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Technological approaches to developing students' independent learning skills in biology teaching methods

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Abstract: This article discusses the specific pedagogical features, methods and tools of the technologies for developing students' independent learning skills in biology teaching methodology. As we know, in order to provide students with thorough knowledge of the subjects and develop their scientific worldview, the independent learning form of teaching has been widely adopted in higher education institutions. Independent learning increases the effectiveness of the students' learning process. Because through independent learning, students develop a sense of personal responsibility, develop self-management skills, and prepare them to work as specialists.

Keywords: Independent learning, didactic foundations of teaching biology, technologies, professional pedagogical activity, pedagogical opportunities.

Introduction: A number of resolutions and decrees have been adopted in the Republic of Uzbekistan on the organization of independent education in higher education institutions. The “Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030”, approved by the Decree of the President of the Republic of Uzbekistan No. PF-5847 dated October 8, 2019, attaches special importance to the priority areas of systemic reform of higher education, raising the process of training highly qualified personnel with modern knowledge and independent thinking to a qualitatively new level, modernization of education and development of social spheres and economic sectors based on advanced educational technologies, as strategic issues. This Concept sets the task of "increasing the share of independent learning hours, developing students' independent learning, critical and creative thinking, systematic analysis, and entrepreneurial skills, introducing methodologies and technologies aimed at strengthening competencies in the educational process, directing the educational process towards the formation of practical skills, and in this regard, widely introducing advanced pedagogical technologies, curricula, and teaching and methodological materials based on international educational standards into the educational process." Because in the teaching of biology teaching methods, like all specialized disciplines, the goal was to develop a methodological base for the development of independent learning skills for students and to conduct scientific research on the basis of an innovative approach to optimizing their activities, such as independent and creative research. On August 14, 2009, based on Order 286 of the Higher Education Commission of the Republic of Uzbekistan, the “Instructions on the Organization and Control of Independent Work of Students” were introduced. In recent years, certain pedagogical tasks have been carried out in the higher education system of our republic on the organization and conduct of independent work of students. The basis of these tasks is aimed at mastering modern methods of student learning, mastering modern methods of creative and independent learning, developing creative and independent learning skills and improving the way of thinking.

Topic related literature review (Literature review). General and specific aspects of the independent activity of future teachers, the issue of studying the pedagogical process as a holistic system were studied to a certain extent by M.Ochilov, J.G.Yuldoshev, R.H.Djurayev, A.Abdullayev; the use of pedagogical technologies in teaching subjects and their role in increasing educational efficiency were studied to a certain extent by N.N.Azizkhodjayev. O.K.Tolipov's pedagogical technologies for developing professional knowledge, skills and qualifications of young people in the vocational education system, Sh.Sharipov's pedagogical foundations for the formation of inventive creativity in students in the form of independent learning [1], Sh.Yunusova's ways of forming independent educational activity of students in increasing mathematical literacy were highlighted [2]. Improving the methodology of teaching biology A.T. Gofurov, S.S. Fayzullaev, J.O. Tolipova [3], the possibilities of using electronic educational resources in organizing and conducting independent work in the process of continuing education I.N. Ibodova [4], O.N. Sultonova [5], S. Matchonov [6], S.Kh. Yaminova [7], M.D. Makhmudova [8], the research work of the pedagogical scientist S. Matjonov is devoted to the organization of independent work of students, in which the issues of organizing oral and written creative work of students in lessons are studied. After all, creative work and independent activity in the formation of a spiritually mature generation require free thinking in itself. Mustaqil tafakkuri, o‘z nuqtai nazariga ega bo‘lmagan o‘quvchi ijodkor bo‘la olmaydi, mustaqil faoliyat yuritolmaydi [9]. A.D. Davydovning qayd etganidek, faoliyat va mustaqillik muammosini hal qilishda turlicha yondashuvlar mavjud. Ba'zi mualliflar faollik va mustaqillikni o'quvchilar harakatining xususiyatlari, boshqalari faollik va mustaqillikni shaxs xususiyati deb tushunsalar, boshqalari esa ularni o'qitish usullari va tashkil etishning hosilaviy hodisalari deb hisoblashadi [10]. Bularning barchasiga qaramay, o'qitishda kognitiv faoliyatni faollashtirish, nafaqat bilimlarni egallash jarayonini takomillashtirishga qaratilgan, balki mustaqillikni talabalarning shaxsiy xususiyati sifatida shakllanadi.

METHODOLOGY

In the practice of Uzbek and foreign education, information resources are covered on the basis of a number of pedagogical approaches in organizing independent work. Based on this idea, a modern student develops in the field of variable information and educational opportunities, and these approaches are implemented in the educational process in a combination of specific tools, forms and methods, and effectively solve the problem of forming their competencies.

