

IMPROVEMENT OF INDEPENDENT COGNITIVE ACTIVITY OF STUDENTS IN AN INFORMATIONAL EDUCATIONAL ENVIRONMENT AS A PEDAGOGICAL PROBLEM

Kudenov Temurbek Maxsetbayevich

Nukus State Pedagogical Institute named after Azhiniyaz, Nukus city, Uzbekistan

<https://doi.org/10.5281/zenodo.7795787>

Abstract. *This article examines the use of mathematical thinking operations (analysis, synthesis, comparison, comparison, clarification, abstraction, grouping, categorization, generalization, systematization) and forms (concept, judgment, drawing conclusions) from students who independently perform tasks related to improving independent cognitive activity.*

Keywords: *informational educational environment, students, independent cognitive activity, pedagogical problem, mathematics.*

In the Republic of Uzbekistan, improving the continuous education system, improving the quality of education and ensuring its efficiency, instead of material factors, the level and potential of improving independent learning activities in educational institutions is also necessary. The system of higher education plays a special role in creating the necessary conditions for students to improve their independent cognitive activities and work in accordance with the requirements of the time.

In the Law of the Republic of Uzbekistan "On Education", adopted by the Legislative Chamber on May 19, 2020 and approved by the Senate on August 7, 2020, improving the quality of education, students' education in various forms (working in-service education (full-time); in-service education (part-time, evening, distance); dual education; family education and independent learning activities; education and training of adults providing education; inclusive education; external education; personnel training in the field of defense, security and law enforcement activities) are defined. Therefore, taking into account the above, it is an important task to improve the activity of independent knowledge, to strengthen the motivation for independent learning.

Today, dramatic changes are taking place in the development of mathematics and human knowledge. In this, the internal structure, essence, values, psychological laws and features of thinking of a person are newly revealed. One of the most difficult and important tasks is independent cognitive activity, the formation of educational-cognitive activities consciously, based on practical experiences, aiming at certain goals and performing thinking operations, the thoroughness of the knowledge and skills acquired by individual students, the stability and consistency of the students depends on the improvement of independent cognitive activities and the development of reading ability.

There are encyclopedic opinions of our thinkers regarding the implementation of active creative non-standard learning by students, training in mental activity, organization methods and tools, as well as technology of engagement by students, motivation, inclination, interest, and emotional aspiration. and they are expressed as follows.

Scientists pay a lot of attention to the development of mathematical thinking, and behind it is not only the repetition of algorithmic actions, but also practical non-standard interpretation of solving the proposed situation - mathematization, its analysis, creating a mathematical model,

necessary proofs, generalizations, analogies and conclusions. they understand how to solve their tasks [9].

Test tasks are based on fundamental mathematical ideas (change and growth, space and form, uncertainty, quantitative reasoning), in which spatial intelligence is considered as one of the important components of mathematical intelligence [8; 9].

60110600- In the qualification requirements of the bachelor's course of mathematics and informatics, the issues related to the improvement of independent cognitive activity of students of higher pedagogical educational institutions in the conditions of educational informatization are mentioned.

In particular, the block of mathematics and natural sciences includes the following:

- providing the foundations of the scientific and theoretical foundations of the in-depth study of fundamental sciences necessary for a specific field of knowledge;
- taking into account the fact that the educational process has a complex nature, to create the competence of organizing the introduction of information technologies on the basis of an integrative approach;
- training in effective use of multimedia capabilities of information technologies in order to ensure the scientificity and visuality of teaching;
- formation of skills to achieve individualization, intensification and optimization of training in the design of educational processes in the environment of modern information technologies;
- to develop the ability to use information and communication technologies in a systematic, logical sequence in order to ensure the effectiveness and efficiency of teaching [2].

Taking into account the above, we can see that the problem of improving the independent cognitive activity of students of higher pedagogical educational institutions in the conditions of informatization of education is a social necessity.

Independent cognitive activity is learning that is acquired outside of educational institutions, it is carried out during work at one's own will. [4] In higher and secondary special educational institutions, up to 40% of the educational hours allocated for the improvement of independent knowledge activities are allocated independent hours.

It is defined as "Independent cognitive activity - acquisition of knowledge in the extracurricular process without the help of a teacher." Expressions such as independent cognitive activity and independent engagement are used. How the great thinkers express these phrases: Muhammad al-Khwarazmi states that it is the activity of independent knowledge, the process of reading. Because the teacher directs, the student forms knowledge, ideas and concepts based on independent reading. Through the book, the idea about things and events becomes clearer. He expresses his opinion about the willful qualities that encourage independent assimilation.

The scientific, social, ethical, and educational thoughts in the works created by scholars are also important due to their universality.

Education consists of a system of tasks and problems of a problem nature, which requires the development of logical thinking in mathematics. Each lecture, seminar session, independent assignment, even laboratory work will be composed of components of problem situations. Solving (solving, doing) them creates logical thinking. That is, the period before the problem situation is a problem situation, and the mental processes after the problem situation require logical search and research activities from the student.

