educational technologies (problem-based, marked-contextual and other teaching methods) are highlighted as a necessary element of the educational process, since independent learning activities make it possible to eliminate gaps in the perception of educational information in high school. . Independent work shows the abilities of students, allows them to motivate learning, independence in actions makes it possible to move from the level of "reproduction" to the level of "knowledge" and "creativity" as a criterion of knowledge [9, p.90].

Independent work is a type of educational activity of students, which is carried out directly in interaction with a teacher or with the help of special educational materials under the guidance of a teacher by performing tasks at various levels in order to acquire knowledge or apply skills [105; page 1]. Independent work serves not only for the effective assimilation of educational information, knowledge and methods of professional activity, but also for the development of such professional qualities as personal responsibility, initiative, creativity, and hard work.

Independent work of students is an individual or collective educational activity that is carried out without the direct guidance of a teacher. In terms of organization, independent work is frontal in nature (together with the class) - all students perform the same task; group – a group of students (3-6 students) is formed to complete the task; in pairs - conducting experiments;

A system of individual assignments is formed for each individual student. The most common type of independent work: working with a textbook, working with information materials or primary sources, solving problems, describing, observing, constructing, modeling, etc. [88, p.253].

Independent work is a learning tool that allows: specific situations correspond to each specific goals and objectives; every action of students is aimed at raising mental activity from a lower level to a higher one, from ignorance to knowledge, knowledge, skill, level of skill; creates psychological conditions for the independent systematic acquisition of knowledge and skills focused on the totality of information; is a tool of pedagogical leadership in managing the cognitive activity of students.

In our opinion, independent work as an organizational form of educational activity has the following characteristics: a clear definition of the purpose of independent work; definition of specific tasks; accuracy of forms of expressing the results of independent work; accuracy of methods for checking independent types of work; It is important that each student completes the assigned task.The place and time of independent classes, didactic goals, types of educational activities, and the material being studied are described from the point of view of intra-subject and inter-subject connections. Independent work performed in class, i.e. during the lesson, outside of class - extracurricular activities. Independent work performed in class is performed directly under the guidance of the teacher and on the basis of an assignment.

(Table 1.1) Types of independent work by the nature of ducational activities

Independent work according to the type of educational activity.			
Execution	Collect, arrange	Research and analysis	Study, application, training
laboratory work, experiments, tables and graphs - demonstration materials, models, layouts, parts, devices; - diagrams and their elements - projects, special tasks, tests, calculations; - abstracts, theses	tasks and exercises; - crosswords, puzzles, riddles - report, outline, reference, development; - review, conclusion; - formulas, description of compounds; - table, graphs; - test questions, assignments, etc.	situation, problem, situation; - conditions, methods and styles of work (production); - work results, their quality and efficiency.	study of educational material - study of exhibition tools, didactic materials; -use of equipment, instruments, electronic devices and computers

Activities performed outside the classroom - tasks given by the teacher are performed directly by students without his participation. Student activities are carried out on the basis of individual work in study groups, clubs, studios, creative groups, as well as in individual fields. Independent work, according to the nature of educational activities, is divided into the following types, such as

implementation, compilation, classification, research and analysis, study, application, training (Table 1.1).According to didactic goals, independent work is divided into the following types (Table 1.2).

(Table 1.2).

Types of independent work for didactic purposes

Independent work according to didactic goals.		
Acquisition of knowledge.	Systematization and consolidation of knowledge	Formation of competence skills and qualifications
Acquisition of knowledge. Systematization and consolidation of knowledge. Formation of skills and qualifications - reading text (textbook, primary source, additional literature); - drawing up a text plan; -image of the structure of the text in the figure; - summarizing the text; - text division; - work with dictionaries and reference books; - educational and research work; - audio and video recording, computer equipment, Internet use	working with lecture notes (text processing); - repeated work with educational material (textbook, primary source, additional literature, audio and video recordings) - planning and summarizing answers, creating a table; - preparing answers to control questions; - analytical text processing (abstract, review; - preparation of information at seminars, conferences; - preparation of abstracts, lectures; - list of references, crosswords on the topic, tests, etc.).	solving problems and exercises based on examples; - performing variable tasks and exercises; - generalization of drawings, diagrams; - performing calculations; - solving situational problems; - preparation for business games; - design and modeling; - performing experimental work; - virtual laboratory performance; - completion of educational tasks; - reflective analysis of audio and video tasks.

A lot of research has been carried out on the problem of activating cognitive activity by exploring effective ways and means of forming and realizing independence and activity of students in the educational process. Independence is the main concept that determines the effectiveness of organizing independent work, and the main goal of the modern educational process is the formation of independence as a personality quality.

Independence determines not only the personal, but also the professional qualities of a specialist. Independence is the ability to act, think, take initiative and make firm decisions freely. Learning is the process of acquiring new knowledge. In order for learning to rise to the level of educational activity, students need to know the criteria that will enrich their knowledge, master new methods of educational activity, independently set educational goals, carry out self-monitoring and assessment of their personal activities (Fig. 1.1).)) activity has unproductive and productive activities. Depending on the learning task, the student performs various actions (memorizes, recalls, analyzes, generalizes, solves).

Independent educational work is defined as the time allocated to the search for knowledge, spent specifically on achieving the set didactic goal, reflection on it, consolidation, formation and development of skills and competencies, desired organizational activities for systematization and generalization of knowledge [28].

According to the educational opportunities for independent activity of students, 4 levels are conventionally divided: movement (based on samples) - preparatory work for independent activity; unproductive activity - increasing information about an object and its properties (not at the memory level); production activities are outside the sample and require independent conclusions; in essence, independent activity is a new situation, the development of hypothetical similar thoughts.

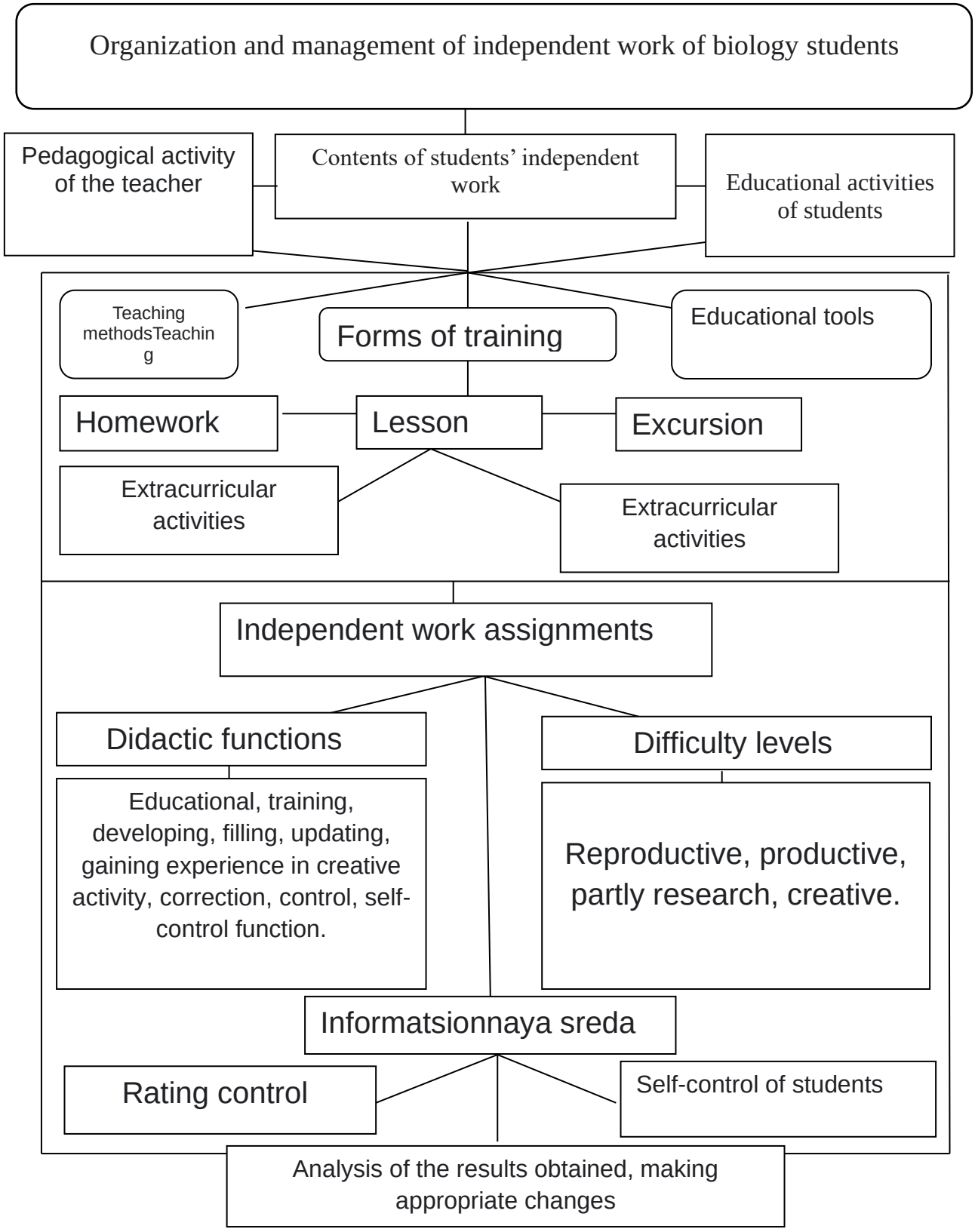

Figure 1.1. Model of the process of organizing students' independent work in biology

Informatization as a sociotechnical process opens up various ways for the user to solve information problems and satisfy his need for assimilation of information.

