

PSYCHOLOGICAL-PEDAGOGICAL ASPECTS OF DEVELOPING STUDENTS' LOGICAL THINKING BASED ON THE COMPETENCE APPROACH

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Abstract. *The article reveals the pedagogical and psychological aspects of the development of logical thinking based on the competent approach of future teachers of physics of pedagogical universities.*

Keywords: *Competent approach, physics, logical thinking, psychological factors, pedagogical factors, innovator.*

It is known that the President of our Republic, Shavkat Mirziyoev, in his Address to the Oliy Majlis and the people of Uzbekistan, defined important tasks for improving the quality of educational services and developing society. It is worth noting that the reforms in the education system in Uzbekistan are continuing and becoming more active. Our people are already seeing the results of the changes implemented in our country. In the coming years, plans were made to build new schools, to continue reforms in the education system, and to increase the status and prestige of teachers and trainers, which made all the employees of the education sector very happy. In particular, the fact that raising the reputation of teachers is sealed in the main law of our country - our new constitution is an expression of the high attention paid to the field of education in our country.

It is important to look at the concept of "subjective" in connection with the concept of "competence" in the development of personal-individual qualities of future teachers. So, competence shows the expediency of considering the problem of developing individual qualities of a future teacher. It is known that it is important to consider the concept of "competence" as an objective requirement for the qualities of a future teacher, which will enable him to effectively solve vital tasks in a certain field of activity.

There are unique psychological and pedagogical aspects in the development of logical thinking competencies in students. It is important to prepare and use information products to organize informal activities based on the development of logical thinking competencies in students during the educational process. Artificial intelligence or a logical physics model can be effectively used in this process. Modeling of knowledge is carried out in different scientific areas and for different purposes. In the educational environment, the professor-teacher appears as both a mental and a virtual expert model. The acquisition of new knowledge is important in the development of logical thinking competencies in students. In this:

1) involving students in solving specific scientific and practical problems, creating certain interests in them in this process;

2) create an opportunity to solve quality problems that develop students' logical thinking competencies and check their solutions;

3) expressing the obtained results in electronic form in most cases, creating virtual laboratory work, creating electronic textbooks.

As a result, students will acquire basic computer skills. Then every student will have the desire to create the necessary information base for themselves. In this process, group members begin to act together. Each student gets the opportunity to enrich his knowledge with the help of the knowledge acquired by his peers. Educational materials enriched with new knowledge will help them in this. To do this, the professor-teacher manages to create a collaborative learning environment by using more intellectual tasks.

As a result of the application of such approach to the educational system, a new direction in the education of the higher educational institution will emerge.

As a result of this approach, development of logical thinking competencies in students is achieved. In this case, knowledge appears in four forms:

1) a paradigm consisting of a system of general views, the basis of a scientific worldview, ideas, principles, symbols, imaginations, which is the basis for the creation of fundamental knowledge;

2) certain private views that unite around the idea of irregularity, openness, transitional nature, based on the inequality of processes;

3) general approaches to self-organization or transition processes of systems;

4) the development of stable thinking, transitional forms and images form the basis of a new worldview.

Today, issues related to the improvement of physics teaching are expressed in the works of E.V.Konrad, I.A.Veselov, B.B.Kadomsev, E.N.Knyazeva, I.Stengers. In these works, it is emphasized that there are no relationships that are not structured and not regulated. It is based on the pedagogical point of view that randomness has a creative character in certain cases.

We consider it appropriate to briefly explain the concept of “mental and logical activity” before elucidating the theoretical and practical foundations of organizing activities to improve the development of logical thinking competence in students.

The mind is an innate mental and physiological characteristic of a person, with the help of which people learn about the world, and can assimilate the sciences and existing knowledge created by previous generations, turning them into their own. So, intelligence is related to knowledge and knowledge, knowledge exists, is a created thing, and knowledge is something that can be learned and acquired by a person. It is known that activity is an internal (psychic) and external (physical) activity directed by a perceived goal.

