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Manzura Iskhakovna Pulatova

candidate phys.-math. sciences, associate professor department "higher mathematics", BETI

Kakhramonovna Khamroeva Zilola

senior lecturer department "higher mathematics" BETI

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TEACHING METHODS AT OPTIONAL MATHEMATICS

*Pulatova Manzura Iskhakovna**candidate phys.-math. sciences, associate professor
department "higher mathematics", BETI,**Zilola Kakhramonovna Khamroeva
senior lecturer department "higher mathematics" BETI***Abstract:**

Background. *The article discusses the problems of introducing optional classes into the secondary school — a fundamentally new mass form of education, examines the methods and techniques of teaching and their appropriate use in optional classes. It is necessary to take into account the fact that the choice of students in elective classes is based on the principle of voluntariness.*

Methods. *The article expresses the importance of focusing mathematical electives on the development of teaching methods for topics and sections of mathematics that are included in high school programs.*

Results. *1. It should be noted that the students of mathematical electives themselves prefer creative forms and methods of teaching and strive not to be passive listeners. 2. Characterizing the whole complex of teaching methods used in elective classes in mathematics, it should be noted that in the proper sense of the word teaching methods are used here the same as in teaching the basic course of mathematics.*

3. In the general course of mathematics, the teaching method is used only fragmentarily, the essence of which lies in the independent disclosure of new content by students with the unobtrusive help of the teacher.

Conclusion. *What is described in this article should not be understood as a decisive rejection of lectures in general. On the contrary, under certain conditions, a lecture method of presentation (say, a survey lecture on a complex problem) can be useful. We only object to the substitution of the creative teaching method by the manner of lecture presentation of the material in all cases without exception.*

Keywords: *optional classes, teaching methods, the choice of math electives, students' propensity for mathematics, creative forms and teaching methods.*

Introduction. The introduction of optional classes into secondary schools - a fundamentally new mass form of education - posed important questions for scientists and teachers of the specifics of teaching at optional courses. What teaching methods and techniques are advisable to use in optional classes, what combinations, what are the similarities and what is the difference between the methods of compulsory and optional classes - these questions arose and were solved simultaneously with the tasks of selecting the content of mathematical electives.

During the formation of mathematical electives, teachers and teachers of elective groups often used traditional, "earned" combinations of teaching methods and techniques that were not related to the specifics of elective classes. The elective was built as a lesson, or better to say, as a continuation of the lesson, or as a traditional type of math circle. In the first case, electives turned essentially into a kind of additional classes aimed at eliminating the gaps of students in knowledge of the general course of mathematics. At the same time, many electives had a pronounced tutoring bias. In another case, the elective was superficial, lightweight and did not achieve the goals of increasing the level of mathematical development of students through in-depth study of mathematics. At the same time, in the practice of the work of advanced teachers - leaders of electives - already in the initial period, there appeared and multiplied the shoots of the teaching methodology that should meet the goals

and objectives of elective classes and take into account the characteristic features of mathematical electives.

An important feature of this period was the orientation of the mathematical electives towards the development of teaching methods for such topics and sections of mathematics, which subsequently entered the new secondary school programs. Therefore, a certain focus on the use of methods and techniques designed for the general course of mathematics at an elective was even useful then. It was on the electives that the methods of presenting such important and key questions of the new school mathematics course as "Sets and operations on them", "Derivative", "Integral" and others were worked out, which made it possible to rightfully consider optional classes as an effective development laboratory content and methods of a new course in mathematics. Nevertheless, it is impossible to imagine electives only in this aspect, one cannot ignore the presence of electives with specific goals and objectives, which should be reflected, in particular, in the choice of appropriate teaching methods and techniques. Therefore, the questions posed at the beginning of the article are still relevant. Below we will try to tell you what answers to these questions modern methodological science offers, based on theoretical research itself and an analysis of the now ten-year pedagogical experience of teaching in elective classes in mathematics.

Methods. Characterizing the whole complex of teaching methods used in elective classes in mathematics, it should be noted that in the proper sense of the word teaching methods are used here the same as in teaching the basic course of mathematics. The specificity of electives is manifested not in the fact that there are some "optional" teaching methods, but in non-traditional combinations of teaching methods and techniques, the use of these teaching methods in unusual contexts. What factors regulate this process? In other words, what features of extracurricular activities make it possible and necessary for a non-traditional combination of teaching methods?

