

# FORMATION OF INTELLECTUAL ABILITIES OF STUDENTS OF THE CHEMICAL DIRECTION OF A HIGHER EDUCATIONAL INSTITUTION

Allaev Jumakul

Ph.D., Associate Professor of the Department of Chemistry, Chirchik State Pedagogical  
University, Chirchik, Uzbekistan

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**Abstract.** *The results of the three-year work experience of the Department of Chemistry at the Faculty of Physics and Chemistry of Chirchik State Pedagogical University, aimed at the formation and development of intellectual abilities of students in the process of studying chemical disciplines, are analyzed. Examples of specific activities of teachers in this direction in the organization of the study of chemical disciplines are given. It is shown that the combination of traditional methods of conducting laboratory classes with conducting scientific mini-studies contributes to the development of intellectual abilities and allows improving the quality of chemical training of future specialists.*

*The article shows that the concept of "intelligence" at the present stage of development of science is largely determined by the purposes for which it is used and the theoretical justification of this use. At the same time, there is currently no unified interpretation of the concept of "intelligence". A definition of the concept of intelligence is proposed, in the context of the need to solve problems in the educational sphere: intelligence is mental activity, based on the formed algorithms of thinking obtained in the process of education, which ensures successful adaptation in various circumstances. Revealed the functions of intelligence, manifested through intellectual abilities.*

**Keywords:** *formation, development, intelligence, ability, student, chemical disciplines, activity, teacher, organization, studies, traditional methods, mini-research, chemical preparation, formation, intelligence, intelligence, thinking, ability.*

In pedagogical universities, the process of teaching chemistry is constantly being improved when obtaining the profession of a chemist. Today, when teaching chemistry, there is a need to acquire knowledge in economics, law, innovative management, computer skills, environmental hydroecological "literacy", which, in turn, creates the basis for the training of a qualified specialist. However, as the authors note, the situation in Uzbekistan, which is being updated to this day, is complicated by the fact that it does not allow preparing a future qualified specialist, including a professional chemist, to achieve the level of development of intellectual capabilities of students[1]. The developed intellectual capabilities of students are of independent importance not only during the period of study at a technical university, but also during the period of future professional activity at an industrial enterprise. The requirement of a high level of intellectual development of students from the position of the employer ensures the quality of his professional activity[2].

By the end of the first decade of the XXI century, it became obvious that the healthcare system in our country does not meet the challenges of the time. The most acute problem is providing the education system with qualified personnel of the chemical specialty[3]. In our study, we consider the issues of professional training of a chemical specialty. If the number of teachers

working in the education system in our country is increasing, then the number of representatives of chemist-technologist laboratory assistant, chemist-analyst is constantly decreasing[4]. This situation leads to the fact that in most educational institutions teachers are forced to perform the duties of a laboratory assistant, a biochemist laboratory assistant, a chemical materialist laboratory assistant, distracting from their direct duties[5]. And this is natural, since, for example, the ratio of the number of chemist-laboratory assistant to the number of teachers in our country is two or more times less than in the developed countries of the world[6].

The general problems of teaching chemical disciplines to students of chemical specialties at a pedagogical university are associated with a low level of natural science training, with the lack of motivation of students to study various chemical disciplines. Many first-year students have no idea about the properties of real chemicals [1]. In our opinion, this is largely due to the lack of skills in performing the simplest laboratory operations, since very often a laboratory workshop at school turns into a demonstration of chemical experiments by a teacher.

The lack of a chemist-laboratory assistant is explained only on the one hand by the problematic state of this socio-professional group (the lack of prestige of the profession, the low level of material remuneration for very hard work, difficult working conditions, the lack, according to many workers, of prospects, and others) [7]. On the other hand, many graduates of secondary schools and lyceums simply do not have the necessary competencies to successfully carry out their professional duties. And this circumstance is due to the shortcomings of their professional training in an educational institution [8]. Students hardly imagine the possibilities of development and self-development in the profession. As sociological studies show, a significant part of the students of the Lyceum of the chemical direction not only did not study the materials of the new concept and qualification characteristics for graduates, but also do not know about these documents [9]. But it is in them that new perspectives of the profession are presented, which make it prestigious [10]. In order to eliminate this shortcoming in the system of vocational training, it is important to motivate students to analyze state documents in order to predict and determine on this basis their advancement in the profession. At the same time, more than half of the students consider studying at the lyceum only as a step towards entering a university. Motivation for a higher level of education may be welcome, but without work at the lyceum received only for a relatively limited number of students [11].

It is important to form the ability of a lyceum student to analyze various circumstances in order to predict the consequences of certain actions, which is determined by the level of intellectual development [12].

The need for the formation and development of intellectual abilities is actualized during the training of middle-level medical personnel by the peculiarities of their professional activities [13]. The chemist-laboratory assistant spends a considerable time communicating with students and students, explaining to them certain instructions from teachers, motivating them to have the right attitude to learning [14]. To successfully perform this function, it is important to have a sufficiently high psychological training. The ability to positively influence the student or students, to create a favorable climate in the workforce is determined by the level of formation of emotional intelligence [15].