Currently, based on the use of information and communication technologies, many social services, coverage of

political processes, digitization of cultural values, and expansion of scientific and industrial activities are implemented. In this regard, the. labor market and the formal demand for the competence of specialists are changing.

Electronic educational resources for organizing independent work of students when teaching biology: modern didactic materials; high visibility and interactivity; provides adaptation to learning in specific conditions; increases students' motivation and interest in learning; increases the speed of learning [54, p.39].

In Uzbekistan and foreign educational practice, information resources are allocated for organizing independent work of students based on a number of pedagogical approaches. Based on this idea, a modern student develops in the field of various information and educational opportunities, and in the educational process these approaches are implemented in a combination of unique means, forms and methods and effectively solve the problems of developing his competencies.

The basic ideas of teachers and psychologists working in this area are practically compatible with methodological approaches to organizing students' independent work in an electronic learning environment with the help of information resources. Also, the conceptual basis for the use of information resources intended for independent learning of students when teaching biology is interpreted as follows (Fig. 1.2).

THE NECESSITY TO USE INFORMATION RESOURCES WHEN ORGANIZING INDEPENDENT WORK OF STUDENTS IN TEACHING BIOLOGY

↓

It is necessary to adapt the information infrastructure of biological education to new teaching strategies within the framework of the requirements of the modern and future labor market, in accordance with the requirements of technological development.

IN SUCH CIRCUMSTANCES, A NEW OBJECTIVE OF EDUCATION

↓

It consists of adapting students to the requirements of technological development based on organizing independent work activities in an electronic learning environment and implementing advanced educational strategies.

↓

METHODOLOGICAL PRINCIPLES FOR ORGANIZING INDEPENDENT WORK OF STUDENTS IN AN ELECTRONIC EDUCATIONAL ENVIRONMENT

↓

Self-management training	Communication educational strategies	Experiential learning (experiential learning)	Education in the online community	Cooperative learning	Situational learning (case study)

RESULT

The competencies and qualities necessary for a modern person are achieved: the development of independent problem solving, independent and critical thinking, communication and cooperation, information literacy, skills of perseverance and flexibility.

Figure 1.2. Conceptual foundations of the methodology for using information resources intended for independent learning of students when teaching biology.

Today's modern development is based on the need to use information resources when organizing students' independent learning;

it is necessary to adapt the information infrastructure of biological education to new teaching strategies within the framework of the requirements of modern and future education. the labor market, in accordance with the requirements of technology development, approaches to clarifying the role of the environment, the possibilities of using information resources [52; pp. 456-458]. systematic approach (N.V. Kuzmina, V.A. Yakunin, etc.) from the point of view of taking into account the interdependence of the components of the educational process, learning in an electronic learning environment creates specific changes (educational goals, specifics of joint activities of subjects, educational content, means, methods and forms) [44; p. 11], [92; page 17].

The personality-oriented approach (S.A. Amonashvili, I.A. Zimnyaya, etc.) recognition of the superiority of the individual as the main criterion for the result and effectiveness of the pedagogical process makes it possible to create conditions for the manifestation of personal characteristics in the e-learning environment [12; 28-32-b], [32; p. 246]. active approach (A. N. Leontiev, S. L. Rubinstein, L. S. Vygotsky, etc.) activity as a condition and means of personality development. This approach considers it appropriate to plan, organize and evaluate the results of information and educational activities in a network electronic environment [29; p. 52].The contextual approach to teaching (A.A. Verbitsky) is based on bringing the entire system of pedagogical technologies closer to each other and the forms of educational activity to the forms of professional activity, the scientific and social content of activity in specific situations. With the help of a system of tasks, educational tasks and professional problem situations, the plot of the upcoming activity is created; stagnation of educational content contributes to rapid growth [26], [27].the dialogical approach (M.M. Bakhtin, V.S. Bibler, G.S. Trofimova, etc.) highlights the interactive nature of electronic media and their high communicative potential. In conclusion, we note that the approaches mentioned above have a fundamental description. The integrative use of a combination of these approaches creates a wide opportunity to ensure the effectiveness of students' independent work in an e-learning environment through information resources. When effectively solving a research problem, it is considered appropriate to use fundamental and practice-oriented approaches of the best practices of e-learning practice. It is for this reason that in this study the work was carried out on the basis of methods of integrative analysis of literature and modern teaching practice.

In addition, the study and processing of new tools and methods for researching best practices in the field of educational sciences using information and communication technologies in the field of e-learning and intercultural communication in foreign countries. International Research Network IRNet (International Research Network for the Study and Development of New Tools and Methods of Advanced Educational Science in the Field of ICT Tools, E-Learning and Intercultural Interaction.) Extensive scientific research has been carried out as part of an international research project [40]. As a result of the conducted scientific research, there was a need to improve the methodology for organizing independent work of biology students using information resources, based on innovative approaches and technologies in the modern electronic educational environment.

Educational practice requires adaptation to the rapidly changing conditions of the modern labor market, the formation of an information culture in the electronic environment of the "digital" generation [82]. It is necessary to adapt students to the requirements of the modern and future labor market, to new learning strategies in the e-education environment, to direct them to master the parameters associated with the professional activities of material, regulatory, labor and human resources. the base of a new information infrastructure, which is constantly updated, changed and improved. In such conditions, the new goal of education becomes adaptation to the requirements of technological development based on the implementation of advanced educational strategies in the electronic educational environment[15, p.1].

At the center of this is the development and progress of the countries of the world. These processes, in turn, require the development and application of deep scientific research in the field of biotechnology, genetic engineering, membrane and quantum technologies, photonics, micromechanics, and thermal nuclear energy. Therefore, it is necessary to fill socio-technological processes with information needs, to introduce effective teaching technologies into educational practice using digital electronic resources [16], [17], [18], [20].

Therefore, based on the requirements of the labor market, it is necessary to create new educational needs and apply advanced educational strategies. We will consider several foreign approaches that form the methodological basis of training in an e-learning environment. These include self-directed learning, communicative learning strategies, experiential learning, online community learning, collaborative learning, situational learning, and more.

Self-directed education [8; p. 3] makes it possible to provide students with personal learning goals and activities in a variety of electronic resources and communication

opportunities. In this regard, Amonashvili focuses on pedagogical cooperation and human-personal relationships [98; With. 1] and takes personal responsibility for the student's educational process.

To do this, it is necessary to create special information and pedagogical conditions for analyzing and evaluating the results of students' activities and work. From this point of view, it is necessary to develop a system of tasks aimed at using information resources when organizing independent work of students, to achieve automation of the analysis of learning results and assimilation, and a visual presentation of learning results. biological phenomena and processes.

The humanitarian aspects of communicative and educational strategies have a structure such as the dynamics of behavior development during a conversation, group work, and modeling a conversation based on professionally oriented communication publications. The goal of such a strategy is to teach a person to diagnose and control their own achievements and failures in social and professional relationships, master behavioral methods, independently analyze and control their personal, educational, professional, and social relationships [99, 1-b]. An important aspect of the implementation of communication strategies is the creation of a common communication space.

In the conditions of an electronic scientific and educational environment, this idea is implemented on the basis of information resources created in biology. Therefore, it is important to improve electronic educational resources intended for independent learning of biology students using new information technology tools and develop a methodology for their use.

Experiential learning takes place in a new e-learning environment. The strategy embodies several principles for implementing educational activities in the digital space: education is of great importance as a process, not a result; teaching is associated with the enrichment and expansion of private knowledge; It involves personally expanding upon what one reads into an experience, thinking from different points of view about the manner of that experience, attempting to find its meaning, expressing one's personal conclusions to the opinions of others, and guiding one's decisions and actions. Experiential learning is a process of learning through experience, or more precisely "learning through thinking" [100; With. 1]. Hands-on learning is a form of experiential learning in which students think about their own products [102], [103], [104]. Experiential learning differs from traditional or didactic learning, in which students play a passive role [104; page 1].

It is related to, but not synonymous with, other forms of active learning: hands-on learning, adventure learning, voluntary learning, cooperative learning, service learning, and situational learning [100]. Experiential learning is sometimes used synonymously with the term experiential education, but experiential learning has a much broader philosophical meaning and is viewed as an individual learning process [16], [95].

Thus, experiential learning, experiential learning serves to master and acquire independent learning activities of students related to the learning process in specific situations. People's interest and motivation play an important role in experiential learning. The predominance of student interest not only increases the effectiveness of learning, but also stimulates the desire to acquire knowledge. Therefore, directly in our study, we tried to widely use the form of experimental learning to improve the independent work of biology students through information resources. However, although learning is an integral process that occurs naturally, the actual learning experience requires certain elements.