Mind is the highest form of theoretical mastery of real existence, and it is manifested through the competence of human thinking. The main indicators of intelligence are manifested in the independence, criticality, deep variability and consistency of thought. The activity of logical thinking involves knowing and thinking in the process of mastering the existing knowledge of a person, here the student, as well as. is a mental and physical activity aimed at developing intellectual culture. In the process of mental activity, the student perceives and assimilates the available knowledge and makes it his own, that is, he acquires knowledge. Acquiring knowledge is a complex process that requires a person, first of all, to be physiologically perfect, that is, to have the five main sense organs intact, and to train tirelessly to acquire knowledge. Through

knowledge in the process of mental activity, the foundations of a scientific worldview are formed in students. Logical activity is related to the organization of students' educational and work activities and is carried out purposefully in the educational process. Therefore, the content of education should consist not only of scientific definitions and facts, but also of materials that develop cognitive activity, arouse students' interest in learning, and independent logical thinking. In the process of formation of logical thinking competence, work is carried out on the development of students' attention and memory and formation of their effective thinking skills. The development of memory and all its types is also important for mental activity.

In the process of logical thinking, the development of thinking and thinking competencies of students is important. The role of exercises on analysis and summation, comparison, generalization, determination of cause-and-effect relationships, classification and systematization is incomparable in the development of students' thinking competence. In the formation of comparative skills, it is necessary to use exercises aimed at identifying the general similarities of things and events, knowing their differences, as well as increasing their interrelationship.

The ability to distinguish the part that represents its essence and core from the studied material is of great importance in the development of students' logical thinking competencies. Of course, the organization of logical thinking activities should not be limited to mastering existing knowledge among students. As a result, students should be trained to think mentally and choose a more convenient way to solve problems in life. Competence of logical thinking forms the basis of cognitive activity of students in the educational process. Cognitive activity of students consists of stages of knowledge perception, understanding, consolidation and their practical use. Acquiring knowledge begins with noticing and perceiving things and phenomena in nature. The second stage in cognitive activity is understanding and generalization of knowledge. The third stage of cognitive activity is the consolidation and application of knowledge.

The stages of cognitive activity and their tasks should be taken into account when forming students' logical thinking competencies. As a result of mental thinking, the student should apply the acquired knowledge in practice. Only then can logical thinking be effective.

The effectiveness of mental activity in the educational process largely depends on the student's ability to determine the relationship between the new topic and the previously mastered topic, which arises from the nature of the logical thinking activity, when the new topic is explained in connection with the previous topic, it is a solid o will be done.

It is necessary to pay attention to a number of psychological aspects in the development of logical thinking. However, if there are no "productive reasons" influencing logical thinking, it cannot emerge. In the literature on thinking, the factors affecting logical thinking are not clearly indicated. We believe that it is important to study the factors affecting the development of logical thinking competence in a holistic manner.

First of all, it is necessary to clarify the concept of factor. In pedagogy, the reasons affecting the course and result of the didactic process are called factors. In order to define the concept of factors that form logical thinking, it is important to separately study one or another factor that reflects the ownership of a common basis when comparing the aspects related to this process. For this reason, when it comes to the formation of logical thinking, it is appropriate to pay attention to the concept of the productivity of logical thinking. Since logical thinking itself is a complex process, the factors affecting its formation have the same structure. The formation of logical thinking requires specific conditions. The level and quality of logical thinking in the didactic

process directly depends on these conditions. In the psychological-pedagogical literature, it is noticeable that there are different justifications of productive causes: “effect”, “movement”, “cause”, “factor”, “variability”, “parameter”, “functional unit”, indicator and others. Similar to the concept of “changing didactic process” in international didactics, we found it appropriate to use the concept of productive reasons for the development of independent thinking.

Productive reasons affecting the process of developing logical thinking have a gradual description and form large associations of productive reasons. As a result, it creates general, complex (holistic), basic (main), special factors (Fig. 1). So, factors affecting the development of logical thinking are two or more important productive reasons belonging to the same group. Factors consisting of several didactic factors and reflecting a sufficient number of productive reasons are called general factors. Complex (holistic) factors are formed from the combination of common factors and factors other than them. The main (main) factors arise from the combination of general and complex (holistic) factors that form logical thinking. Since the development of logical thinking is carried out in the process of teaching various subjects, special factors can be distinguished based on the peculiarities of the subject.

