

## THE ADVANTAGES OF BILINGUALITY AND TRILINGUALITY IN INCREASING THE COGNITIVE KNOWLEDGE OF ACADEMIC LYCEUM STUDENTS

Saidova Zulfizar Askarovna

Mathematics teacher of the Republican Academic Lyceum named after S.H. Sirojiddinov, specializing in "Natural and exact sciences"

<https://doi.org/10.5281/zenodo.8185443>

**Abstract.** *The article describes the methodology of forming the ability to solve complex problems of students of academic lyceum. One of the urgent problems of mathematics teaching methodology is teaching students to solve mathematical problems. This is explained not only by the complexity of this type of activity for students, but also by some shortcomings in the way of forming the ability of students to solve complex problems. The methodology of solving educational problems in mathematics is a well-developed field of didactics, but the traditional methodology should be adapted to modern requirements for students of academic lyceum and pay due attention to the educational process. The above-mentioned problem is especially relevant in academic lyceums, because the students of academic lyceums of our republic have another urgent problem - language barriers. The article analyzes the validity of using this method in the educational process using the author's technique of bilingual and trilingual approach.*

**Keywords:** *algorithmic method, methodology, national and ethnic characteristics, ethnopsychologist, empirical research, dementia effect, cognitive reserve, assimilation.*

One of the urgent problems of mathematics is the learning of students of academic lyceum to solve physical problems. Solving problems allows students of academic lyceum to learn correctness and logic of thinking, critical understanding of obtained results, develops flexibility, flexibility of thinking. In order to solve problems in mathematics, it is necessary to clearly understand the condition and requirements of the problem, to know its theoretical foundations, to master mathematical apparatuses and mental operations of finding solutions to problems, to know where to start and what to do in the situation, to solve difficulties and problems in the process.

Solving math problems is a complex process that requires not only mathematical knowledge, but also specific skills. It is necessary to analyze the situation of the problem, reformulate and reconstruct it, replace the original problem with another problem or divide it into smaller tasks, create a solution plan, formulate hypotheses and check the proposed solutions. Learning to solve is learning to ask yourself questions using mathematical concepts, laws, and learn to answer questions correctly, which is impossible without understanding the state of the problem.

The process of solving any problem: perceiving and understanding the content, searching for a solution plan, implementing the plan and verifying the solution. In order to understand, each student must not only read carefully, but also understand the situation described in the problem. It is important to understand and apply the relationship between physical terms, data and unknown quantities, and therefore the formation of the ability to solve physical problems begins with the creation of conditions that ensure a complete and adequate understanding of the situation described in the problem need.

Our choice is due to the fact that academic lyceum students have a foundation based on all the skills and abilities necessary for successful problem solving. Cognitive activity in students helps in solving mathematical problems more deeply. In the process of working using an algorithmic method to solve problems, students establish connections between the concepts learned during the study of the topic, which leads to meaningful application of the knowledge gained, confidence in their abilities and abilities. The main characteristics of the algorithmic method are determinism, mass character and efficiency. Clarity means that the instructions included in the algorithm must be strictly defined, clearly indicating the essence of each action, generally understandable and unambiguous. In other words, the determinism of the algorithmic method is expressed in the fact that solving problems according to the algorithm is a strictly directed, fully controlled process.

A popular feature is that this method allows solving not just any specific problem with a single initial data, but also different tasks of the same type, and this type includes an infinite number of specific tasks possible. Algorithm is always aimed at obtaining the desired result and is effective with appropriate initial data. Using a bilingual or trilingual approach to teaching allows students to acquire physical knowledge based on the interdependence of two languages or three languages (Uzbek, Russian and English).

The second element of our methodology is P.Ya. Galperin's theory of the systematic gradual formation of mental activities, according to which the skills formed in students are gradually acquired by them, passing through certain stages, each of which is qualitatively better than the previous one. is different. This theory takes into account the national and ethnic characteristics of academic lyceum students in the best way, allows to achieve high-quality results, individualizes the educational process, eliminates the need for special memorization. Since our methodology is designed to develop mathematical problem-solving skills at the first stage of education, it is very important that students learn to use their cognitive skills to solve physical problems. At the stage of formulating actions in a material form, it is easier for students of academic lyceum to perceive the material, because imaginative thinking prevails in students of academic lyceum, and at the stage of speech movement, they develop skills and abilities to solve physical problems, as well as oral and written. they develop the ability to repeat the content of their actions in speech, thereby increasing their knowledge of the Russian and English languages and activating their linguistic self. The application of the theory of planned gradual formation of mental actions by P.Ya. Galperin allows to take into account the ethnopsychological characteristics of academic lyceum students. Empirical studies conducted by scientists in national schools indicate the following:

- a) 70% of children have characteristics such as modesty, isolation;
- b) More than 80% are slow and responsive.

The data was obtained by observing children's reactions to various school and life situations and was confirmed by the results of personal interviews with children and teachers, as well as partial questionnaires to determine the ethnopsychological characteristics of academic lyceum students. Determining the peculiarities of the organization of the pedagogical process, geographical isolation of the received information, which helps to perceive the surrounding world calmly, without haste.

The accumulated experience shows that consideration of national and ethnic characteristics should be present in the educational content as a factor determining the effectiveness of the entire

educational process. The inclusion of the national-regional component in the educational content significantly enriches the educational process, makes it lively, comfortable, increases the activity of students, and serves creative mastery of science. The relative slowness of children in study groups creates a certain psychological climate. Children sometimes stop answering if the teacher makes a comment or a small correction to the answer during the answer.

