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A CLUSTER SOLUTION FOR THE ORGANIZATION OF INDIVIDUAL STUDENT LEARNING IN THE TEACHING OF NATURAL SCIENCES

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Abstract:

This article analyzes in detail the individual characteristics and capabilities of students in teaching natural sciences and in the organization of the educational process. A theoretical analysis of the organization of training sessions based on an individual approach in the educational process is presented. According to the principle of the innovative pedagogical cluster, the methodology of the approach to the student's personality is highlighted, based on the effectiveness of its application in practice.

Keywords: pedagogical educational cluster, individual approach, individual training, "heard-seen-done", teaching of natural sciences, personal development, education and upbringing, student portfolio, Student Academy.

TABIIY FANLARNI O‘QITISHDA TALABALARNING INDIVIDUAL TA’LIMINI TASHKIL ETISHNING KLASTER YECHIMI

Annotatsiya:
Ushbu maqolada tabiiy fanlarni o'qitishda hamda ta'lim - tarbiya jarayonini tashkil etishda talabalarning individual hususiyatlari va imkoniyatlarini keng tahlil qilingan. Ta'lim jarayonida individual yondashuv asosida o'quv mashg'ulotlarini tashkil etishning nazariy tahlili keltirilgan. Pedagogik ta’lim innovaosion klasteri tamoyiliga binoan talaba shaxsiga yondashuv metodologiyasi yoritilgan bo'lib, amaliyotda qo'llash samaradorligi asoslangan.

Kalit so'zlar: pedagogik ta'lim innovatsion klasteri, individual yondashuv, individual ta'lim, "eshitdim-ko'rdim-bajardim", tabiiy fanlarni o'qitish, shaxsiy rivojlanish, ta'lim va tarbiya, talaba portfoliosi, talabalar akademiyasi.

КЛАСТЕРНОЕ РЕШЕНИЕ ОРГАНИЗАЦИИ ИНДИВИДУАЛЬНОГО ОБУЧЕНИЯ СТУДЕНТОВ ПРИ ПРЕПОДАВАНИИ ЕСТЕСТВЕННЫХ НАУК

Аннотация:
в данной статье подробно проанализированы индивидуальные особенности и возможности студентов в преподавании естественных наук и в организации учебного процесса. Представлен теоретический анализ организации учебных занятий на основе индивидуального подхода в образовательном процессе. Согласно принципу инновационного педагогического кластера, освещается методология подхода к личности студента, основанная на эффективности ее применения на практике.

Ключевые слова: педагогический образовательный кластер, индивидуальный подход, индивидуальное обучение, "услышанное-увиденное-сделанное", преподавание естественных наук, развитие личности, образование и воспитание, портфолио студента, Студенческая академия.

Introduction

If we look at the development of societies, we can see that their development is directly related to education and science. Without science and education, no field would have developed, discoveries would not have been made, times would not have been renewed. Over the centuries, this fact has not changed. Even now, the general image of the world is improving and defining its shape on the basis of science. Even the level of development of countries is evaluated by their educational progress. Accordingly, the fields of education and science in the world continue to develop rapidly. And global development paves the way for the introduction of new approaches, modern trends, advanced training systems in the field.

Despite the fact that the system of continuous education has already been established in our country, real attention and new approaches to the field have increased dramatically in the last decade.

Science is not a field that freezes in one place, it requires constant updates. For example, once the form of general education, teaching all students on the basis of the same, unchanging programs, was widely used, today most countries have actively switched to individual education. This is being implemented at every stage of continuing education. That is, great attention is paid to the development of individuality in the educational stages of preschool, school, higher education and post-higher education [1].

In general, individualization of education realizes the personal potential of the student in education. This will ensure their several rights and opportunities. For example, choosing or

defining individual meanings and goals in each academic subject, personal interpretation and understanding of key concepts and categories, creating individual educational programs, monitoring one's own performance, reflecting and self- the right to choose self-assessment methods. The rights to individual choice of subjects, creative laboratories and other types of lessons in accordance with the main curriculum are also included. After all, the factors that ensure the sustainable growth of a developed country in the future depend on how the education sector is organized. Therefore, from the first days of independence, the creation and development of a new continuous education system aimed at taking a worthy place in the world in the field of education was set as a priority task. In the period of reforms, a comprehensive education system based on integrity and continuity was formed in our republic, which covers all stages of raising the young generation into a mature person.

Developing an effective system of training competitive personnel for the field of pedagogical education, improving the quality of education, introducing advanced educational technologies to the field, and training highly qualified specialists with the skills to use modern knowledge and pedagogical technologies. In order to put it into practice, the Chirchik experiment was launched [3]. In the development of education, the cluster approach is considered as the main solution for the development of education, and in this regard, the special principle of pedagogical education cluster in the teaching of natural sciences is considered effective.