Muhammad al-Khorazmi writes in his works that the worldly mind participates in the formation of intellectual power or powers of discussion and reasoning in a person. In his "Encyclopaedia", he describes the nine parts of logic and their interrelationship.

The science of logic is considered to be the most necessary science for a person. In his work, Muhammad al-Khorazmi provides detailed information about the tasks of the science of logic, the types and rules of thinking, the structure of thinking, and the various forms that occur in human thought. The following aspects of the works of thinkers should be paid attention to in order to create creative formation of logical thinking and mathematical thinking in students. Access to logic, which is the most important for a student, to understand the process of knowledge, to create mathematical knowledge through the basic concepts of mathematical thinking, to make judgments based on certain ideas and to be able to express them, to come to conclusions and their specific forms, to prove and its Muhammad al-Khorazmi describes processes such as the rules, the essence of proof, complex judgments and their question-and-answer reflection, sometimes wrong conclusions of people, the rules of mathematical calculation techniques and their subsequent parts. described hierarchically. [5]

In the process of higher education, it is possible to acquire any complex knowledge due to the effective use of thinking operations. Students become familiar with the functional and operational aspects of mathematical thinking forms (concept, judgment, conclusion), and also try to use all their intellectual reserves to use them independently. the conditions for using all forms of judgment (individual, private, general, conflicting, hypothetical, negation) in educational and independent learning activities of mathematics are provided. They try to use inductive (direction of thoughts from specific to general) and deductive (direction of thoughts from general to specific points) ways of drawing conclusions in a certain way in cognitive activities. Understanding the essence of concepts (individual, specific, general, concrete, abstract, collective) ensures the stability of knowledge. All this is the basis for the development of mathematical thinking.

Logic for Muhammad al-Khwarizmi:

- to learn the rule of avoiding mistakes through correct thinking of the person.
- to search and find ways to move from known knowledge to unknown knowledge.
- emphasizes the attitude of a person to logical thinking, grammatical speech, practical thinking always needs logic.

According to Muhammad al-Khorazmi, mathematical logic is one of the most necessary sciences for any person engaged in science, and he believes that its study is an important means of correctly knowing and determining the truth.

Independent performance of tasks related to improving independent cognitive activity requires students to use mathematical thinking operations (analysis, synthesis, comparison, comparison, clarification, abstraction, grouping, categorization, generalization, systematization) and forms (concept, judgment, conclusion).

Improvement of independent cognitive activity in HEIs - introducing students to educational activities or educational methods is considered special in the development of mathematical thinking. In particular, teaching students how to look at mathematical concepts and mathematical situations from different points of view and how to transfer it to the situation (situation) gives high results. It should be emphasized that, as a rule, the transfer of mathematical methods is carried out "at once", gradually, "by breaking and fixing", revising, reorganizing the content, moving from visual material to mathematical (logical) material.

Based on the above considerations, we described the processes of improving independent knowledge as follows (see Figure 1).

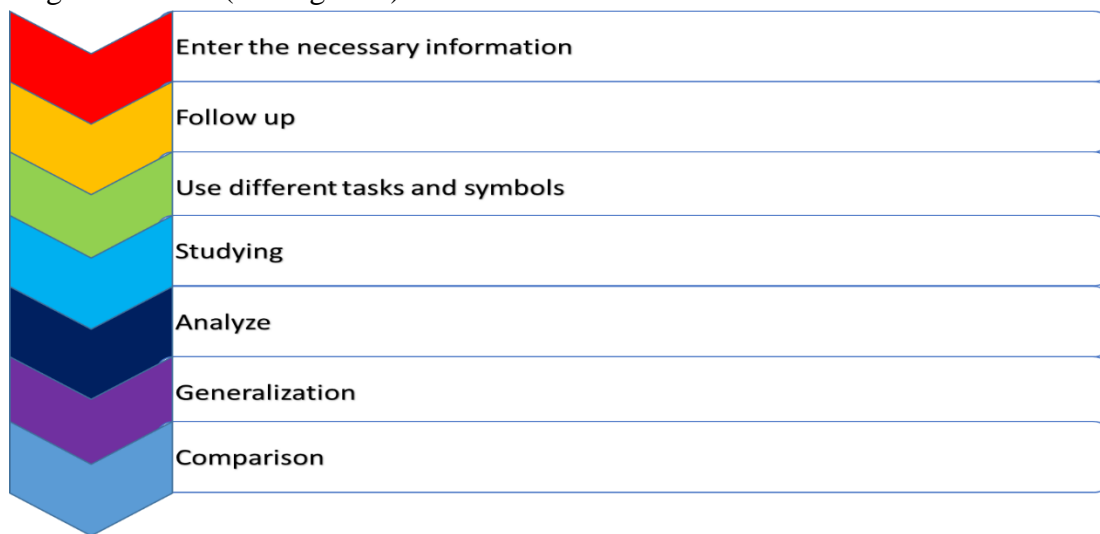


Figure 1. Processes of improving independent cognitive activity

Muhammad al-Khorazmi, one of the scientific thinkers, defines the independent study of mathematical knowledge as follows:

- 1) the need to engage in youth;
- 2) persistent problem solving
- 3) increase logical thinking;
- 4) good knowledge of mathematical terms;
- 5) recognizes the strength of the desire to acquire knowledge.

