INTELLECTUAL TRAINING OF STUDENTS OF TECHNICAL INSTITUTE

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ABSTRACT

How in modern conditions to improve the quality of chemical training at a technical university? The author connects the answer to the data and other questions with the improvement and development of the forms, methods and techniques of students' intellectual training, the development of their intellectual universals throughout the entire learning process at the university. Among intellectual universals, intellectual abilities are given priority. In this regard, a psychological and pedagogical analysis of this phenomenon is carried out in the article, species diversity is given. Certain techniques, forms, methods for improving intellectual abilities that play a leading role in improving the quality of training of specialists are shown.

Keywords: intellectual, intellectual training, intellectual universals, psychological and pedagogical analysis.

INTRODUCTION

Intellectual training of students is inextricably linked with the development of new conceptual ideas, ways to improve the quality of professional training. Time and practice have shown that the search for the development of modern higher education continues, to this day, but now it can be argued that more and more specialists accept and actively support the idea of the quality of education. The fact that the idea of the quality of specialist training is not only declared, but also actively implemented, is confirmed by a series of scientific studies, an increase in the number of publications and conferences at various levels, the creation of a regulatory framework, and the implementation of the mechanism.

The problem of training in the disciplines of the chemical profile has recently left much to be desired. Chemistry teaching at a higher school was the subject of discussion at the 16th Mendeleev Congress on General Applied Chemistry (St. Petersburg, 1998), at the international conference Chemical Education and Society Development (Moscow, 2000). A number of trends are noted: the volume of chemical information decreases simultaneously with the quantitative increase hours of study in basic chemical disciplines. A low level of students' chemical literacy is also noted. So first-year students of TII (90%) have zero points for the first test, which indicates a school chemistry course. There is also such a paradoxical situation: students enrolling

in chemical engineering specialties pass entrance exams in physics. And where is the right to choose an entrance examiner replacement? So it turns out that the best students in chemistry, students who win prizes at olympiads and study at a chemical school go to other universities.

How, in such conditions, to teach a modern student chemical fundamentals? How to interest him? How to form a certain level of professional knowledge in the first year? How to improve the quality of training naturally - scientific, general professional disciplines.

We associate the answer to these questions with the improvement and development of forms, methods, and methods of students' intellectual preparation, the development of their intellectual universals throughout the entire educational process at the university [1]. Among intellectual universals, we give priority to intellectual abilities. In this regard, we carried out a psychological and pedagogical analysis of this phenomenon; let us dwell on some author's approaches.

METODS AND MATERIALS

The problem of abilities is quite well studied in foreign and domestic psychological science and has great theoretical and practical significance. In Russian psychology, the study of abilities was received in the writings of B.G. Ananyeva, TI. Artemyeva, L.A. Wenger, E.A. Golubeva, V.N. Druzhinin, I.A. Winter, V.A. Krutetskogo N.S. Leites, K.K. Platonova, L.S. Rubinstein, B.M. Teplova, V.D. Shadrikova, M.A. Cold and others

The evolution of the concept of abilities is reflected in special dictionaries, encyclopedias, in pedagogical literature, private methods, etc.

A.N. Leont'ev defines ability as the properties of an individual, which determine the success of any activity. A widely accepted definition of abilities is that these are “the properties of the individual, the ensemble of which determines the success of a particular activity” [2]

According to V.D. Shadrikova, the concepts of "property" and "ability" appear as identical. In particular, ability can be defined as a property (or a set of properties) of a thing (system) that appears in the process of functioning [3]. In other words, cognitive ability (functional system) is a property of a certain psychic reality that reveals itself in a situation when a person performs a certain task and is fixed in the form of indicators of the effectiveness of this activity.

B.M. Teplov believed that ability refers to individual psychological characteristics that distinguish one person from another. "No one will talk about abilities where it comes to properties in respect of which all people are equal," the scientist notes. At the same time, he proves that abilities are not any individual

characteristics in general, but only those that are relevant to the success of an activity. However, another researcher, B.F. Lomov approve

RESULTS

So, in pedagogical activity, a whole set of pedagogical abilities, necessary in the professional activity of a teacher, is highlighted. In the most generalized form, pedagogical abilities are presented by V.A. Krutetskiy, who gave them the appropriate definitions:

- didactic - the ability to transmit learning material to students, making it accessible, interesting, and stimulate active independent thought;
- academic - ability to the corresponding field of science (to mathematics, chemistry, physics, literature, music, etc.);
- perceptual - the ability to penetrate into the inner world of the student, an understanding of his mental states;
- speech - the ability to clearly and clearly express your thoughts and feelings using speech, as well as facial expressions and pantomimics;
- organizational - the ability to organize a student group, to properly organize their work;
- authoritarian - the ability to achieve success on the basis of emotional-volitional influence on students;
- communicative - the ability to communicate, establish relationships, the manifestation of pedagogical tact;
- prognostic - the ability to pedagogical imagination, expressed in predicting the consequences of their actions, educational designing of students, the ability to predict the development of certain personality traits;
- the ability to distribute attention simultaneously between several activities [8].