Rector of Chirchik State Pedagogical University dated January 31, 2023 No. 01 - 17 on improving the quality of education and involving students in scientific and research work "On involving students in scientific and research work at the university based on an individual approach" gi and 02.02.2023 No. 01-20 "On the application of technologies of individual approach to the educational process of the University" in order to fully and qualitatively ensure the implementation of the orders of students in the faculty of natural sciences and attached by choice.

Currently, students should be able to collect and analyze information on their scientific topics, make pedagogical recommendations on science tasks and apply them in practice, search for scientific literature on their chosen topic, how to use it, and analyze it. have concepts on [8].

Analysis of literature on the topic. Individual education is one of the forms of educational activities that implements the teacher's pedagogical influence on the student. The activity of the teacher with the student outside the classroom is understood. Its effect was manifested in the form of master-apprentice education, especially in applied arts and crafts [9].

As a result of the scientific research conducted by A.A.Ibragimov and J.R.Allamjonova, the theoretical foundations of individual education were widely analyzed and explained. states that the trajectory is leading.

When A.K. Boymurodov conducted an analysis of the education system with an individual approach, it was noted that the use of an individual approach creates the following opportunities:

- independence of students in education is ensured, methods suitable for them are chosen;
- confidence is expressed in the students' existing knowledge, potential, and experience;

• the students' desire to express their "I", taking into account their social characteristics and lifestyle, is encouraged;

• redistribution of professor-teacher and student tasks in the educational process, limitation of the leadership role of the professor, he is considered as an assistant, consultant [9];

Currently, individual education based on flexible, i.e., adaptive curricula, is being applied to the educational process based on the introduction of A. S. Graniskaya, Inge Unt, V. D. Shadrikova technologies into educational programs [10].

Individual education technologies put into practice by Unt Inge Erichovna are based on the transformation of independent work of students into independent practice both at the educational institution and at home. This technology is being implemented in all parts of educational work: the task, methods and goals of independent education.

According to A. S. Graniska, it is necessary to stimulate the educational process, to gradually complicate the tasks, in this case it is possible to develop the scientific and practical competence of students in the most effective ways. The center of this adaptive system is a student with unique characteristics and capabilities, based on which the teacher creates an individual work model [11].

Effective learning tools and methods are selected, created and adapted to model individual learning technologies. A distinctive feature of the individualization technology is the teaching of the whole group during the lesson, including the division of the educational process into 2 parts, while at the same time the teacher's work with individual students and the teacher's individual work will consist of providing.

The unique feature of V. D. Shadrikova's individual education technology depends on the development of educational tasks according to B. Bloom's taxonomy, the creation of 6 levels of tasks during the lesson, and the level of knowledge of students, their capabilities. In this case, each student learns the curriculum at his own level, but the teaching-methodical complex, the program is carried out in exactly the same way. based on the principle of "development from simple to complex", often combined with a differentiated approach.

Research Methodology

An individual approach to education does not mean individual education, separating students from others, but it means taking into account special conditions in the formation of one or another character of a person, and understanding the individual psychological characteristics of each student on a scientific basis. In psychology, the individual characteristics of a person mean the characteristics that distinguish one person from another. The task of the individual approach is to determine the individual methods of development and to ensure the activity of each person [12].

According to the pedagogical encyclopedia, individualization means the system of managing their learning activities, which takes into account the individual-psychological characteristics of each learner.

Individualized training is provided through educational methods and various educational-methodical, psychological-pedagogical and organizational management measures based on an individual approach to the organization of the educational process [13]. Also, in the process, the method and pace of teaching are selected according to the individual differences of learners, the level of development of their ability to study [14].

It serves to take into account the individual characteristics, interests, professional difficulties and needs, personal motives, experience, qualification level and social opportunities of teachers. Creating an individual educational trajectory of a teacher requires him to have skills such as being able to understand and evaluate the level of professional deficits, planning and foreseeing development points. During the research, the results of the questionnaires conducted with the trainees of professional development courses showed that pedagogues have a positive attitude towards the creation and implementation of an individual educational trajectory and have a need for it.

Pedagogical education innovation cluster is based on the principle of "heard - saw - done":

1. To provide methodical support to general education schools (teaching natural sciences) of the higher educational institution, increase the quality of education, continuous professional development of teachers;
2. To increase the coverage of higher education through the establishment of "Continuous Vocational Education Electronic Platform" and to direct graduates to the profession, to develop the skills of effective organization of classes and the educational process based on innovative pedagogical technologies;
3. Carrying out scientific research work on ensuring integration, innovation, integrity, continuity, consistency, effective succession in the field of pedagogical education;
4. Organization of pilot-testing processes of science-based innovative projects, creation of opportunities for quick reconnection with preschool, secondary education and HEIs and other applicants in the training of pedagogic personnel;
5. Current issues of pedagogical education development.