All the ideas and views presented by our scholars have fully expressed in their works that the main process that ensures the intellectual and perfection of a person is the activity of knowing independently of the science of mathematics. It is expressed in the encyclopedic works that the activity of independent knowledge of mathematics greatly helps in the development and improvement of qualities, characteristics, virtues and aspects, and is an extremely necessary process for him to mature as a person.

The process of cognitive activity independent of mathematics and its transformation into cognitive activity, especially by students studying in higher education, is a social reality for the research subject of mathematics.

Due to the fact that cognitive activity is based on the principle of striving for innovation, it is considered to be two inseparable edges of a single reality (phenomenon) that arises at the same time.

In the course of our research, we carefully studied the concept of "Independent cognitive activity" and developed our own author's definition. In our opinion, "in the process of improving independent cognitive activity, it is important for future specialists to develop the skills of independent expansion of their knowledge, and for this, it is important to work with various sources of information, analyze data, come to certain conclusions, and form one's own point of view. adjectives can also be included. As a result, future mathematicians will acquire creative and constructive skills"

As a result of improving the independent cognitive activities of students of higher pedagogical educational institutions in the conditions of informatization of education, it is possible

to ensure active and conscious acquisition of knowledge by students, as well as extensive preparation for professional activities, and clear and correct formation of life goals.

REFERENCES

1. Decree No. PF-4947 of the President of the Republic of Uzbekistan dated February 7, 2017 "On the strategy of actions for the further development of the Republic of Uzbekistan" / Collection of legal documents of the Republic of Uzbekistan, 2017 , No. 6, Article 70, No. 20, Article 354, No. 23, Article 448, No. 37, Article 982.
2. Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan, 60110600 – Qualification requirements of the Bachelor's course of Mathematics and Informatics
3. Decision PQ-3183 of the President of the Republic of Uzbekistan of August 2017 "On the establishment of special part-time departments in the field of pedagogy in higher educational institutions" / Collection of legal documents of the Republic of Uzbekistan , 2017, No. 32, Article 803.
4. Decree No. PF-5313 of the President of the Republic of Uzbekistan dated January 25, 2018 "On measures to fundamentally improve the system of general secondary, secondary special and vocational education" / Legal documents National database of information, 25.01.2018, No. 06/18/5313/0618
5. On July 5, 2018 of the President of the Republic of Uzbekistan "On additional measures to increase the quality of education in higher education institutions and ensure their active participation in comprehensive reforms implemented in the country" Resolution No. PQ-3775 / National database of legal documents, 06.06.2018, No. 07/18/3775/1313.
6. Decision of the President of the Republic of Uzbekistan. On measures to further expand the participation of economic sectors and sectors in improving the quality of training of highly educated specialists. OR NGO, 2017, No. 30, Article 729.
7. Ikramov J. Mathematical culture school: Methodological aspect problem razvitiya mishleniya i yazika shkol'nikov pri obuchenii matematike. - Tashkent: Teacher, 1982. - 226 p.
8. Il'in V.A., Sadovnichiy V.A., Sendov B.Kh. Mathematical analysis. 1.2. - Tashkent: - M.: Nauka, 1980. - 576 p.
9. Yoldoshev JG, Hasanov S. Pedagogical technologies. Study guide. - Tashkent: Economy-Finance, 2009. - 652 p.
10. Ishmatov Q. Scientific and practical bases of formation of teaching methods and pedagogical technologies in general professional subjects. Study guide. - Namangan: 2006. - 85 p.
11. Nurmakhanov K. E. Improving the Methodology of Using the Geogebra Program in E-Learning Environment //Annals of the Romanian Society for Cell Biology. – 2021. – C. 14571-14577.
12. Nurmakhanov K. THROUGH GEOGEBRA DIGITAL LEARNING SYSTEMS SOLVING PROBLEMS OF ANALYTICAL GEOMETRY //European Journal of Research and Reflection in Educational Sciences Vol. – 2020. – T. 8. – №. 4.
13. Erpayizovich, Nurmakhanov Kayrat. "IMPORTANT FACTORS FOR USING THE GEOGEBRA PROGRAM IN TEACHING ANALYTICAL GEOMETRY." Galaxy International Interdisciplinary Research Journal 10.11 (2022): 691-693.