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**RECENT ADVANCES IN
SCIENTIFIC WORLD**



MONTERREY, MEXICO
18-19.12.2021



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TEACHING THE NATURAL DISCIPLINES IN A SPIRAL APPROACH

***Abstract.** This article discusses the spiral approach to learning. The main aspects of personality-oriented learning are considered. The article shows how to effectively create a lesson strategy using a spiral approach. Four spiral preparation steps were suggested.*

***Keywords:** a spiral approach, personality-oriented learning, natural disciplines.*

In personality-oriented learning, the main place is occupied by the student's personality, his identity, self-worth, the subjective experience of each is first revealed, and then consistent with the content of education. If in the traditional philosophy of education socio-pedagogical models of personality development were described in the form of externally set patterns, standards of cognition, then personality-oriented learning is based on recognizing the uniqueness of the subjective experience of the student as an important source of individual life.

Recognition of the student as the main active figure of the whole educational process is a personality-oriented pedagogy.

Curriculum is a dynamic process. Development means changes which are systematic. A change for the better means any adjustment, revision or improvement of existing condition. To produce positive changes, development should be purposeful, planned and progressive. It will take years to evaluate if the curriculum is effective and attuned to the needs of the learners and the society [1].

The principle of spiral construction of educational material is one of the methods for realization the personality-oriented learning. This principle can help to create new effective relationship between a student and a teacher as the basis of spiral construction of educational material is simplification of learning. Moreover, the student's attitude towards the discipline can also change. It can become more conscious and motivated. So, the principles of construction of this system are aimed at the comprehensive development of the individual.

In a spiral approach, a student is introduced to the same topics several years in a row, advancing them slightly on each pass; with topics arranged from the simplest to more complex. The broken spiral on the other hand is the case where students were unable to gain mastery of the previous topics and are introduced to a more complex new topic [2].

The spiral approach must go through all learning and personality development. So, there is a gradual development from a student who has not yet realized his incompetence to a specialist in a certain field, who realizes and knows the depth of his knowledge and level of qualifications. This theory describes the levels of personality development. This can be development of a person, student, leader or team, or even an entire organization. This is a natural logical movement from the bottom up. A person, in this case, opens the way to development in a new world of values, different thinking and ways of achieving goals and communication. The illustration of this principle in Fig. 1.

The lesson is the main element of the educational process, but in the system of personality-oriented learning its function, the form of organization, changes significantly. In this case, the lesson is not subject to reporting and testing

knowledge, and identifying the experience of students in relation to the material presented by the teacher.

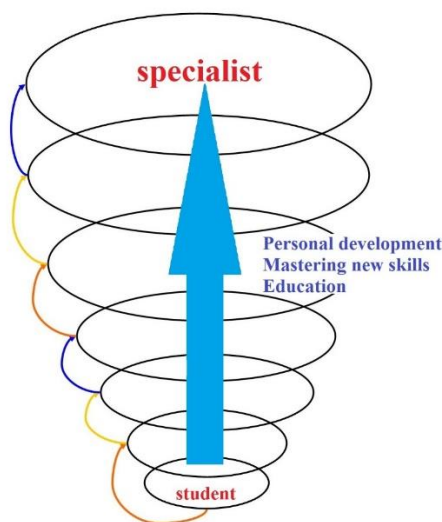


Fig. 1. Illustration of a spiral approach to personality development (authoring)

However, there are significant differences from classical classes in natural sciences, such as chemistry, physics, biology, and so on. The teacher must identify the various individual mental operations that students should use. To ensure optimal learning conditions for students with the spiral method, it is proposed to use case technologies [3-4], as well as other modern techniques, for example, flipped lessons [5-7]. Thus, the spiral progression approach in science aims to expose the learners into a variety of concepts repeatedly with deepening complexity until the learners show mastery [8].

When constructing a lesson using a spiral approach, it should be noted that students should not lose sight of the main problem while gradually expanding and deepening the range of related problems. In contrast to the concentric structure, in which the initial problem sometimes returns even after a few years, in the spiral structure there are no such breaks. In addition, in contrast to the linear structure of learning, the spiral structure is not limited to a single presentation of individual topics. Let's consider at the strategy of one natural discipline lesson from the perspective of a spiral approach.

1. Defining the global theme of the lesson.

The topic should be defined in such a way that it is not detached from the following topics, and also becomes a continuation of the previous ones. For example, in the preparation of curricula in chemical disciplines, topics are first devoted to individual elements or atoms, then the structure of certain compounds built by these atoms, and then the chemical properties arising from a particular structure of chemicals. The student must understand that each topic he considers is not a separate piece of theoretical material, but a real science, systematized and relevant not only in the pages of the textbook, but also in real life.

2. Choice of methods and techniques to achieve the objectives of the lesson.

Thus, for the implementation of learning in a spiral approach should choose tasks for students on the principle of simple to complex. A bad example might be parsing the simplest questions in class and presenting more complex tasks as homework. It would be a good idea to divide a large complex problem into many sections so that students can analyze the algorithm for solving the problem. In addition, the complex scientific nuances teacher can explain with real-life examples. For example, by drawing analogies of life situations, students learn the material much more effectively.

3. Individual approach to each student.

This point can be achieved if the number of students in the group is not more than 10-12. The teacher must determine the level of knowledge and capabilities of each student and, accordingly, apply the right approaches and techniques to control their acquisition of knowledge. A good example of processing practical material is alternating work at the board, or a survey in the form of a brainstorm.

4. Spiral approach in knowledge assessment.

It is necessary to develop such control measures and tests that will comprehensively reflect all the skills of students that were developed in the lesson. An example of such control work can be a comprehensive multi-level test. Such tests will help not only the teacher to properly assess the student's knowledge, but also the student to see their gaps in knowledge.

In conclusion, it should be noted that personality-oriented learning plays an important role in the education system. Modern education should be aimed at the development of human personality, the disclosure of its capabilities, talents, self-

awareness, self-realization. Application of personality-oriented technology in the educational process enriches the structure of knowledge and learning approaches. The man understands depth of knowledge and effectiveness of their abilities. Thus, the goals of professional competencies are developed. Awareness of their skills and knowledge increases competitiveness in the labor market and promotes enrichment of professional experience and self-realization. Therefore, the principle of spiral construction is a crucial method in the formation of a new educational field, especially in relation to natural sciences.

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