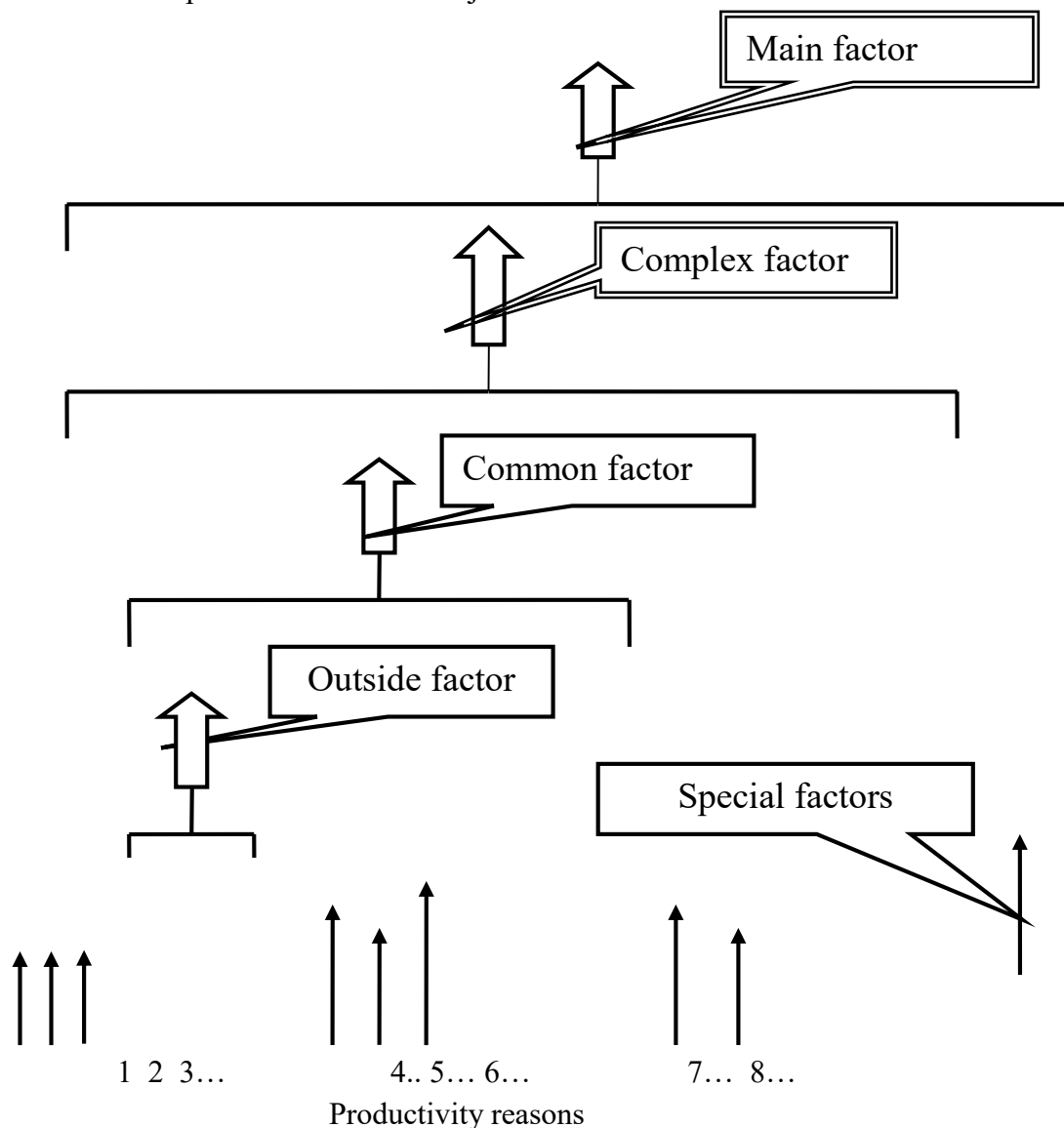


Figure 1. Productivity of the logical thinking process

Productive reasons for logical thinking are very simple, but if they are not taken into account, the independent thinking process will not be effective. These reasons may be of different importance in the process of developing logical thinking, and may have an accelerated or opposite effect.