The choice of optional classes by students is based on the principle of voluntariness. The student chooses whether he will participate in the elective classes, for example, in mathematics. However, he can be guided by a variety of motives. It is clear that the motives of students' choice of an optional course should be taken into account when developing teaching methods, since for the teaching method to work in the sense put forward in the works of the largest Soviet teachers, it is necessary to combine the teacher's goal with the student's goals. (We will leave aside the question of managing student motivation, that is, the question of choosing pedagogical influences, the result of which would be a conscious and socially significant system of students' motives, manifested when choosing an elective.)

There is a widespread opinion among teachers that when choosing optional classes in mathematics, students are primarily guided by purely utilitarian considerations related to the need to prepare for competitive exams in universities, or with a desire to fill the gaps in knowledge of the compulsory mathematics course. The importance of these motives for students when they choose an elective in mathematics is indisputable. Thus, according to a special study of the motivation of students when choosing electives in mathematics, it turned out that about 70% of students of electives in mathematics, when choosing an elective, took into account their desire to prepare for competitive exams in universities.

Results. At first glance, it seems that the figure cited serves as a convincing confirmation of the discussed utilitarian concept. However, as shown by the data of the same study, there is truth in the statement that when choosing a mathematical elective, students are guided by the desire to prepare for competitive exams, there is truth, but not the whole truth. The fact is that if a student loves mathematics and is interested, then it is natural for him to strive to continue his mathematical education. A student interested in mathematics chooses a mathematical elective, guided by his interest, love for mathematics, and the desire to learn it better. At the same time, he, of course, remembers the need to pass competitive exams. Which of these two motives - the love of mathematics or the desire to enter - is more significant for students when choosing electives? It turns out that the overwhelming majority of students give priority to the motive associated with having an interest in the subject, love for mathematics and a desire to learn more about it. Thus, a sustained interest in mathematics is the cornerstone of student motivation when choosing a

mathematical elective, while other motives and aspirations (related to this) are subordinate in nature. On the face of that is the coincidence of the goals of the student and the teacher, which is necessary for the successful implementation of the learning process, which consists in deepening knowledge in physical and mathematical, natural and humanitarian sciences, developing the versatile interests and abilities of students.

Opera on the student's persistent interest and inclination to mathematics is that fundamental feature that should significantly influence the choice of teaching methods and the development of methods used in optional classes.

Discussion. An active interest of students in mathematics directly by the desire to learn more. Any teacher understands how math classes can be transformed if students show an obvious interest in science. For elective students, mathematics cannot be boring, classes are not on duty. And this significantly expands the methodological capabilities of the teacher.

Here are just two examples showing the new role of teaching methods in electives in mathematics. It is useful to consider the extent to which these methods are applicable in teaching the general course of mathematics, whether they can play the same role in it as in the elective.

In the general course of mathematics, the teaching method is used only fragmentarily, the essence of which lies in the independent disclosure of new content by students with the unobtrusive help of the teacher. This teaching method has different names in different classifications of methods. In relation to mathematics, its essence is splendidly expressed by the outstanding mathematician and teacher D. Poya, and following D. Poya, we will call this method heuristic.

The heuristic method of teaching in a regular classroom is cumbersome and takes a lot of time and effort for the teacher. At the same time, in the presence of interest and a conscious attitude of students to learning, the heuristic method can become decisive in the study of many topics and sections of mathematics, since in these conditions it is not necessary to stimulate students to activity, but it is only necessary to direct and control this activity. That is why a peculiar form has developed in the practice of extracurricular classes in mathematics: students are offered a number of sequential tasks, during which the students themselves "discover" new mathematical content. So, for example, the entire presentation of the topic "Additional questions of arithmetic of integers" in the optional mathematics course for the VII grade is built.

Another example illustrates the possibilities associated with the conduct of students, albeit small, but complete independent research. It is clear that in the general course of mathematics such an opportunity arises extremely rarely. At the same time, the implementation of this opportunity, directly aimed at assimilating the experience of creative activity at the highest level, is already included in the daily practice of the best teachers of electives in mathematics, the implementation of research assignments by students on complex issues that require long and focused work is typical for electives in programming, computational methods, etc.