Similarly, experiential learning relies on independent learning initiative and an active learning phase. Cooperative learning includes the most common models - cooperative and collaborative learning. Cooperative learning is based on a project approach. The main role belongs to cooperative activities [96], [20; page 35.

Joint information activity is manifested in the implementation of distributed tasks when solving independent educational tasks related to biology or performing laboratory exercises. Here it is necessary to follow several basic principles of cooperation: positive interdependence with partners, personal responsibility, complementing each other's successes, using the necessary social skills and incentives in learning, ensuring the implementation of interdependent actions when creating a joint product with the group. Collaborative learning is effectively implemented using the concept of knowledge management in an e-learning environment [57, p. 309].

Knowledge is acquired through collaboration with the group. Collaborative learning involves joint search, analysis and discussion of information. The main idea of collaborative learning is project activity [30; p. 218].

In particular, a special place is occupied by modeling situations related to professional activities when using information resources in organizing students' independent work. Situational learning (case study) is carried out by solving, discussing (modeling) problem situations in the modern digital educational space.

When implementing such a pedagogical approach, it is important to have access to various information and sources of information, information media, simulated situations, the establishment of joint teaching methods, as well as the availability of independent learning tasks related to the topics. This will certainly ensure that students are able to solve a problem through a comprehensive analysis of biological phenomena and processes and scientific reasoning. This approach to creating computer models similar to the original opened a new direction in development [10;1-b].

Thus, these approaches have a practical-oriented description. In this way, it is possible to develop the competencies and qualities necessary for a modern person: independent problem solving, critical thinking, communication and cooperation, information literacy, perseverance and flexibility. Today, it is necessary to individualize learning, support independent learning and creative development of students, in contrast to mass group synchronous learning. In particular, it is necessary to summarize the positive experiences characteristic of the modern student and exchange best practices within the framework of international research [14], [15].

The main conditions for learning in the electronic environment are, first of all, the presence in the educational institution of a wide information environment, socio-cultural environment: the ability of students to follow corporate achievements and news; activity in using the information and communication capabilities of the network educational environment; implementation of individualized information and communication educational needs, etc.

At the same time, the potential of the network environment is used in educational cooperation and distribution of work. Students' activities in the e-learning space are based on individual learning needs and, to a large extent, on the instructions and recommendations of the teacher. The model of information exchange between participants in the educational process is carried out electronically, as in a traditional educational environment. Only today is the practice of digital education being developed, which is designed for students to receive education in the information environment and has the opportunity to meet educational needs.

Such digital educational practices include:

– online learning and computers;

- formation of knowledge based on digital educational content (educational videos, educational interactive systems, electronic textbooks, digital ontologies);

– interactive formation of skills and training of skills (simulators, simulators, virtual laboratories, virtual precision);

- cooperation and interaction in educational activities (multifunctional learning environments, telecommunication projects, network discussions, network learning community);

- productive educational practice (digital storytelling, digital projects, mental maps, creation of multimedia products for students - video, animation, infographics);

- organization of assessment (graduation scale, online diaries, ratings, gamification);

- control and management of educational activities (learning management systems, network organizers, test systems, etc.).

In the practice of digital education, there is a high need for various tools: - digital design influences motivation, expands learning activities and helps to master content;

- selection of interactive forms, content, types of educational activities, cooperation in cross-activities;

- new learning models and methods for assessing results - adaptation to the choice of goals of educational activities, individualization of educational directions;

- experience in solving educational and professional problems using modern digital tools; demonstration of personally experienced types of educational activities, etc.

A striking example of advanced digital educational practice is e-learning technologies - massive open online courses (MOOCs), which are used by the world's most experienced teachers in promising, in-demand areas [89; p. 441]. Blended learning is also widely used as a unique active independent laboratory of educational practice, expanding the capabilities of e-education [78, p. 72]. Blended learning is the training of a student who acquires knowledge independently online and with the help of a teacher during classes [87; 1b.].

Based on the above opinions and on the basis of an analysis of advanced educational practices implementing an information educational environment, the following conclusions were drawn: improving independent work in organizing

students' cognitive activity in the conditions of information resources directs students to self-knowledge. development, creativity, creativity, common with modern approach and development.

As a result of this approach to setting cognitive tasks, knowledge is mastered from reproduction (representation of what is remembered) to creative processing in new conditions; increasing student motivation serves to meet the specific needs of the digital generation associated with modern development.

At the same time, the skills of correct decision-making are formed, relying on independent opinion and personal experience, acting against various information attacks; ensuring high activity and communicativeness of the electronic environment when organizing independent work, ensuring active and self-government of subjects based on the use of information resources;

Improving students' independent work with the help of information resources makes it possible to organize students' cognitive activities on the global network and expand the information space.

Thus, as provided for in the "Strategy of Action for the Further Development of the Republic of Uzbekistan", a wide opportunity will be created for students to use global educational resources. Teachers and students will be able to use the opportunities of large-scale communication, mass communication, interdisciplinary and institutional connections. Based on the characteristics of the educational practice of the electronic environment, students are active subjects of a subject-oriented personal learning process.

Based on best educational practices, it is necessary to comprehensively consider targeted, meaningful, technological and reflective evaluation components of the design of an electronic network environment [p.84;97].

In conclusion, it should be noted that the use of information educational resources when organizing independent learning for biology students:
1. Activates teaching and learning activities. 2. Develops the basic competencies of students (information, communication, self-development, independent learning). 3. Increases student motivation and the quality of learning the material.

1.2. § Methodology for organizing independent work of students in biological education.

One of the main objectives of the secondary specialized vocational education system is to strengthen the inclination of future specialists to self-development, achieve a level of independent knowledge, and form creative individuals capable of self-development. capable of carrying out innovative activities.

To solve these problems, it is necessary to stimulate students to creative research, to independent work, to turn their knowledge into an active creator, and not a consumer of the educational process. The acquisition of new information by students in the modern era of globalization makes it necessary to improve the method of organizing independent work and learning. In this sense, organizing independent work for students is not only an important form, but also an important component that forms the basis of the educational process. Independent work includes exercises such as creating problem situations, finding solutions to educational problems, consolidating acquired knowledge, improving skills, competencies, and developing competencies of practical and laboratory content [66; With. 168].

Possible: work that requires mental, strong-willed and physical strength of students; works in the nature of cognitive or practical tasks; works that embody problematic situations; independent work that requires a creative approach to solving practical problems; activities that involve planning one's own activities, its scientific organization, performing tasks independently, comparing the results of work with the goal; work ensuring the regularity of the progress of work, monitoring results, making changes and improving implementation where necessary; begin to complete the assigned tasks, which in turn allows for the holistic development of the student's personality, contributes to the formation of mental and practical methods of activity, work on oneself and creativity.

It seems that independent work should not be allowed just like that. Each independent work requires solving a specific problem.

For this it is important that the student can think independently. This process begins when a problematic situation arises. Most importantly, students develop independent thinking skills through independent work. Such students have aspects that provide the basis for quick, accurate and correct decision-making in non-standard or unexpected situations [64; With. 101].

Educational motives that activate independent work are: - a positive change in attitude towards independent work; - increased student participation in creative activities. - participation in exams and Olympiads in natural sciences; - the

emergence of a process of competition between students in certain situations. The group of independent work methods includes textbooks, additional educational literature, demonstration tools, solving problems and exercises, experimentation, etc. One of the unique features of the independent work method is that students complete educational tasks without the direct supervision of a teacher. The independent work method involves organizing and managing students' independent learning activities.