The formation and development of intelligence is one of the main tasks of general education training, which the majority of lyceum students receive during their studies. Since the

features of professional activity assume the formation of the intellect of a lyceum student as the most important task, it can be assumed that the formation of intelligence should become one of the leading directions of the educational process in a secondary education institution[16].

At the same time, the analysis of literature and practice reveals the following contradictions between the objective need for the formation of intellectual abilities of a student and:

- the fact that the very concept of "intelligence", and, accordingly, the concepts of "intellectual development", "formation of intellectual abilities" are currently ambiguously defined [17];

- insufficient development of models for the development of intellectual abilities of students at all levels of education [18];

- inconsistency of the proposed conceptual foundations, directions and organizational and pedagogical conditions for the development of intellectual abilities in education;

- frequently changing requirements for the nature, scope and results of student training in lyceums;

- commitment of a significant part of the teaching staff to traditional methods of training students, in order to ensure compliance with the requirements of the state standard for the content of secondary vocational education and after that to develop personal qualities, if time remains[19];.

The above contradictions cause the need to solve an important pedagogical problem – based on the understanding of pedagogical approaches to the training of students in educational systems of different levels, to develop and test the conceptual foundations for the formation of intellectual abilities of a lyceum student, to identify the directions and organizational and pedagogical conditions of this activity. The solution of this problem determined the topic of our research: "Formation of intellectual abilities of students of a pedagogical university".

The purpose of this study was determined to develop conceptual foundations, a model and organizational and pedagogical conditions for the formation and development of intellectual abilities of students of a pedagogical university. The object of the study is the process of general education and vocational training of students of a pedagogical university.

Formation and development of intellectual abilities of pedagogical university students. The object of the study is the process of general education and vocational training of students of a pedagogical university.

Methods and research base. In accordance with the purpose and objectives of the study, methods of the theoretical and empirical levels were used: - comparative analysis of philosophical, psychological and pedagogical sources, various types of official documents on the problem under study; - synthesis of theoretical and empirical information; - systematization; - modeling; - sociological survey; assessment and self-assessment; - psychological testing; - experimental work; - study of reports and certificates on the results of inspections, final documents of meetings, conferences, publications in the periodical press; - methods of system-structural approach, analysis, synthesis, prognostics, observation, content analysis, study of practical activities.

The principle of flexibility is also responsible for the possibility of changing the content of education and methods of its transmission to students in accordance with the requests of all subjects (the state, employers, students and their parents, teachers and heads of educational institutions and organizations, the education system as a whole) of the educational process, more precisely with the maximum possible consideration. By determining the ability to change the content and methods of education in accordance not only with individual requests, but also with

the capabilities of students, the principle of flexibility ensures the real implementation of personality-oriented learning. In addition, in accordance with the principle of flexibility, it becomes possible to use uniform blocks of educational content when preparing students for different specializations.

We have considered the principles on which the structural and functional model is based. When training medical workers, the structural and functional model includes the following blocks: - organizational and managerial; - research; - educational and educational; - diagnostic;- preventive.

The most important condition for using the structural and functional approach is the widespread use of information and communication technologies.

The results of the experimental work allowed us to conclude that the proposed system for the development of intellectual abilities of a lyceum student develops the basic components of intelligence, contributes to a more successful development of general education and professional disciplines.

Conclusions. Systematized (on the basis of social and intra-system) trends in the state and development of education, as well as problems in the socio-professional group of chemist - laboratory assistant, chemist - analyst, hindering their effective professional activities and determining the need to reform the education system. It is shown that the requirements for secondary education are increasing - this is a global trend. The requirements for graduates of secondary schools and lyceums in accordance with the new challenges associated with the reform of the education systems of the Republic of Uzbekistan are presented.

It is shown that the concept of "intelligence" at the present stage of the development of science is largely determined by the purposes for which it is used and the theoretical justification of this use. At the same time, there is currently no unified interpretation of the concept of "intelligence". The definition of the concept of intelligence is proposed, in the conditions of the need to solve the problems of the educational sphere: intelligence is a mental activity based on the formed thinking algorithms obtained in the process of education, ensuring successful adaptation in various circumstances. The functions of intelligence, manifested through intellectual abilities, are revealed.

The requirements for professional activity and knowledge of the pedagogical corps implementing the system of formation and development of intellectual abilities of students of a pedagogical university, as well as a set of indicators for monitoring its effectiveness are highlighted.

The development of intellectual abilities in the process of studying the basics of the chemistry course makes it possible to significantly improve the quality of chemical training of future specialists, as evidenced by the results of control papers and exams, the prizes of students at various competitions. At the same time, it should be noted that such activities should be carried out systematically and systematically, through goal-setting. Differences in goals should also 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. The developed methodological techniques contribute to the development of students' understanding of the importance of the studied chemical disciplines in their future professional activities. The three-year experience of the Department of Chemistry at the Faculty of Chemistry according to the above scheme has shown its high efficiency.

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