In relation to different types of activities, the general intellectual methods are distinguished.

Nostril (general) and special abilities. General intellectual abilities are a system of intellectual personality traits that ensures the success of mastering knowledge, science, and complex activities. Special abilities - a system of personality traits that ensures the achievement of high results in a special field of activity.

A widely accepted definition of abilities is that these are the properties of the individual whose ensemble determines the success of a particular activity. Many authors include such components as impressionability, good memory (both figurative) and verbal-logical, the ability to create new images, the ease of the state of empathy, and the wealth of verbal associations. These components - a complex set of mental processes and various personality traits, notes I.A. Winter [9].

In defining abilities, we will agree with the traditional definition of abilities as an individual psychological property of a person, which is a condition for the success of an activity. General abilities are the psychological basis for the success of cognitive activity. Special abilities are the psychological basis for success in a particular field of activity.

From the whole variety of abilities, we single out intellectual abilities that determine the effectiveness of intellectual activity.

Intellectual abilities believe N.V. Vidineev, this is the ability to think in the form of lexical (semantic) meanings of words, judgments, inferences, concepts, hypotheses, theories [10].

S.L. Rubinstein notes that intellectual (mental) abilities are, on the one hand, the result of training, but on the other, the premise of learning. The core, the main component of intellectual ability is the quality of the processes of analysis, synthesis, and generalization [6].

V.D. Shadrikov shows that intellectual ability is a property of a certain psychic reality that reveals itself in a situation when a person performs a certain task and which is fixed in the form of indicators of the effectiveness of this type of activity [3].

M.A. Cold connects intellectual abilities with intellectual activity. Intellectual abilities are a property of intelligence characterizing the success of intellectual activity in particular situations. Such abilities are evaluated in terms of speed and accuracy of information processing in the context of problem solving, diversity and originality of ideas, tempo and quality of learning, the severity of individualized ways of learning.

V.N. Druzhinin identifies four types of intellectual abilities: convergent, creativity, learning, cognitive styles. Convergent intellectual abilities characterize one of the aspects of intellectual activity aimed at finding the right result. Creativity is a creative intellectual ability to generate many original ideas in an unregulated environment. Creativity criteria are a set of certain properties of intellectual activity: fluency, originality, receptivity, metaphor (willingness to work in a fantastic context).

Learning - the magnitude and growth rate of the effectiveness of intellectual activity [7].

A similar definition is given by V.S. Bezrukova. Intellectual or mental abilities - abilities that ensure the success of intellectual activity. The degree of their development affects the mental (intellectual) capabilities of the individual [12].

Nature

Convergent abilities are manifested in the efficiency of the information processing process, in terms of correctness and speed of finding the only possible answer in accordance with the requirements of a given situation. According to the author, convergent abilities characterize the adaptive capabilities of individual

intelligence, from the point of view of individual intellectual behavior in regulated conditions of activity. They characterize the level, combinatorial, procedural properties of intelligence.

The next type of intellectual ability according to M.A. Cold - divergent (or creativity) - is the ability to generate a wide variety of original ideas in unregulated conditions of activity. Creativity in the broad sense of the word is creative intellectual abilities, including the ability to bring something new to experience, the ability to generate original ideas in the context of resolving or posing new problems. Another type of intellectual ability is learning ability [11].

Representations of learning are widely developed in the psychological and pedagogical literature. In the context of the "zone of proximal development" L.S. Vygotskogo learning is seen as a manifestation of the level of intellectual development. Understanding the leading role of learning in the child's mental development allows us to formulate the position that the formation of new intellectual mechanisms depends on the nature of learning and the child's creative independence [12].

In the broad sense of the word - learning is considered as a general ability to assimilate new knowledge and methods of activity. The literature defines the main criteria for learning is the cost-effectiveness of thinking. In a narrower sense, learning is the magnitude and rate of increase in the effectiveness of intellectual activity, under the influence of learning influences.

A special kind of intellectual ability is cognitive styles. Cognitive styles - psychological differences between people, characterizing the originality of their inherent ways of studying reality. There are: coding styles of information, cognitive styles, intellectual styles, epistemological styles. Intelligent styles are individually - original ways of posing and solving problems. Distinguish between legislative, executive, evaluative style.

Epistemological styles are individually - peculiar ways of a person's cognitive attitude to what is happening, manifested in the features of an individual "picture of the world."

A review of existing positions, approaches allows us to identify the leading role of intellectual abilities in terms of improving the quality of training of specialists, intellectual development. Moreover, we adhere to the point of view of M.A. Cold in determining intellectual ability. "Each of the intellectual abilities is considered as a property of intelligence, derived in relation to the characteristics of the composition and structure of individual mental experience" [11].