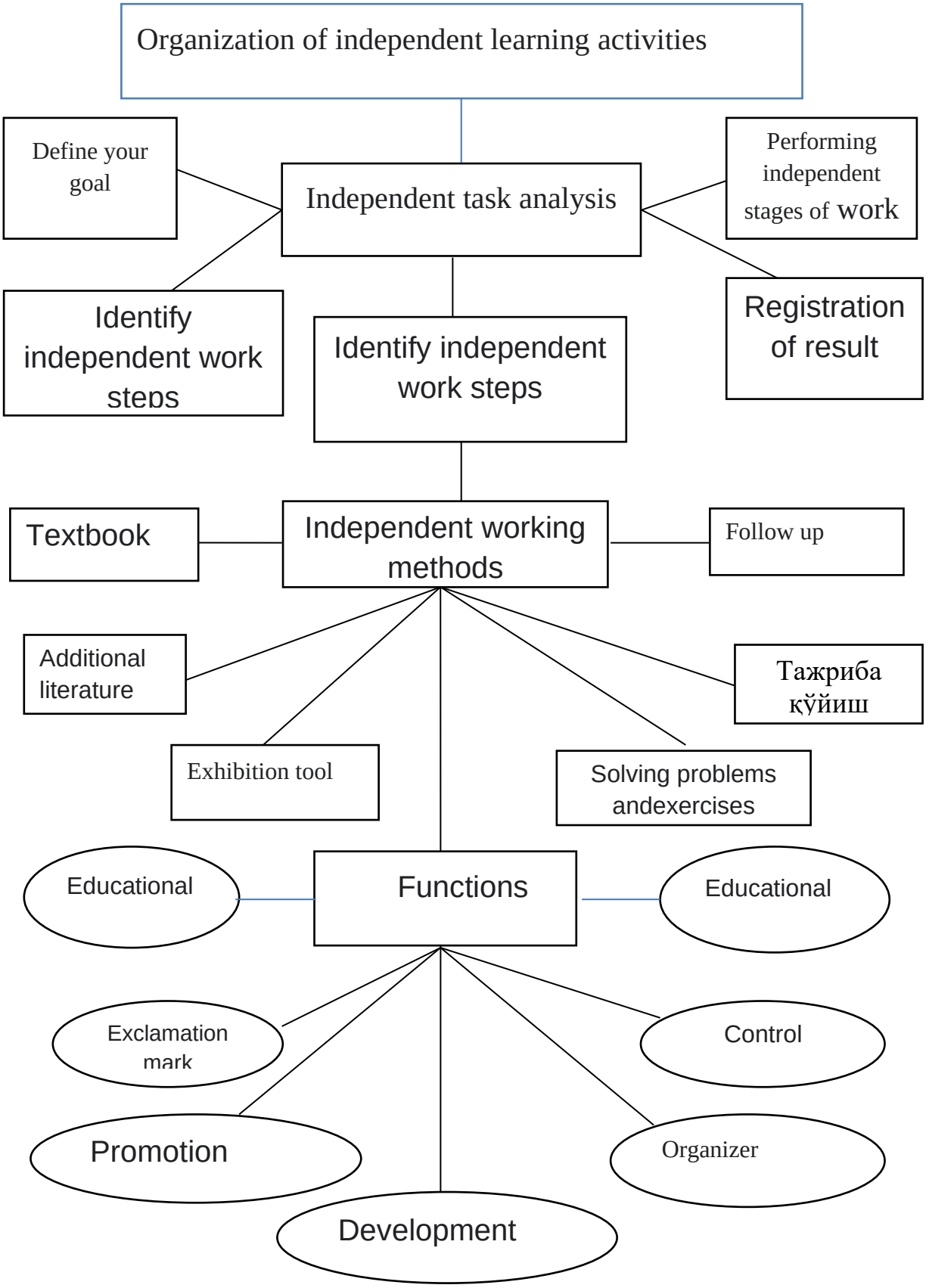

Figure 1.2 Classification of independent work methods

In this method, the results of independent observation and experimentation with textbooks, additional educational literature, exhibition tools, tasks and exercises are considered as a source of knowledge (Fig. 1.2). Like all methods, the method of independent work has an educational, training and developmental function. As an educational task, it can be noted that it ensures students' independent acquisition of knowledge and skills, deepening, consolidating and repeating knowledge. They are especially valuable in practical learning skills and student mastery of skills, since skills without independent action cannot be raised to the level of skills of an automated and creative nature.

Its task in the educational direction helps students develop independence, cognitive activity, spirituality, taking an active life position, hard work and human qualities. Its task in the developmental direction is to help students develop a scientific worldview, thinking, abilities and skills, and train the will. Methods of independent work include giving independent work assignments, developing independence in educational activities, developing educational work skills, organizing independent work according to a model, and giving creative tasks.A group of ways to motivate and justify students' activity in learning creates positive justifications that provide students with enthusiasm and activity in mastering new educational material through pedagogical stimulation in the educational process. These methods prepare the ground for the development of students' interest in learning, intellectual activity, the need to acquire new knowledge, a culture of communication, self-control and management skills, and assessment. Also, an explanation of the social significance of education forms conscious discipline, duty and responsibility among students. Methods of increasing interest in reading, didactic games, educational discussions, forming the duties and responsibilities of students in learning are the following:

a) methods of increasing interest in reading - creating a positive mood in students, using interesting analogies, the effect of surprise, creating the joy of learning, the method of encouragement and reprimanding students.

b) didactic-game method, a method of choosing a game plot, creating game situations, choosing educational games, encouraging students.

c) the method of educational debates is to create a situation that causes academic debates, to create scientific debates. Ways to lead students to success, express students' opinions, correct mistakes in answers, motivate students.

d) the method of forming the duties and responsibilities of students in their studies includes methods such as explaining the social significance of education, explaining the personal significance of studying, establishing educational requirements, encouragement and reprimand in learning.

Methods of control and self-control in learning. Control is considered one of the integral parts of the educational process. Regularity and consistency of control encourages students to active mental work, prepares the ground for the development of responsibility, diligence, attention, and memory. , self-control and assessment skills. The completeness, truthfulness, breadth and regularity of these methods, like all other methods, make it possible to realize the functions of an educational, educational, developmental and differentiated approach to students. This group of methods includes oral and written control, control using laboratory and practical work, self-control, methods of mutual control using checklists and tests, as well as the following:

a) oral and written control methods - methods of teaching students to logically present knowledge, develop speech, identify and eliminate typical errors in students' answers.

b) control methods using laboratory and practical work, determining educational and practical skills, determining students' skills in working with educational equipment and tools, determining and assessing the quality of completed tasks, the correct choice of objects and tools depending on the content of the work, completion of the work and presentation of the result, a method for determining the accuracy of the results obtained.

c) methods of self-control of drawing up a short plan based on educational material, creating questions, highlighting the main idea, searching for answers to questions, solving problems and checking them according to a sample, comparison, checking the correctness of the results obtained, creating questions, methodological correctness of questions, logical consistency, truthfulness, a large-scale method of monitoring students' knowledge.

It consists of methods such as accuracy and comprehensiveness of monitoring students' knowledge.Methods of control and self-control in learning, like all methods, have an educational, educational and developmental function. The teacher provides an educational control task, inviting all students to listen to their friend's answer, correct errors and shortcomings in the answer, make corrections and additions. Thanks to this, in this process the acquired knowledge of students is

systematized, repeated and consolidated. The educational task of supervision is manifested in ensuring the motivation of students, the formation of responsibility and duty in education, and the formation of feelings.

The developmental function of control is manifested in students' acquisition of sustained attention, consolidation of memory, self-control and assessment skills. Independent work can be organized in various ways: working with resources, conducting observations, designing, conducting experiments, working on a computer, using the Internet, etc. Depending on the level of questions and problems, the teacher can organize independent work using various information resources. As a result of correct and consistent organization of independent work with information resources, students acquire the ability to independently master new knowledge.

Improving the independent work of biology students with the help of information resources will help them acquire skills in effectively using sources and addresses of information, the ability to work with electronic educational literature and data banks, and a systematic and creative approach to tasks. As a result, students are directed to independent creative activities and prepare for research activities. Therefore, the process of independent work is an important tool for achieving the main goal and objectives of the secondary vocational education system. The development of computer technology and the creation of digital educational resources have set specific tasks for organizing students' independent work when teaching biology.

The organization of independent work plays an important role in orienting students towards independent learning in biology lessons. The educational process requires students to be active. The teacher must guide students to independent learning in the educational process, provide accurate knowledge and control the learning process. By providing less information, it is necessary to help develop academic skills and develop the ability to use the acquired knowledge. A number of active methods and forms are used in teaching biology. One of these methods is to activate the cognitive activity of students by developing and completing various independent work assignments[10]. In the modern lesson, it occupies a special place, since the student gains knowledge only in the process of independent activity. Lessons taken from the textbook and organized by students in object-subject relationships are important for student acceptance through active action and increased motivation to learn.

Knowledge acquired actively as a result of students' personal work is retained in memory for a long time; it is necessary to create conditions for students' creative activity when organizing independent work using information resources [1], [10].

Independent work can be organized in different ways depending on the forms of training. Independent work assignments are organized directly during the lesson, for the purpose of extracurricular work or independent learning. Independent work is carried out in different ways:

electronic didactic tasks related to the content of the topic, searching for answers to questions, reading additional literature, extracting basic and necessary information, explaining and interpreting natural phenomena, conducting reflections and research, creating ideas, as a result, thoroughly assimilates knowledge. In practice, the following methods of independent work can be distinguished:

1. Working with textbooks and educational literature. Working with a textbook: picture, diagram, table, searching for answers to questions, summarizing, narrating, answering according to plan, summarizing several paragraphs, working with primary sources, performing virtual laboratory and practical work, etc. In contrast, we have developed an information resource for students' independent work in biology lessons in academic lyceums, virtual laboratory classes and a system of test tasks to control knowledge.

Exercises in biology lessons: answering questions, repeating answers are carried out by performing various didactic tasks, especially tasks related to working with textbooks occupy a special place.

Also, at the same time, independent work assignments are carried out in the practice of biological education: solving problems and performing practical and laboratory work;

independent test work (stories and biological dictation); preparation of presentation materials and abstracts;

complete individual and group tasks during virtual observations and excursions; optimized through virtual laboratory experiments and observations.