According to the essence of independent work of students, independent work of students is an integral and mandatory part of the entire educational process, it is a type of student activity and is determined by the educational process. Educational tasks are performed by the student when performing an educational task characterized by the corresponding activity. In addition to the acquired knowledge, skills and competencies, inspiration and creative imagination; help to form the knowledge, skills and abilities necessary for solving cognitive problems, cognitive activity, mental independence and creative abilities. The formation of students' theoretical and practical knowledge, skills and competencies in science is carried out during the lectures, practical, laboratory and independent study hours provided for in the curriculum. Students need to have the skills of planning the process of independent learning and effective time management. For this purpose, it is recommended to draw up daily and weekly study plans for them. Planning will help them master knowledge gradually.

RESULTS

When providing knowledge to students in the learning process, it is necessary to strengthen and expand the subject materials studied independently, and to direct them to perform independent work. In the subject of biology teaching methods, it is advisable to implement students' independent learning activities as follows:

1. Develop students' independent learning skills by performing short-term independent work in practical and seminar lessons of the subject.

2. When directing students to independent learning, it is necessary to strengthen and deepen the knowledge and skills obtained from the biology teaching methodology.

4. Independent learning tasks should consist of tasks that form the basis for the development of students' creative activity.

5. The teacher should explain the ways to perform independent tasks step by step, giving methodological instructions.

6. The teacher ensures that students monitor the results of independent learning tasks, correct mistakes, evaluate, and encourage them. In the technology of independent learning management, the goal of the lesson is clear, professionally oriented, and the means and sequence by which this goal will be achieved are seen as the organizer of the learning process, and the importance of student activity is given. For this, the teacher uses various teaching methods and

opportunities in the description of the content of the educational material. The methods used in each lesson have their own characteristics in the pedagogical system. The main type of lesson in which the teacher guides the formation of concepts and actions is practical lessons, and the methodology for conducting them depends on pedagogical experience and skills [11]. The methodology of teaching biology in higher education provides an advanced perspective on solving the problem of equipping students with the skills and qualifications of independent and organized work in preparing them for pedagogical activity and organizing their independent work during the learning process for mastering. “It would be better if the lecture continued with independent study of the questions by the students” [12]. The goal of independent education is to develop the need and ability of future specialists to use information to search for new knowledge, and on its basis to create new information. Based on this, the issues of “independence”, “independent thinking”, “independent education” and “independent work” were revealed from a scientific and theoretical perspective and on the basis of important didactic requirements for independent education. It identifies didactic approaches to the event being studied as a primary source, and considers the ability to independently solve the problem being studied as one of the important conditions for the transition of knowledge to firm confidence.

E. Kryukova indicates the following features of the formation of independent learning skills in young people:

Extensive development - cumulative; acquiring new knowledge; orienting; identifying oneself in culture and finding one's place in society; complementary - eliminating shortcomings reflected in the content of education, filling gaps in the educational process; self-development - improving consciousness, memory, thinking, creative qualities;

methodological - negating the narrow focus inherent in a particular profession;

communicative - establishing certain connections between science, profession, and also youth;

joint creativity - carrying out creative activities together with students in a group, finding solutions to existing problem situations, assisting in creative work, complementing it;

ensuring independent development - providing methodological assistance in overcoming difficulties in the process of independent and free thinking or action,

spiritual support - maintaining a sense of participation in the organization of intellectual actions of humanity [14].

In our scientific work, students' independent work activities were monitored based on the method of giving various tasks. A variety of educational tasks - the educational tasks given range from simple to complex, are coherent and consistent, and the content of each task is based on the synthesis of knowledge, skills and competencies acquired during the training session. In order for students to independently complete such tasks, it is necessary to form their knowledge and research skills. Educators are required to follow such tasks as applying a pedagogical technological approach to the development of independent learning activities in students and evaluating the results at the indicator level. To form such activities, it is necessary to create situations for independent work. From the analysis of scientific literature, it is known that although research has been conducted on the content and essence of independent learning forms and their organization, the need to improve the methodological system for developing students' independent learning skills in teaching "Biology Teaching Methods" in higher pedagogical educational institutions determines the relevance of our research work. Nowadays, in all forms of education, the use of non-traditional educational technologies is gaining importance, based on the high pedagogical skills of the teacher and a new approach to the educational process. Most educational technologies are used in most lessons, laboratories and practical exercises. However, it has been observed that the use of a technological approach in organizing independent learning outside the classroom gives effective results in developing students' knowledge, skills and competencies. Technological approaches in independent learning differ from the lesson process in the ways and means of their application. It is worth noting that technologies used for independent learning are implemented without the participation of the teacher, that is, in this situation the teacher becomes an observer. In the textbook "Pedagogical Technologies in Teaching Biology" by the pedagogical scientist J.O. Tolipova, the didactic purpose of collaborative learning, problem-based learning, modular learning, didactic game technology and design educational technologies in biology teaching and their specific features of their use in biology lessons are highlighted based on lesson designs. During the research, the purpose and content of these technologies were studied and the advantages of using design educational technology in developing students' independent learning skills were identified.