Therefore, being a psychological category, intellectual abilities allow to solve many pedagogical, educational tasks. It can be assumed that certain teaching methods, built taking into account the development of intellectual abilities, contribute to

improving the process of training a specialist in a technical university. The solution of this problem, in turn, creates the necessary basis for the transition to the next stage of training, including the development of experimental methods, practical skills. We used the basic techniques for the development of intellectual abilities in the course of general and inorganic chemistry, which has rich capabilities in terms of developing mental, intellectual operations.

To this end, we highlight in the course of general and inorganic chemistry some scientific, fundamental foundations aimed at working out the elements of chemical thinking: analysis, synthesis, comparison, generalization, abstracting, formulation of concepts, formulation and resolution of problem situations, etc.

The teaching of general and inorganic chemistry at a university is different from school in the breadth of the material coverage and the depth of its consideration; University course - a course in higher chemistry, taught on a scientific basis. Therefore, fundamental, modern ideas about the structure of matter and the main laws of processes should precede a course of inorganic chemistry at a university. In this case, we focus on issues that allow us to generalize and explain the material according to the composition and properties of substances. The physical and chemical introduction allows us to make the course of inorganic chemistry scientifically focused, makes it possible to rely on theoretical generalizations in the study of factual material, and to bring the subject's presentation closer to the modern state of chemical science. Otherwise, this course can go into the list of disparate facts, in some places fastened by a few, and sometimes illusory categories.

DISCUSSION

We pay great attention to the chemical processes taking place around us. We point out the fact that in nature and in artificial conditions one constantly has to deal with a wide variety of processes, such as synthesis, dissociation, all kinds of chemical reactions, with processes in which the signs of physical and chemical phenomena (for example, dissolution) are intertwined with physical changes (for example, with the melting of substances). If, moreover, the complexity of many of them and the variety of their conditions — temperature, pressure, concentration of substances — are taken into account, it will become obvious how difficult the task, even at least in general terms, to understand all this diversity, to outline some, albeit approximate ones, generalizations covering a particular circle of phenomena.

Without knowledge of the structure of atoms and molecules, the nature of chemical bonds and intermolecular interactions, this is impossible. However, this information is only necessary, but not sufficient. After all, the properties of substances are known, first of all, in interaction with other substances. Therefore, starting to study

chemistry, you need to know the general laws of the course of chemical reactions and the processes that accompany them.

The improvement of intellectual abilities is carried out by us both in lecture material and in laboratory and practical classes. We are building a certain system of problematic questions and tasks in the methodological support of the course, which outlines the basic laws of chemical transformations and the processes accompanying them.

In the guidelines and manuals, we consider a range of issues related to the energy of processes, the doctrine of chemical affinity, and reveal the elements of the doctrine of the speed and mechanism of the reaction. We pay special attention to the properties of solutions, which are widely used in everyday life, technology, and industry. We give some examples of the application of the considered material to element chemistry. Thus, the range of issues addressed is not entirely traditional. The character and sequence of presentation of the material differs from the generally accepted ones. So, for example, along with the usual examples of the application of the Hess law, we consider its use in various thermochemical cycles, including the ionization potential, electron affinity, lattice energy, and heat of hydration. This demonstrates to students the versatility of a simple calculation method and from the very beginning connects the stated material with questions of the structure of matter. We also pay attention to the reactivity of substances and their chemical affinity.

We also pay great attention to questions of independent research: we compose creative work for practical and laboratory studies, including historical material: these are chronological, synoptic tables, and historical experiments. The inclusion of students in research projects allows us to improve intellectual abilities that affect chemical preparation and the implementation of basic applied research.

The development of intellectual abilities through the study of the fundamentals of the course of general and inorganic chemistry allows us to significantly improve the quality of chemical training of future specialists, as evidenced by the results of tests, exam results, prizes in competitions and student Olympiads.

CONCLUSION

It should be noted that such work should be carried out systematically and systematically, through goal-setting: setting taxonomy goals in the field of development, training, education of students. Differences in goals should lead to different ways of organizing training, including the use of different principles for the selection of educational material and the construction of curricula, the use of different

means and forms of training. Effective in this regard are intellectual trainings, problematic seminars, electronic textbooks, innovative technologies. It should be noted that such forms of work as scientific disputes and discussions are very popular among students. These are peculiar intellectual exercises for the mind, as a result of which truth is born. At the same time, we focus not only on scientific problems, but also on problems of a production nature, everyday life. When organizing a discussion to discuss a certain issue, we work out the appropriate technology in advance.

Intellectual training of specialists is the goal of the methodological work carried out for many years at the Department of Chemistry and Chemical Technology of the TII Tsonga. This led to a significant improvement in the quality of training of specialist chemists, technologists, and mechanics. Our achievements are: prizes at inter-university student Olympiads, improving the quality of student learning is from 35 to 80%. Students successfully work in a department scientific laboratory, take an active part in student competitions and scientific conferences, and participate in fundamental and applied research.

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