P.I. Pidkasisty says that learning to work independently with textbooks and books is a unique teaching method.

Let's look at several methods for working independently with publishing sources. The main ones are:

- Summing up - writing a brief description of the content of the text read. Synthesis is carried out in the first (own) or third person language. Expressing yourself in your native language develops independent thinking.

- Planning the text. The plan can be simple or complex. To make a plan, after reading the text, you need to divide it into parts and name each part.

- Summing up – a brief summary of the main ideas in the text read.

- Annotation – a brief summary of the content of what was read without losing its essence.

- Reviewing - expressing your attitude to what you read in the form of a short review.

- Link writing – writing information about the results obtained after a search. Directories can be statistical, biographical, terminological, geographical, etc. possible

- Creating a logical and meaningful model - expressing basic concepts and terms based on what has been read in the form of a diagram in relation to each other.

- Compilation of a thematic thesaurus - the formation of an ordered set of basic concepts by topic or section.

- Drawing up a matrix of ideas - comparing descriptions of one type of things and events related to the works of different authors [34, p. 6].

G. S. Ergasheva emphasizes that the components of textbooks differ from each other and each of them fulfills its own didactic task [83; 27-b]. However, the components of the textbook complement each other and ensure its integrity. The significance of this in educational practice is immeasurable, and the text is very difficult to understand without a guide and illustrations.

S. N. Volkova offers different ways of working with text. Reading the entire text helps students gain a complete understanding of the subject being studied. When choosing methods for working with a textbook, it is necessary to take into account students' knowledge of the subject and the volume of the text. Studying a text in logically complete parts gives an effective result [2], [30].

Sorted reading is widely used in the classroom. In such cases, it is necessary to work more with the content of the textbook. Fragments of text based on illustrations and instructions from the teacher; comparison of observation

results in nature; Draw conclusions; evidence analysis; can be explained based on the definition of cause and effect relationships.

In organizing work with text, answering textbook questions, working with pictures, drawing up a plan, and highlighting basic concepts are important. A different approach is required when working with additional materials. Such materials should be used as a supplement to the main material. The teacher himself determines the methods of its assimilation depending on the content of the text. Questions and tasks (mastery apparatus) can be used at different stages of the lesson for the purpose of observation, experience, conversation, control and assessment of knowledge.

In addition, questions and tasks allow you to work with text and illustrations. In biology lessons, there are different ways to work with illustrations. The illustrations in the textbook, as mentioned above, have an informational function. To obtain this information, students use visual, focused observation methods.

To “read” the information in an illustration, it is necessary to encourage students to ask questions and pay attention to important elements of the image.

In addition, when working with pictures in the textbook, comparisons with observations of nature or other objects are widely used. Comparison helps to highlight the most important features of an object, determine its interaction with other objects and its own characteristics. It develops students' analytical and synthetic abilities and expands their scientific horizons. Comparing illustrations helps clarify the content of the text and create a complete and clear idea of the subject. In our opinion, the following types of tasks can be used for students to work with the textbook: (Table 1.4).

Table 1.4

Types of tasks used when working with the textbook

Types of tasks in working with the textbook			
	Reproductive research	Analytical comparison	creative
1.	Zapolnenie tablits	Tables and diagrams	Rabota nad textami lover
2.	Working with terms	The analysis is figurative	Text with omitted words
3.	Creating diagrams		Give a definition of the presented word (concept, term).
4.	. We work with basic concepts.		Test solution
5.	To make a plan		Crosswordlar
6	Summary		Highlighting the main idea

35

It is known that, depending on their age, students are interested in working with didactic material of various forms. At the same time, it is aimed at allowing high school students to easily work with textbooks, increase their interest in science, and direct them to creative activities.

1. The above examples serve to ensure independent activity of students and active communication with the textbook in biology lessons. In contrast to the above methods, the methodology we recommend is of particular importance, since it is aimed at activating cognitive activity by performing educational tasks with the help of information resources, based on the independent activities of students.

2. Performing independent tasks during laboratory classes. Laboratory classes occupy a special place in students' assimilation and consolidation of new material. Laboratory training provides in-depth knowledge of the scientific foundations of modern production, skills in working with reagents, equipment and instruments [31], [46]. Scientific research is also being conducted on organizing laboratory classes in biology using electronic educational resources [59; 309-b], visualization of various biological processes [58; 218-b,]. 3. Organization of independent learning of students and use of knowledge in control. It is used for the

purpose of self-development of students' independent work through information resources, developing independent learning skills, using distance learning opportunities, and consolidating educational materials received in the classroom. Independent work allows students to deepen their knowledge and develop new skills. According to didactic purposes, the organization of independent work in biology is conventionally divided into four types [77;71-b] (Fig. 1.3). The first type of independent work, based on the independent activity of students in biology lessons, is the acquisition of knowledge based on the assimilation of new concepts at the initial stage of activity.

Stages of organizing students' independent work on a goal

4-STAGE	Creative (creative) level of creative application by students of previously acquired knowledge, skills and abilities when solving educational problems that arise in unexpected situations, mental (analysis, synthesis, comparative comparison, generalization,conclusion) and logical (induction, deduction, discrimination) . problem) requires operations
Objective of independent work: Achieve learning objectives: know, understand, apply, analyze, synthesize and draw conclusions in accordance with Bloom's taxonomy.	
3-STAGE	Chastichno issledovatelskie uchebnye zadaniya orientiruyut uchashchixsya na tvorcheskuyu deyatelnost putem eneninia poluchennyx znaniy, umeniy i navykov v novyx neojidannyx situatsiyax, analysis of subjects, synthesis, comparative comparison, application i obobshcheniya zakonov i norm.
Goal of independent work: achieve learning goals for analysis and synthesis using Bloom's taxonomy.	

STAGE 2	Independent work assignments at a productive level prepare the ground so that students can analyze, synthesize, compare, juxtapose the biological objects being studied, draw conclusions, simultaneously applying several laws and norms and generalizing.
The purpose of independent work: to achieve the learning objectives of practical application according to Bloom's taxonomy.	
STAGE 1	The content of independent work assignments at the reproductive level requires students to know the essence of biological laws, phenomena, processes, concepts and terms that determine their ability to memorize, without processing educational material.
Independent Study Goal: Achieve learning objectives for knowledge and understanding according to Bloom's taxonomy.	

Figure 1.3. Types of independent work for didactic purposes.

The second type of independent work is aimed at developing the skills of processing and storing educational material in memory by organizing the student's independent activity based on the acquired knowledge and developing a system of independent work assignments. This can be achieved by analyzing, with the help of information resources, the processes occurring in objects and events, or justifying the reasons for changes in them, as well as acquiring a culture of communicative communication through independent tasks developed in connection with the stages of mastering educational materials. materials for biology lessons. In both cases, such tasks can be completed based on students' prior knowledge. Students' cognitive activity consists of processing, designing and updating previously learned educational materials. This process requires analyzing the object being described and determining the most appropriate and logical sequence within it.

The third type of independent work is associated with the knowledge that students acquire when performing atypical tasks. The student's activity when performing tasks of this type is to create new experience based on previously acquired knowledge and experience through the formation of knowledge, skills and abilities.

This type of research requires finding and implementing the expression of a solution idea. Tasks in such independent work require a new approach to previously acquired knowledge, that is, from the point of view of the requirements of specific tasks. The fourth type of independent work is associated with creating opportunities for student creative activity. When performing such tasks, the student's cognitive activity consists of increasingly penetrating into the essence of a biological object or process, searching for new, previously unknown ideas, and establishing connections necessary to obtain new information.

To complete such tasks, the student is forced to think about the essence of the idea and the new activity that he needs to create, this or that information [42; With. 1-2].

In scientific sources related to pedagogy, independent work is divided into model, reconstructive-variational, heuristic (partially creative), creative research work [12, p. 28]. Independent work on samples consists of solving standard problems and exercises using samples. Such work helps to master the educational material, but does not develop the student's creative activity. Reconstructive-variative independent work involves not only the practical aspects of cognition, but also the processing of a knowledge system, solving an existing problem using acquired knowledge. Heuristic independent work is associated with the search for solutions to certain problems and questions that arise during lectures, practical laboratory and seminar classes. Independent work at this level is aimed at seeing the research problem, being able to formulate it independently, forming a hypothesis, developing a plan to solve the problem and solving it. In independent work at the level of creative research, the main task is related to creating the conditions necessary for the emergence of a problem situation. In this case, students' activity consists of searching and exploring ways to solve a problem without using ready-made examples. Such tasks include setting up experiments, designing equipment and models. Independent work is one of the most important forms of learning; in the process of doing it, the student's knowledge deepens and his individual activity increases. Independent work assignments for students in biology belong to a series of didactic materials that perform the following functions: The educational function of independent work assignments. Independent work assignments encourage students to systematically and systematically study the basics of science in order to gain their knowledge, while identifying typical gaps in the knowledge, skills and abilities that students have acquired.