Based on these features, in the training of future biologists in the teaching of natural sciences, each student has his own individual program, based on his psychological and pedagogical interests, in which field of natural sciences there are opportunities to conduct more creative or scientific activities need to be determined. In this regard, it is appropriate to organize pedagogical and psychological interviews with each student, diagnostic interviews based on their social, spiritual and axiological views.

Therefore, although the direction of study is clear, despite the fact that the knowledge of students formed in the process of cognitive cognition is clearly oriented, the professional needs of future biologist-pedagogues, the results of the diagnosis of their difficulties arising during the 4+2 program, interests and A program is required based on the motivations of the student, which is directed to personal and professional development, provides the opportunity to optimize the types and forms of continuous education, and provides for independent education.

It is according to this program that the teacher of natural sciences defines, realizes and based on his experiences, the future pedagogues-biologists realize their personal potential, professional improvement, define their position and manifest themselves in the process of education. have a separate way of movement [15]. Based on the need to train competitive personnel, the use of individualization technology in the educational process, taking into account the personal characteristics of each student, is considered the main basis for ensuring the competence of future specialists.

The formation of high-potential specialists can be realized by the formation of effective education based on person-oriented technologies. Modern society needs a wide base of theoretical and practical knowledge and morally and socially stable mature personnel. In this regard, individualization of education provides practical help. The technology of individualization of education is aimed at taking into account the personal and psychological characteristics of students and can be defined as the organization of an educational process based on an individual approach. A necessary condition for the involvement of individual educational technology in the educational process is the result of the analysis of the factors affecting the cognitive process of students, i.e. identifying cognitive abilities, interests, teaching ability, learning ability.

The process of teaching natural sciences requires the integration of theoretical and practical knowledge, as well as testing the knowledge acquired by students with the help of scientific and practical experiments. The great thinker Abu Rayhan Beruni was also in favor of explaining the experience by experiment and observation. In his debate with Ibn Sina, he argued that practical experiments provide more reliable information than speculations, and that opinions can change and lose their original meaning through word-of-mouth. , who emphasized the importance of practical experience.

The innovative pedagogical project "I heard-saw-did" was defined as the main principle in the organization of individual education, and it is considered the basis for the effective organization and implementation of the educational process (Table 1).

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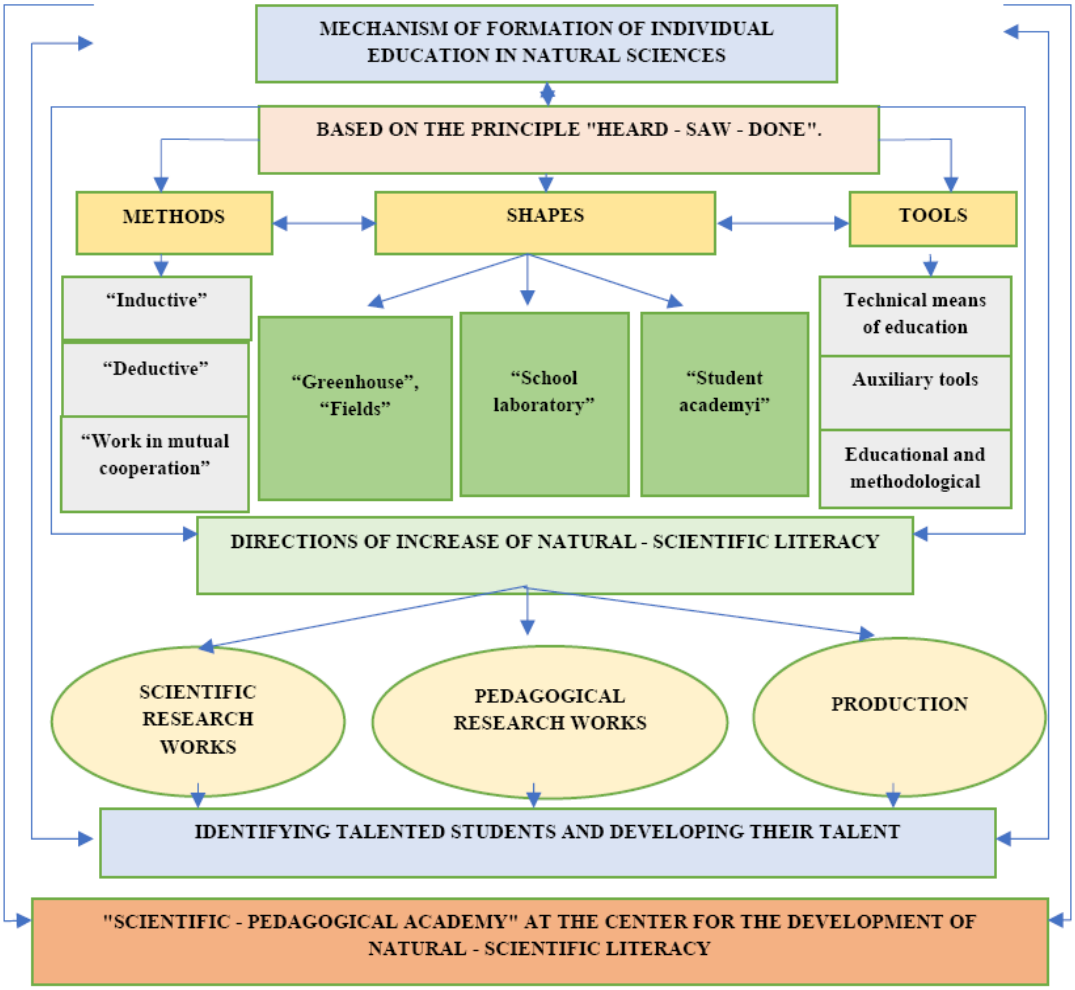