Design technology is not a novelty in world pedagogy, since it arose on the basis of the design method developed in the 1920s by the American philosopher and educator J. Dewey and his student V.H. Kilpatrick.

J. Dewey proposed organizing education by activating the students' specific goal-oriented activities, taking into account their interests and needs. To do this, he taught students the need to apply their acquired knowledge, skills and abilities in practice, to show them ways to use them in their future lives, that is, to teach theoretical knowledge in connection with practice. In this process, students acquire new knowledge, skills and abilities by applying previously acquired knowledge and skills to solve important problems in familiar situations [15]. Design technology is the achievement of the desired result in the process of solving a problem of practical or theoretical importance. If a theoretical problem needs to be designed, a specific solution should be developed, and if it is a practical problem, specific recommendations should be developed on the issue of its application in practice. Advantages of this educational process: students develop their knowledge and skills independently.

The improved methods of project-based educational technology are a creative and scientific research method that can be implemented through the following methods, which form the basis for the development of independent activity of students:

Project method - students identify a problem and create projects to solve it. This develops their creative thinking and problem-solving skills.

Individual work - students acquire the skills of working independently on a given educational task. The student develops independent analytical, logical and comparative skills in the theoretical and practical process [16].

In order to develop independent learning skills in students, educational tasks on each topic are given in the form of creative projects, to a certain extent: research projects; creative projects; role-playing projects; practical projects; projects designed to achieve research and goals.

According to the subject and content of the projects: projects covering one field of study; projects requiring interdisciplinary research.

According to the nature of the projects: projects designed to achieve a specific result; projects designed to achieve a multi-directional result.

In our research work, a project of educational tasks designed to achieve a specific result in the methodology of biology teaching in independent learning of students was developed and effectively used in experimental test facilities. In implementing these tasks, serious attention was paid to the following aspects:

repeating knowledge-based tasks in biology teaching methods to prepare students for professional pedagogical activity, improving the didactic thinking and professional skills of future biology teachers in the spirit of creativity and inquisitiveness;

finding and effectively using design methods and techniques to develop students' acquired knowledge, skills and qualifications in biology teaching methods;

increasing the ability to act creatively in the content of learning tasks, which is important to strengthen in independent learning;

- to form a social, ideological, high worldview in students by instilling professional ethics - courtesy, decency, truthfulness, honesty, courage and vigilance, purity, steadfastness, patience, humility, humanity, patriotism, justice, fairness, kindness, sincerity, etc.

Successfully solving such problems leads to a high level of knowledge, literacy, and effective completion of activities aimed at mastering the secrets of their chosen profession. Students achieve mastery of educational activities - through preparation, reading, learning, consolidation, and independent problem-solving skills based on creative exercises. In this case, the teacher needs to know how each student perceives a new topic. This helps to correctly divide students into groups, take into account the learning capabilities of each group, and correctly select differentiated tasks for independent work.

When teaching students in a differentiated manner, the importance of their independent work can be determined as follows:

1. Students get used to working hard and gaining knowledge in order to consciously complete the tasks of the subject of study continuously, completely, and systematically.

2. Students learn to overcome difficulties in mastering the educational material and work with perseverance and willpower to achieve their goals.

3. Students' love for the subject, conscious discipline, interest in work and study are cultivated.

4. Students' mental abilities - thinking, attention, memory - are developed, and learning and thorough assimilation of knowledge in the classroom are ensured.

5. Students learn to apply their acquired knowledge at a high level in practice. Their activity, independent thinking, initiative and creativity are formed.

6. Students' socially useful qualities are developed and greatly contribute to their scientific, cultural, political, moral, spiritual and aesthetic maturity.

Students' independent learning activities are based on

the formation of their self-awareness, consciousness, thinking, and will, and the conscious regulation of their behavior and their entry into the sphere of social relations, which creates skills that enable independent activity and creative activity, which leads to the socially useful activities of students.

CONCLUSION

In conclusion, it should be said that in the course of the research work, effective methods and tools were identified for improving the skills of students' independent learning in the methodology of teaching biology based on a technological approach. Educational tasks and methods of controlling them were identified that allow students to learn independently. The effective aspects of independent learning in the methodology of teaching biology are that it prepares students for pedagogical activity and forms the basis for developing the skills of independent and creative research on themselves.

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