Educational function of independent work assignments. Qualities that open the way to improvement in students: will, conscious discipline, solving specific educational problems by performing mental operations in order to solve problems: analysis, synthesis, comparison, generalization and drawing conclusions. provides an opportunity to develop as individuals through mobilization. endurance, patience and the use of knowledge and energy to achieve success.

Developmental function of independent work assignments. Independent work assignments encourage students to consolidate and develop acquired knowledge, skills, results achieved as a result of their own knowledge, self-development as individuals and their place in their future career.

Function of filling independent work assignments with knowledge. Independent assignments provide an opportunity to identify gaps in the knowledge, skills and abilities acquired by students and fill them, consolidate and develop them.

Function for updating knowledge of independent work orders. Independent tasks prepare the ground for mastering new knowledge, directing students' activities to apply previously acquired knowledge, skills and abilities in new and unexpected situations.

The function of acquiring knowledge and experience in creative activity when performing independent work tasks. Types of independent work assignments with a degree of partial research and creative complexity help students think creatively, gain experience in creative activity, make decisions, and draw conclusions.

Function for correcting knowledge of independent work assignments. Identifying typical deficiencies in the knowledge, skills and abilities acquired by students and eliminating them by repeating learning tasks increases the power of knowledge.

The function of monitoring knowledge and self-monitoring the implementation of independent work tasks. Types of independent work tasks of reproductive, productive, partially research and creative levels of complexity are placed in educational information technology programs in the form of hypermedia education, while ensuring comprehensive control, as well as teacher control that determines what has been learned. knowledge, skills and qualifications of students through self-control, in accordance with the achieved result, the development of learning motives is achieved.

One of the components of students' cognitive activity when teaching biology is independent work. Bloom's taxonomy for educational purposes is divided into the following groups: (Fig. 1.4)

1. Independent work aimed at studying biological concepts and laws; 2. Independent work aimed at understanding biological processes and phenomena;

3. Independent work aimed at applying the acquired knowledge, skills and abilities in practice;

4. Independent work aimed at repeating and consolidating acquired knowledge, skills and qualifications;

5. Independent work designed to analyze biological processes and phenomena based on biological concepts and laws;

6. Independent work aimed at the synthesis of biological processes and phenomena based on biological concepts and laws;

7. Independent work aimed at creative application of acquired knowledge, skills and abilities;

8. Independent work designed to control and evaluate acquired knowledge, skills and qualifications;

9. Independent work aimed at creatively solving a problem situation; 10. Difficult independent work

The main conditions for organizing independent work are: - scientific nature of independent work and its research nature; - formation of students' needs for independent learning; - individualization of tasks performed; - methodological guidance in organizing independent work. They consider it expedient to use electronic resources and the harmonious use of information and pedagogical technologies when organizing students' independent work [76].

Zh. O. Tolipova recommends using the technologies of problem-based, didactic game, cooperative learning, modular, developmental, differentiated learning, and active learning in the educational process of teaching biology. The purpose, essence and mechanisms of using teaching methods when applying these technologies are indicated. In particular, research methods in problem-based learning, methods that take into account the dynamics of students' ability to work in concentrated learning, problem-based methods in modular learning, methods

that guide students to various activities in developmental educational technology, individual teaching methods in differentiated educational technology. It is recommended to use interactive methods in active learning and game methods in game learning [69; pp. 136-140].

In our opinion, the organization of independent work of students using information technology resources in combination with modern pedagogical teaching technologies serves as a factor in orientation towards professional activity at the level of the modern customer and the requirements of the development of science and technology. Electronic education (e-learning) as an integral part of the modern educational system serves to improve the quality of education by providing access to information educational resources, organizing the management of the educational process, and expanding the possibilities of distance education [41; With. 27-41].

The transition to e-learning requires the use of an active approach based on modern technologies, active and interactive teaching methods. In these cases, the interactive approach is the central link of the educational process. This approach serves to achieve didactic, developmental and educational goals, effective assimilation of educational material, motivation of students, conceptual, demonstration, cognitive, training and control tasks as a universal tool of the educational process. E-learning is an exemplary form of interactive interaction between teachers and students.

It is considered advisable to systematically use electronic resources intended for independent learning of students in biology lessons, laboratory classes and knowledge testing. Therefore, the electronic educational resources we have developed are unique in that they are designed to work directly with a textbook in biology lessons, perform laboratory exercises and independently monitor knowledge [33], [38].

Although filling out the tables at first seems more difficult to students, if the first tasks are completed on the blackboard together with the teacher, then at the next stage it is necessary to achieve partial completion by the students themselves, and at the third stage it is necessary to achieve independent completion by the students. Various tables are given in the textbook itself, in methodological and didactic manuals, in workbooks, but it is also possible to compile them independently: This is expressed in (Table 1.5).

1. Read the text carefully and fill out the table:

1) Classify plants according to their life form.

2) Write the characteristics of trees, shrubs and subshrubs, grasses.

Table 1.5

Explain the features of the life form of plants

Tree	Shrub	Subshrub	Grass

Working with terms and basic concepts in the textbook is important for learning new terms and basic concepts. If students cannot master the terms and basic concepts of a new topic in a textbook, subsequent topics will become more difficult, as a result, the workload of course materials will increase, and their interest in science will decrease. Therefore, it is necessary to teach students to work with the terms and basic concepts of the textbook. In order for students to master key vocabulary in biology lessons, it is necessary to ensure that textbook work is used in harmony with other types of assignments. For example: Complete the task. Explain these words to reinforce the content of the text in the textbook.

Unisexual

– Pollinated flower

– Seedless flower

– Disexual flower

– Monoecious plant

– Dioecious plant

– Erect flower

– Oblique flower

– Or When working with terms:

Table 1.6

Explanation of terms

the term	Description	Use in text
Zygomorph		
Actinomorph		
Hercules		
Endosperm		

When working with a textbook, the presentation of the content of educational material in the form of diagrams provides a concise and visual representation of the information in the text. The diagrams can be completed by the student independently with the help of a textbook, and when organizing work with diagrams in the lesson, different methods can be used: drawing up a diagram under the guidance of a teacher; the teacher explains according to a ready-made diagram; ready-made diagrams are read aloud by the students themselves; students themselves prepare and fill out diagrams, etc. If the lesson is organized in this way, students will learn the material well, their interest in science and the quality of knowledge will increase. Studying additional material for strong students gives weaker students the confidence and motivation to achieve higher grades.

The next type of organization of work with a textbook is planning. When conducting it, it is necessary to explain the purpose and content of such materials. An even better idea is to frame it as a visual aid and hang it on the chalkboard. Orally describe the material according to the prepared plan. The uniqueness of the plan lies in its short and concise structure. This type of assignment can be used from elementary school. Most of the paragraphs in the textbook are very useful for developing planning skills. Synopsis. Abstracts can be quotable, free, relevant and require logic, accuracy and presentation skills.

To ensure that students do not have to create plans and notes on their own, such work should be done primarily in collaboration with the class team. When using basic notes, the main materials presented in the textbook are given under conventional signs: logical-compositional schemes highlighted in the text, teaching you to highlight basic concepts and write them down in a notebook, mastering the

main content of the text has been achieved. When working with the above didactic materials, it is possible to use oral or written (selective or simultaneous combination of all of them).

During supervision, it is necessary to pay attention to which students are having difficulties and work individually on who needs what help. I. Tasks for organizing work with the textbook using didactic materials related to analysis and comparison Didactic materials related to comparison and analysis also require highlighting the main material of the textbook, concise writing and clear expression of thoughts. Any comparison includes elements of analysis, that is, the identification of individual parts and features, as well as synthesis and generalization and the establishment of their relationship. Comparisons can be made based on the basic materials and basic concepts given in the text. For example: Assignment. Compare algae according to their characteristics: (Table 1.7), or the comparative characteristics of monocots and dicotyledons can be expressed in (Table 1.8)

Table 1.7

Comparative characteristics of algae

Comparablecharacters	Unicellularalgae	Multicellularalgae	Marinealgae
Mainrepresentatives			
Living conditions			
Structure			
Reproduction			
Usefulproperties			
Harm			

Table 1.8

Signs	Monocots	Dicotyledons
Specificstructure		
Distribution		
Keyrepresentatives		

The use of images is important when working with the textbook. They can be used to perform comparison and analysis tasks.

For example: 1) What are the names of the plants shown in the picture
2) What crops do the plants shown in the picture belong to?
3) Compare the plants in the picture. 4) Draw a conclusion.

II. Creative work with assignments. When organizing work with the textbook, didactic tasks of a creative nature are used: “Substantiate what is...”, “Explain why...”, “What conclusions can be drawn from this?” It is necessary to solve questions in the form of definitions, and also to teach students to evaluate not only the number of questions, but also their quality and their own answers.
To control this work, you can use several methods:
1. Sorting or recording in notebooks of students of the whole class;
2. Listening to questions from several students and other students answering their questions;
3. Two students answer each other’s questions;
4. Organization of intergroups, etc.
5. The following three methods are very interesting and useful for students, they allow them to listen to each other and make independent assessments.
6. It is necessary to identify and correct errors when giving texts on a topic with errors. This is of great interest, especially for students. Students need knowledge, imagination, logic, and deep thinking. Good writing should convey a story, be unique, interesting, and be told like a journey. Completing tasks like this helps students develop their communication and creativity skills.
7. It is not difficult to compose a text with missing words. Such tasks should be given in the first part of the lesson, left for students with low learning abilities, and excessive stress should be avoided when performing complex tasks, for example, correcting erroneous texts.