One of the most important tasks of a higher education institution is to educate mature personnel and teach them to take care of their physical and psychological health. Because studenthood is the second stage of adolescence, how successfully a student adapts to a higher education institution and can effectively perform various types of activities is closely related to his health level and physiological characteristics. Similarly, in the process of developing logical thinking, it is necessary to take into account the age-related features of the reflex activity of the student's nervous system and higher nervous activity. Dominants can be said to be one of the productive reasons that have a positive effect on the organization of the logical thinking process.

Dominants are associated with many mental processes. These are feeling, perception, thinking, memory, imagination, attention, and they require the balance of the functions of the brain units that provide the activity. Nerve centers in the cortex of the brain, which are the main source of stimuli, attract and concentrate the flow of excitation (impulse) coming from the peripheral nerves to the central nervous system and other nerve centers at the same time. reduces activity. This shows why there are actions aimed at one goal in human behavior. A dominant state can be completely inhibited by another dominant activity. This brings to mind the law of inhibition of memory. Any specific information overrides the previous information. Therefore, it is necessary to take strong measures to remember the new one so that it does not disappear. For this, according to J. Musayev, it is necessary to regularly exercise different muscles of the mind.

The level of competence, namely the competence of concentration, the competence of logical thinking, the ability to restore things that have been seen, the shape of individuals, imagination, decision-making, and finally, the competence of clear independent, creative thinking, to a certain extent, how fast and how fast the student's mind is depends on the full exercise. If a student cannot think, he should not be depressed. Such a situation can be corrected by overloading the mental muscles. If you are satisfied with the student's potential, do not forget to maintain it with regular exercises.

Another common factor affecting the development of logical thinking is the development of the higher nervous system in university students. By the second stage of adolescence, this process is fully formed. However, as a result of a temporary decrease in the tone of the upper parts of the brain, difficulties are observed in the formation of conditioned reflexes in the field of speech. The speech will be expanded, short and clear. Therefore, understanding, understanding, describing, analyzing and discussing (critical thinking) are important in every physics lesson.

Pedagogical scientist According to B.Kh.Khodjaev, the types of higher nervous activity should not be overlooked. Depending on the strength, balance, mobility of nerve cells of the nervous system, four types of higher nervous activity can be distinguished:

1. A strong balanced type. Students belonging to this type are prone to disorders of higher nervous activity in difficult conditions, are characterized by high emotional excitability, quick anger, and temper tantrums.

2. Strong unbalanced type. Students of this type move from one type of activity to another with great difficulty.

3. Strong balanced mobile type. In such students, conditioned reflexes are formed quickly and are distinguished by their stability.

4. Be weak. Both nervous processes are distinguished by slowness of excitation and inhibition. Students belonging to this type learn with difficulty to new conditions of teaching, changes in it, cannot bear strong and continuous influence and get tired quickly.

During the research, it was found that pedagogical factors are the main factors affecting the development of logical thinking competencies in physics classes among students (Fig. 2). These are: 1) provision of educational and methodical literature and textbooks; 2) material, technical and methodological support; knowledge bank, professor-teacher competence, etc. Of course, logical thinking cannot be achieved by reading physics textbooks. In order to develop logical thinking in students, it is necessary to recommend reading additional literature. The more a student studies, the more knowledge he begins to acquire. Most importantly, he compares the received information with each other, summarizes different opinions and draws final conclusions. It is also important to develop independent cases, case studies, situational tasks and specific instructions for their implementation. Secondly, material and technical support is considered as a pedagogical factor for physics lessons. In order to carry out reading and writing lessons in the development of independent thinking, it is necessary to have didactic tools, TTV (technical means of education) and handouts in the auditorium. Because it is desirable to have tools that have a high impact on all aspects of cognitive processes in order to realize independent thinking. The third and the most important of the pedagogical factors is the knowledge bank. In order to think independently, the student must have a large fund of knowledge on the current topic. The basis of our opinion is that "an empty head does not think: the more knowledge and experience this head has, the more it can think." The limited and combined nature of knowledge prevents independent thinking.