1-table *The mechanism of formation of individual education in natural sciences*

The goal of the principle of "heard-saw-done" is to create results that are able to carry out a specific task in a certain period of time, clearly and in a measurable way. A clearly defined goal is a guarantee of perfect and effective performance of the task. In this, the three bases of the principle are considered leading.

It leads to the application of theoretical knowledge in education to practical, everyday life processes and the formation of practical skills, and takes the lead in highlighting the personal abilities of each student, regardless of his specialty.

At the stage of "I heard" - in the form of a theoretical lesson, lectures, conversations, stories are conducted and the necessary knowledge is acquired.

At the "Kordim" stage - practical training, laboratory and seminar training is organized and qualifications and skills are formed.

In the stage "I have done" - in the form of independent education, students transform the knowledge, skills and abilities acquired in two stages into competencies.

- It is appropriate to provide analytical information, lectures and written works on the given subject related to separate chapters of the studied sciences in the field of natural sciences;
- preparation of illustrative infographic materials on the chosen subject, in which the subject is given by the teacher in relation to the subject, its content and form, execution is determined by the student;
- creation of scientific crosswords, lapbooks and smart notebooks, the size, complexity, and content of which are formed by the student himself;
- to write a review of the scientific monograph of a modern scientist, the author's work, separating the main ideas and rules, with a personal based assessment and a recommendation for use;
- performing homework of various nature. This includes solving exercises and problems, translating or retelling the text, choosing and studying literary or scientific sources, making various tables, performing graphic work, performing various calculations, etc. includes;
- performing individual creative tasks aimed at developing initiative and independence in the student. Individual assignments can be received by each student or a group of students;
- on the basis of writing a scientific essay on the selected topic, the theoretical knowledge related to the stages of the pedagogical cluster principle "I heard-saw-I did" is achieved in the form of practical assignments and tasks.

Now, in order to provide a pedagogical cluster approach, it is appropriate to use the following task and creative assignment methods for individual education. It is advisable to use portfolios according to the type and content, and they can contain several sections. For example, in the case of a student studying in the field of natural sciences, each person has his own world of internal and external interests. Each student whose individual interests are studied is invited to create a "student portfolio" and submit it to the "student academy" fund. According to the leadership and priorities of each student, the Portfolio consists of the following four sections:

1. "My image" (personal information of the student is provided based on the student's photo, essay, application form, descriptions; it contains the following panels: "my application form"; "meet me - this is me!"; "My thoughts"; - "me and my interests".).
2. Portfolio-collector (materials collected by the student in the field of specialization (list of references, drawings, tables and pictures, photocopies of articles, creative works of fellow students) is included; the section should consist of the following sheets possible: "desktop"; "from the work of my classmates" is considered a small original archive).
3. Work materials (all materials created by the student himself, systematized are included; the sections can be as follows: "written works", "creative works", "research experiments", "practical developments").
4. Personal achievements (the achievements and results of the student during half, one academic year or the entire period of education are reflected; it may contain the following labels: "my Creative idea"; "my idea" my initiatives regarding lim").

The above-recommended portfolios are diagnostic material not only for pedagogical personnel and tutors, but also for students who have not been able to reveal their personal interests and

creative aspects, to find their personal "I" and to carry out cognitive activities in the educational institution. Effectively helps to organize.

Conclusions and Suggestions

In conclusion, it can be said that the individualization of education is one of the main foundations of the pedagogical cluster, which requires an approach to each student's personality as a "value". After all, the scientific, pedagogical, psychological, and practical approach to the personality of the student will be the basis for them to become truly selfless pedagogues in the future.

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