8. Defines the presented concept, develops thinking and communication activities. When studying new material, based on the text read in the textbook, a story is created and a short and concise description of the given word is given. Initially, the basic words are presented in a certain sequence, then the task becomes more complicated and is presented in an indefinite sequence. In any case, students are required to name and explain the story, what questions it answers, and what content it covers. These types of tasks are convenient for differentiated instruction and can also be used for repetition of material. In such cases, students are asked to

construct a story using key words and complete it without the help of a textbook. 9. Teaching students to solve crossword puzzles and test questions while working with the textbook is one of the most common methods of monitoring the assimilation of educational material, and, of course, it is appropriate to use it only after completing a certain paragraph or section.

10. Crosswords help develop intellectual and creative abilities. Crosswords can be created in such a way as to highlight thematic or basic concepts and terms. Thus, the use of electronic educational resources when working with textbooks helps students independently assimilate knowledge, carefully complete questions and assignments, and apply their knowledge in a variety of ways. It is necessary to ensure that when giving different tasks, students are not divided into “strong” and “weak”. At the same time, it is permissible to dwell on the content and educational tasks of organizing students’ independent activities and using electronic educational resources in laboratory classes.

As stated in the National Personnel Training Program, training a generation responsible for the future, mature in all respects, requires further improvement of educational and training activities carried out in educational institutions, increasing its effectiveness. To do this, it is necessary to develop tools that allow the student to obtain active independent knowledge, increase his interest in learning and apply them in the educational process.

Textbooks and teaching aids are a didactic means of organizing laboratory classes and are the main source of independent learning for students. In the process of preparing for laboratory classes, students are given separate tasks to work with textbooks and teaching aids. Students are given assignments to prepare for the upcoming laboratory lesson using the textbook.

Educational literature will be needed to familiarize yourself with the material on the topic during the laboratory lesson. Thus, the material and technical base of laboratory training in biology consists of visual aids, tools and equipment, modern technical teaching aids, information resources, textbooks, teaching aids, animals and plants kept in the corner of wildlife.

All of them together ensure the effectiveness of laboratory research. When organizing and conducting laboratory classes, based on the content of training, the specified material and technical means are used as necessary. It is also necessary to follow certain criteria when organizing and assessing the effectiveness of independent learning for biology students.

The main criterion for assessing the effectiveness of students' independent work is:

– complete completion of educational tasks independently, without external support, in accordance with the organizational and information plan;

– ability to use modern technologies and information resources;
- adequate development of analytical and creative abilities, the ability to correctly diagnose, evaluate and correct the results of one's own activities;
– the presence of the necessary personal qualities (dedication, responsibility, a certain amount of passion, attentiveness, enthusiasm, etc.). There are specific methods for using information resources when organizing students' independent work in biology, which allow self-development in an electronic learning environment, correct diagnosis, evaluation of performance results and their correction.

1.3-§.Organization of independent work of students based on a competency-based approach.

Modernization of education implies not only the priority of providing students with information based on a competent approach, but also the formation of skills to solve problems that arise in various situations. Thus, in the study, the acquisition of knowledge through independent work assignments was achieved to increase the personal creativity and cognitive activity of students. In the process of teaching subjects included in the academic lyceum curriculum, including biology, it is necessary to develop basic competencies in students.

Education based on a competency-based approach is education aimed at developing in students the practical application of acquired knowledge, skills and qualifications in their personal, future professional and social activities [50, p.7]. Students must have the necessary general competencies in order to enter into personal, social, economic and professional relationships in the future, take their place in society, solve problems that arise in this process, and most importantly, be competitive in their field and profession.

Ya. B. Gosudarev explores the problem of creating a competent model of the electronic information and educational environment (EATS) in connection with the requirements of the educational standard and the implementation of educational results [30; 39-49.b]. The competence of information and communication technologies (ICT) includes: solving problems using ICT technological tools (in particular, computers, multimedia projectors, etc.), audio-text, multimedia

problems, etc. The basic information and methodological conditions for the implementation of educational programs require their provision in the information and educational environment.

The implementation of educational activities in the conditions of organizing an information and educational environment includes: a complex of information and educational resources, as well as digital educational resources;

A set of ICT technological tools: computers, information devices, communication channels; covers the system of pedagogical technologies. The organization of the information and educational environment for the implementation of educational activities should provide:

information and methodological support for the educational process; planning educational activities and providing them with resources; development and implementation of individual and group activities; - monitoring educational activities and recording resultsstudent health monitoring;

it is necessary to introduce modern methods of creating, searching, collecting, analyzing, processing, storing and presenting information; remote coordination of educational relations of all participants using distance education technologies (students, their parents, teaching staff, managers in the field of education, the public);

ensure remote cooperation of organizations with other organizations engaged in educational activities, cultural institutions, healthcare, sports, employment services, and life safety. It is known that through the educational process, a general education school is responsible for developing in students general educational competencies, including communication, skills to work with information, competence in self-development as an individual, competence in socially active citizenship, general cultural competencies, and mathematical competencies. literacy, awareness of science and technology news and the challenge of creating content competences of use. A competent approach to the educational process is a set of general principles that make it possible to organize the educational process based on innovative technologies and analysis of the results of enriching the content of education to achieve educational goals. They include the following: Develop the ability of students to solve problems in various types of activities and areas of independent life on the basis of acquired knowledge, skills and abilities, based on their own life experience, observations, personal conclusions, and also smoothly perform the required activities in the necessary cases;

When choosing the content of biological education and creating methodological support, it is necessary to increase the interests of students, expand their scientific worldview, solve ethical, ideological, political, and environmental problems, and apply didactically processed knowledge and skills of students. in new unexpected situations, your own life experience, observations, pay attention to the fact that this will allow you to draw scientific conclusions about it The main goal in organizing the process of biological education is to create conditions for students to acquire knowledge, skills, qualifications, standardized DTS, as well as for working with information, acquiring communication skills, acquiring mathematical literacy, and demonstrating social activity.

gain experience in independently solving educational problems;

The results of the educational process are assessed based on the results achieved at a certain stage of this process, i.e. the level of knowledge, skills and competencies acquired by students, which form the basis of competence;

The competency-based approach assumes that the goals of education are students' self-awareness, understanding of ways to achieve learning goals in the educational process, activation of students' educational activities, students' adaptation to society and independent life. through self-development and socialization. In our opinion, students, organizing their independent work on the basis of a competency-based approach, have the opportunity to perform the following functions: satisfy the social needs of our country for young people capable of solving problems in society, science, production and independent life. in the future by organizing independent activities; solid mastery of the fundamentals of biology, development of student motivation, formation of personal qualities; adaptation of students' knowledge, abilities and skills, experience of creative activity to the requirements of modern and technical development and solving

existing problems by organizing independent work of students with the help of information resources; orientation to professions by increasing readiness for independent practical activity, in-depth scientific analysis of the nature of phenomena and processes, involvement in research activities as a result of developing experience in creative activity; You can include such functions as independent consolidation of scientific and theoretical knowledge acquired in biology with the help of information resources and preparing students for independent life by applying them in practice in specific and procedural problem situations. The competency-based approach to education is aimed at developing basic competencies.

The setting of complex independent educational tasks in biology lessons manifests itself as a motivational component and an important pedagogical technology that shapes the educational competence of students [106; page 2]. Competence is divided into levels depending on how the content is learned and its significance in a person's life. The competencies that prepare the basis for the overall development of the student's personality are called general competencies, and the competencies that are formed only through the subject of biology are called special competencies. Analysis of the literature showed that student competencies are divided into three levels [66; page 6].

1. Basic competencies - the content of all subjects included in the curriculum of a comprehensive secondary school and the competencies developed during the learning process are taken into account.

2. Special (biological) competencies - competencies formed on the basis of knowledge, skills and qualifications in the process of biological education.

3. Interdisciplinary competencies - competencies are provided that are formed by establishing interdisciplinary connections when teaching social, humanitarian, natural, mathematical and practical subjects included in the curriculum.

In our opinion, the competence of a biology student is the ability to use and apply the knowledge, skills and abilities acquired in biology when solving practical and theoretical problems that arise in everyday life.