Among the pedagogical factors, the competence of the professor has a special place. Enrichment of the educational content with new ideas, continuous improvement of educational methods, requirements for the knowledge levels of professors and teachers - all this requires the professors to regularly supplement and strengthen their knowledge, improve their qualifications and requires methodical skills. The students themselves constantly put new demands on the professors. The professor-teacher asked hundreds and thousands of "why?", "how?" faces such questions.

In addition, the professional competence of a professor does not depend only on the scope of knowledge. The source of education requires the professor-teacher to acquire improved knowledge methods, develop thinking patterns, and enrich life experience. All this helps the professor-teacher to analyze the educational materials together with the students, to answer the problems, to solve the tasks.

Educating thinking does not mean imparting simple knowledge. This is the development of mental qualities, methods and methods of mental work. No textbook can teach that. Only the professor-teacher forms these qualities in students, only when he has acquired these qualities. An important task of developing students' logical thinking in physics classes is to teach methods of academic work. It is necessary to teach the process of real research and finding the unknown. The professor-teacher should research the task himself and show how to organize solutions.

From these examples, students learn to analyze and evaluate their personal actions, see their mistakes and shortcomings. The professor-teacher initiates the joint activity of the participants and makes them interested in research. As a result, their logical thinking skills increase.

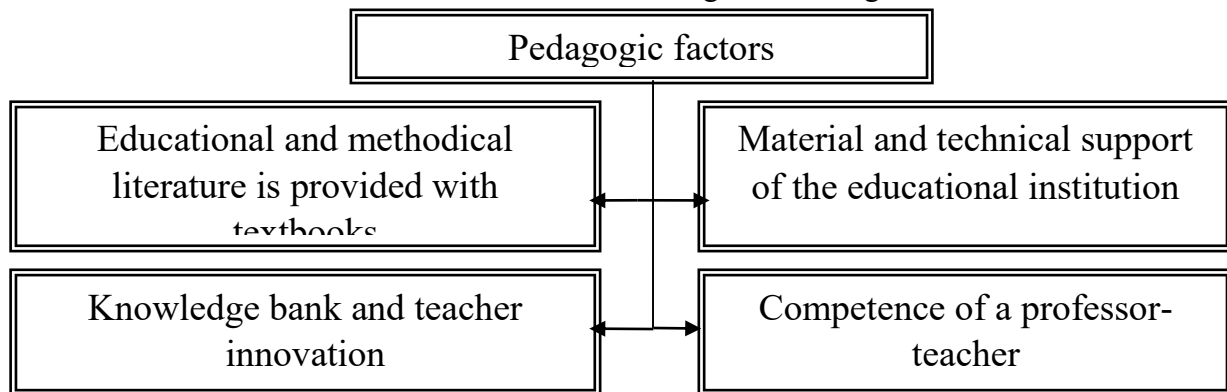


Figure 2. Pedagogical factors affecting the development of logical thinking competencies

Proofs, theoretical rules, conclusions, generalizations, corresponding to them, the methods of students' educational work reflect the content of teaching the subject of physics. The process of students' acquisition of physical knowledge is considered in connection with the level of development of thinking, imagination and other cognitive processes, motivational-volitional and emotional (emotional) spheres of activity. The development of logical thinking skills is determined based on the selection of the form, method, methodical methods and means of teaching the subject of physics based on the educational goals.

Therefore, thinking in physics classes is understood as the competence to know the processes of existence through concepts as a higher form of vital reflection in the minds of students by summarizing the essence of the interaction and connection of physical phenomena, laws and formulas. DTS, qualification requirements, curriculum, textbooks, which determine the content of physics subject teaching, should have a special place in the composition of such competencies that allow the development of logical thinking competencies of students. Also, it is necessary to improve the method of developing logical thinking of students based on the priority of their personality and interests in general competencies related to basic and science.

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