A number of teachers practice significant amount of assignments in their work with students in extracurricular activities. In this case, the task is naturally divided into stages, when the students first, for example, study the necessary literature before starting to develop an algorithm for solving the problem. The report on the knowledge gained is deserved in the classroom. Then the students select or develop a suitable algorithm for solving the problem and talk about it. They then implement the solution as, say, a program for a computer program, debug the program, and count. In the absence of a computer, the teacher selects a problem that can be solved by the capabilities of small computers. Finally, students analyze the solution and the answer received from the point of view of the real meaning of the answer and its interpretation in terms of the original problem. This approach is applicable when it comes to solving a practical (industrial, economic, etc.) problem, and is typical when studying applied mathematics at an elective.

One should not think that the implementation of this method is necessarily associated with the use of computer technology. Even when solving applied problems, the algorithms that arise in them are not necessarily implemented on a computer. For example, when studying the topic "Elementary Graph Theory", the construction of simple network traffic and the calculation of the critical path at different stages of the modeled process, students carry out without a computer, "on their fingers.

Students who have begun to study mathematics in extracurricular classes have increased opportunities for intensifying their learning, and their ability to work in the course of classes increases. This largely determines the teacher's approach to concept management. Hence the need to use such techniques that help to increase the effectiveness of training. The experience of working with students shows that in the arsenal of the teacher of the optional group those teaching methods and techniques that lead to the greatest activity of students are successfully applied. That is why, in optional lessons, you can raise the question of accelerating the study of the material.

An increase in the pace of learning can be achieved due to the fact that a certain part of the material is worked out by students independently. As it were, independent research training sessions are formed, addressed to the entire optional group. The content of these assignments is an organic part of the teaching material at the elective. Such educational research sessions are "programmed" in the methodology of the new elective course "Selected Mathematics Questions" for all topics and sections.

The above examples show that the reliance on the sustained interest of students in the study of mathematics is an essential factor that expands the methodological capabilities of the teacher and allows him to use teaching methods and techniques in fundamentally new contexts than in a regular mathematics course. However, with an uncritical approach to the matter, with the inability or unwillingness of the teacher to use the whole gamut of teaching methods, a kind of exploitation of the interests of students arises, in which the methodological imperfection of teaching a certain section of mathematics is compensated by the interest of students in the study of mathematics.

In the practice of teaching, unfortunately, one has to meet a one-sided passion for reproductive teaching methods on electives. Sometimes it is considered good form to conduct an elective as a lecture at a university, ignoring other forms and methods of teaching. Of course, a student who is interested in mathematics will withstand such a teaching method, which breaks so sharply with the idea of developing students' creative activity and independence. However, the teacher misses many methodological opportunities.

What has been said should not be understood as a decisive denial of lectures in general. On the contrary, under certain conditions, the lecture method of presentation can be useful (say, a survey lecture on a complex issue). We only object to the substitution of the creative teaching methodology by the manner of lecture presentation of the material in all cases, without exception.

It should be noted that the students of mathematical electives themselves prefer creative forms and methods of teaching and strive not to be passive listeners.

Elective lessons in mathematics should be structured in such a way as to be interesting, exciting, and sometimes entertaining for students. It is necessary to use the student's natural curiosity to form a stable interest in his subject. The famous French physicist Louis de Broglie wrote that modern science is "the daughter of surprise and curiosity, which are always its hidden driving forces that ensure its continuous development."

The main forms of conducting elective classes in mathematics are currently the presentation of the key issues of this elective course by the teacher (lecture method), seminars, interviews (discussions), problem solving, student essays (both on theoretical issues and on solving a cycle of problems), mathematical essays, student reports, etc.

However, the teacher should not give preference to any one form or method of presentation. At the same time, keeping in mind that students' independent work should take a leading position in optional mathematics classes, one should nevertheless more often use problem solving, essays, reports, discussion seminars, reading educational and popular science literature, etc.

One of the possible forms of conducting elective classes in mathematics is to divide each lesson into two parts. The first part is devoted to the study of new material and independent work of students on theoretical assignments. At the end of this part of the lesson, students are offered homework on the theory and its applications. The second part of each lesson is devoted to solving problems of increased difficulty and discussing solutions to especially difficult or interesting problems. Solving successively all problems on their own or with little help from a teacher,

schoolchildren gradually study the course with a lot of personal participation, showing activity and independence, mastering the technique of mathematical thinking.