The methodology we offer for the gradual formation of the ability to solve physical problems in academic high school students includes three main blocks:

1) preparation. In this block, the task of stimulating actions and preparing students for the perception of new material, as well as updating knowledge, is solved;

2) generating (forming). Students of the academic lyceum have a direct formation of the ability to solve physical problems based on the methodology we have developed.

3) generalization - systematization takes place, analysis of the results of the formation stage.

It can be seen from the mathematics lessons in the educational process that the mastering of the independent work topics given by the teacher is more effective among students who know Uzbek and Russian than those who know only Uzbek, they can learn three languages (Uzbek, Russian and It can be clearly seen that those who know English) are even more effective than those who know two languages (Uzbek, Russian). True, we can say that we can increase our knowledge through translation programs, but students' language skills will encourage them to watch and understand foreign films, read foreign literature in the original version and use them more. However, there are other aspects of learning new languages that you may not be aware of. Only by learning a foreign language do we start appreciating our mother tongue more. Since we started talking about it from childhood, we don't think about how it was built, often we don't realize its beauty.

American scientists conducted a study, gave tasks to understand words to people who know several languages and observed their tomographs. The results showed that such people are better able to identify similar words compared to those who speak only one language. This ability helps to block out various distractions and focus on one task.

In a 2007 study by the American Council on the Teaching of Foreign Languages, children studying foreign languages received more math hours in their school curriculum than students who did not study foreign languages at all. was found to show better results. It's no surprise - learning the basics of another language will trigger your logical thinking.

When learning a foreign language, the ability to remember new information improves, which reduces study time. Moreover, multilinguals tend to do multitasks simultaneously.

Bilinguals develop cognitive control, which allows them to focus on important things and ignore unnecessary things. Therefore, they set more specific goals and better solve various problems.

Improving cognitive functions also affects the learning process. For example, adult bilinguals learn a third language a second faster than monolinguals. They focus on the new language and minimize interference from what they already know.

Bilingualism can reduce the risk of developing age-related brain diseases and help counteract the effects of dementia. Knowing several languages contributes to what is called cognitive reserve.

The issue of interdisciplinary relations has always been and will remain a serious

pedagogical problem. Usually it is discussed on materials of related sciences (mathematics - physics, chemistry - biology, language - literature, etc.). The relevance of these areas is clear, but it does not end there. Interdisciplinary courses should overcome the polar division of philological and mathematical education. The deep differences that exist between linguistics and mathematics do not in any way exclude the existence of points of contact between these disciplines. It seems interesting to consider the process of learning mathematics from the point of view of psychological characteristics that characterize mental activity in the process of learning a foreign language and identifying common difficulties.

Thus, the purpose of this study is a comparative analysis of the common moments of mathematics and foreign language acquisition.

The process of learning a foreign language is characterized by the need to use systematic efforts of a person to overcome the psychological inseparability of concepts. In his time, K. D. Ushinsky paid attention to this feature in learning a foreign language and saw "one of the advantages of learning foreign languages" is "the child's ability to separate the idea from the combination of sounds that can be different in different languages." As stated by L. S. Vygotsky, mastering a foreign language frees the verbal thought "from the captivity of specific linguistic forms and phenomena." As stated by L. V. Shcherba, "there is no simpler and more natural tool than learning a foreign language to free the concept from the power of symbols."

Thus, the pedagogical results confirm our assumptions about the positive effect of our proposed methodology on learning to form the ability to solve mathematical examples and problem-solving problems and developing cognitive competencies of academic lyceum students. It follows from all this that the application of the theory of gradual formation of concepts and mental actions of academic lyceum students leads to a high level of assimilation, the level of acquisition of skills necessary for solving mathematical examples and problem-solving problems.

## **REFERENCES**

1. Tadjiyeva Z.G., Abdullayeva B.S., Jumayev M.E., Sidelnikova R.I., Sadikova A.V. Methodology of teaching mathematics.-T. "Turon-Iqbal" 2011. 336p.
2. Methodology of teaching mathematics. Edited by V. Myshina. MD 986.
3. R.A. Habib. Formation of students' mathematical thinking. Tashkent 1971.
4. Alikhanov S. Mathematics teaching methodology. T., Teacher, 2001.
5. S.A. Gasteva, B.I. Krelstein and others. Mathematics teaching methodology. T., 1960
6. N.S. Sayidahmedov, N.N. Indiaminov. Pedagogical skill and pedagogical technology.-T.: "Science and technology", 2014.
7. Y. Rasulova, O. Nurmatova. Teaching manual of pedagogy. "Voriz-NASHRIYOT" T.-2009.
8. Methodology of teaching mathematics in middle school: Obshchaya methodology: Ucheb. posobie dlya studentov fiz.-mat. fac. ped. in-tov/ V. A. Oganessian, Yu. M. Kolyagin, G. L. Lukankin, V. Yes. Sanninsky. - 2-e izd., pererab. i dop. - M.: Prosveshchenie, 1980.
9. Didakticheskaya model of bilingual education of mathematics in higher pedagogic school dissertation and autoreferata po VAK RF 13.00.01, doctor of pedagogical science Salekhova Lyailya Leonardovna
10. Wozniak G.M. Prikladnye zadachi v motivatsii obucheniya // matematik v shkoleyu-1990-№2.