A biology teacher must design a methodological system of work using information resources in all forms of teaching independent work tasks: lessons, extracurricular activities, excursions and extracurricular activities in order to develop the above general competencies in students. Below we discuss opportunities for developing students' general competencies when teaching biology. A biology teacher, taking into account the development of communicative competence, must master oral and written speech in biology lessons, which will be necessary for students in the future to communicate in society, express their opinions clearly and understandably, and formulate questions in a logical sequence. based on the text of textbooks and additional literature, answer questions in writing and orally, in writing, observing the norms of the culture of communication with peers and teachers, be able to express their opinions when working in small groups while respecting the opinions of the group members who know how to work in a team, who know how to defend and convince his opinion on the basis of acquired knowledge, skills and qualifications, organize academic debates in classes and

manage his passions in various conflict situations, take necessary decisions to resolve problems and disagreements, should create a basis for mastering foreign languages along with his mother tongue.

To acquire the above academic skills in students, it is recommended to use innovative technologies in the educational process. It should be noted that didactic game technology in biology lessons includes a conference, press conference, game exercises, collaborative learning technology, work in small groups, team learning, “saw” or “zigzag” methods, “Let’s learn together”, problem an approach. educational technology "Brainstorming".

Using case study methods, students have the opportunity to develop communicative competencies, while acquiring knowledge, skills and abilities. Biological evenings and olympiads are important in the development of students’ communicative competencies. In order for a biology teacher to use educational films and videos related to the subject in order to develop students’ competence in working with information, sorting information from additional literature and websites, expanding their scientific worldview by distributing tasks to students on Basics of preparing essays, documents and presentation materials , lessons, extracurricular activities, excursions and extracurricular activities must be used effectively and efficiently. The basis for the formation of students' competence to work with information is the following educational skills, standardized by the DTS in biology of secondary schools: skills in working with textbooks, knowledge and application of the instructions given in the introduction to the textbook; be able to distinguish phrases separated by color; target, based on the content of the textbook; knowledge and use of symbols and common signals; know how to use footers; be able to use instructions. Skills in working with text: the ability to plan the text read.

find answers to questions using text; write a lecture using the text; be able to perform practical tasks using the textbook text;

be able to compile tables, charts, diagrams based on the text of the textbook; be able to find concepts and rules using the textbook text; make a description of the object, draw a conclusion. When drawing up a plan for the work of the “Young Biologists” circle, the biology teacher must take into account the development of students’ competence in working with information. A biology teacher is obliged to pay attention to independent work and training of students in order to develop the competence of self-development of students as individuals, to create for themselves a database of standard and non-standard educational and test tasks in subjects. -assessment of students, and convert it into

adaptive test items by placing it in the computer memory, and it is also necessary to focus on physical, spiritual, mental and intellectual maturity in spiritual moments spent with students.

The use of innovative technologies, including those focused on the student's personality, in the process of biological education and upbringing makes it possible to develop the competencies of self-development of the student as an individual [39, p.145]. In the process of teaching biology, biology lessons, extracurricular activities, excursions and extracurricular activities play an important role in the development of socially active civic competence of students. In this process, students become familiar with events, phenomena and processes in nature and society, articles of the Constitution of the Republic of Uzbekistan on this topic, and pay attention to mental, spiritual, ethical, economic, legal, physical, and labor education. , contribute to the development of the Motherland by mastering a specific profession, society and it is necessary to serve the interests of the family, show kindness to people, encourage them to be generous. All forms of education: lessons, extracurricular activities, excursions and extracurricular activities play an important role in the formation of socially active civic competence in students. Environmental evenings, gardening events, meetings with famous writers and scientists prepare the ground for the development of socially active civic competence among students.

In order to develop general cultural competencies in students, the teacher, when teaching biology, must instill in the minds and hearts of students national and universal values, respect the worldview, religious beliefs, national and ethnic characteristics, traditions and rituals of other people, take care of the worldview, religious beliefs, national and ethnic characteristics, traditions and rituals of other people. preserve the historical, spiritual and cultural heritage of the people that has developed in society. It is necessary to pay attention to aesthetic education along with intellectual, spiritual-ethical, economic, legal, physical and labor education, observing the rules of etiquette, dressing modestly, observing cultural norms and leading a healthy lifestyle .

Thematic evenings, events, meetings, sabbaticals spent with students play an important role in the formation of general cultural competencies among students. In order to develop students' mathematical literacy, knowledge of science and technology news, and usage skills, biology teachers should begin working with non-routine learning problems and biology problems involving calculation to develop students' independent and creative thinking skills. In biology lessons, it is

recommended to use the flower formula to explain the structure of a flower, interpret its model, draw a diagram of a flower, and use biological questions that bring economic benefits.

The above points prepare the basis for the development of general competencies in students when teaching biology. A biology teacher should pay attention to developing interdisciplinary competencies in students along with basic competencies. In this process, when teaching biology, it is necessary to design the formation of basic competencies through the implementation of interdisciplinary connections that prepare the ground for the practical application of knowledge, skills and abilities acquired by students in social, humanitarian, natural, mathematical and applied academic subjects.

A biology teacher needs to analyze the content of the subject being studied and determine ways to implement interdisciplinary connections in the educational process. Electronic multimedia textbooks on biology provide for the expansion of the information system by displaying processes and events, in addition, many illustrations, animated objects, virtual laboratories for practical and laboratory work, a system for creating test tasks of various types. levels, based on a person-centered educational approach, allows you to organize training.In order to develop communicative competence, a biology teacher must master oral and written speech in biology lessons, which will be necessary for students in the future to communicate in society, clearly and clearly express their opinions, formulate questions in a logical sequence based on the text in textbooks and additional literature , write written and oral answers to questions, observe the norms of cultural behavior when communicating with peers and teachers, be able to express one's opinion when working in small groups, respecting the opinions of others. members of a group, be able to work in collective cooperation, be able to defend and convince one's opinion based on acquired knowledge, skills and qualifications, in the classroom be able to manage one's hobbies in organized educational debates and various conflict situations, be able to make decisions necessary to resolve problems and disagreements, as well as speak foreign languages in addition to their native one.

To acquire the above academic skills in students, it is recommended to use innovative technologies in the educational process. It should be noted that didactic game technology in biology lessons includes a conference, a press conference, game exercises, collaborative learning technology, work in small groups, team learning, "saw" or "zigzag" methods, "Let's learn together," and a problem-based

approach. educational technology “Brainstorming” Using “case study” methods, students have the opportunity to develop communicative competencies, while acquiring knowledge, skills and abilities.

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development of the Motherland by mastering a specific profession, serve the interests of society and family, show kindness to people, encourage them to be. Activities held in lessons, extracurricular activities, excursions and extracurricular activities occupy a large place.

Evenings related to nature conservation, landscaping events, meetings with famous writers and scientists, prepare the ground for the formation of socially active civic competence among students.In order to develop general cultural competencies in students, the teacher should teach biology, instilling in the minds and hearts of students national and universal values, respecting the worldview, religious beliefs, national and ethnic characteristics, traditions and rituals of other people, and taking care of the preservation of historical, spiritual and cultural heritage people that have developed in society.

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The above points prepare the basis for the development of general competencies in students when teaching biology. A biology teacher should pay attention to developing interdisciplinary competencies in students along with basic competencies. In this process, when teaching biology, it is necessary to design the composition of basic competencies by implementing interdisciplinary connections that prepare the ground for the practical application of knowledge, skills and abilities acquired by students in social, humanitarian, natural, mathematical and applied academic subjects.

A biology teacher needs to analyze the content of the subject being studied and determine ways to implement interdisciplinary connections in the educational process. Electronic multimedia textbooks on biology provide for the expansion of the information system by displaying processes and events, in addition, many

illustrations, animated objects, virtual laboratories for practical and laboratory work, a system for creating test tasks of various types. levels, based on a person-centered educational approach, allows you to organize training.

The introduction of ready-made lessons, equipped with lectures and demonstrations by the teacher, into multimedia developments in biology will greatly help students complete their homework, as well as independently master the material.Students will have the opportunity to create their own source of information from the objects included in the program, fill them in, master them, study in depth some topics and sections, test their knowledge using interactive elements, and conduct various experiments. As the main feature of virtual laboratories that are part of multimedia developments, we can indicate the principles of the interactive impact of modeling, models and processes on the order of creation of laboratory work.

It is characterized by the diversity and abundance of information transmitted through audio-virtual objects based on a student-centered educational approach. A student who has studied the material at the level of its source receives additional information from the links included in the educational program as information objects. The method of presenting new materials in the form of interactive objects increases students' interest in learning the news.

The most important aspects of multimedia resources are: the possibility of integration into the educational environment; the ability to create a personal learning environment;

the ability to work with the program regardless of how well the educational institution is equipped with computer equipment, that is, even if there is only one computer or computer lab;

availability of ready-made lessons with audio and video content that meet the relevant requirements;

the presence of a large collection of control and test tasks, which allows you to implement a person-oriented educational approach, create tasks and form their various types;

control and testing tasks can be carried out in the form of training, control, when completing tasks, students receive personal instructions;

all videos and animations are voiced and virtualized, which reduces eye strain when reading from a monitor, and it is also important that ready-made lessons are

supplemented with text read by a narrator. The discs, covering different programs, include different types of information objects, including illustrations, animations, videos, virtual laboratories and other objects. The use of multimedia capabilities significantly expands the educational environment and makes the learning process more interesting and enjoyable.

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