In essence, extracurricular activities are the most dynamic type of learning differentiation.

In whatever form and by whatever methods the elective classes in mathematics are conducted, they should be structured in such a way as to be interesting, exciting, and sometimes entertaining for students. It is necessary to use the student's natural curiosity to form a stable interest in his subject. The famous French physicist Louis de Broglie wrote that modern science is "the daughter of surprise and curiosity, which are always its hidden driving forces that ensure its continuous development."

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One of the possible forms of conducting elective classes in mathematics is to divide each lesson into two parts. The first part is devoted to the study of new material and the independent work of students on tasks of a theoretical and practical nature. At the end of this part of the lesson, students are offered homework to study theory and its applications. The second part of each lesson is devoted to solving problems of increased difficulty and discussing solutions to especially difficult or interesting problems. This form of conducting extracurricular activities can contribute to a successful transition from the forms and methods of teaching at school to the forms and methods of teaching in higher educational institutions.

It is also natural, when conducting optional classes, to mainly use the methods of studying (and not teaching) mathematics, as well as the problem form of teaching.

In particular, it can be accomplished by presenting the elective course being studied as a series of sequential tasks. "Solving successively all the problems on their own or with little help from the teacher, students gradually study the course with great personal participation, showing activity and independence, mastering the technique of mathematical thinking. Theorems have the form of problems. If the theorem that students must prove is large or difficult, then it is divided into several tasks so that the solution of the previous one helps to solve the next one. Definitions are either included by the teacher in the text of the problem, or are communicated separately. If necessary, the teacher conducts a preliminary conversation or makes generalizations. Leaflets with assignments, reproduced on a typewriter, are given to everyone students "

It is also useful to widely use problems of a problematic nature.

Currently, electives in mathematics are conducted in two main areas:

a) studying courses under the program "Additional chapters and questions of the course of mathematics"; b) studying special mathematical courses. The content of the program "Additional chapters and questions" of a systematic course of mathematics allows you to solve and deepen the study of program material, to acquaint students with some general modern mathematical ideas, to reveal the application of mathematics in practice, prepares the teacher to work on a new program. "

As a concrete example of setting an optional course, let us consider the combined topic "Sets and operations on them. Infinite sets". The content of the program on this optional topic is clearly oriented towards the fact that general concepts of sets, elements of a set and operations on sets arise from the consideration of specific examples of sets of solutions of equations, inequalities and their systems.

This formulation of the question does not correspond to the role played by the concept of a set outside the framework of the theory of equations and inequalities both in mathematics and outside of this science. Therefore, it is possible that after studying this topic, students will not notice the initial objective source of the emergence of the concept of a set and will not understand the

fundamental meaning of this concept for all mathematics. In order for this topic to most fully contribute to the deepening of students' mathematical knowledge, they must have formed an idea of the concept of a set as an initial concept of mathematics, from which the science-mathematics develops. This is not about the rigorous rationale of mathematics. It is enough to show with specific examples how the concepts of a set, relations between sets and operations on sets manifest themselves in various branches of mathematics - arithmetic, algebra, geometry, in the doctrine of functions, equations and inequalities.

The main forms of conducting elective classes in mathematics are currently: lectures, practical work, discussion of assignments for additional literature, student reports, writing abstracts.

The use of the lecture and seminar system in the study of a number of topics of the course allows you to present educational material in large blocks and, on this basis, free up time for students to work independently to consolidate and deepen the theoretical material presented in the lecture.

In practical classes, purposeful work is carried out to develop students' abilities and skills for solving basic types of problems.

Seminars are devoted to repetition, deepening and generalization of the material covered. According to their didactic goals, they also serve to acquire new knowledge, teach the independent application of knowledge in non-standard situations. It is natural to take advantage of the relationship between the main and optional courses for the development of students' thinking, if at appropriate moments they pay attention to the nature of work with the material. For example, you can not only make a systematization, but also draw the attention of students to the systematization as such, explaining its goals, the mathematical means used. The impact of the optional course on the development (in particular, mathematical) of the thinking of schoolchildren will be even stronger if the connections between it and the main course become two-way. To achieve this will help the presentation in mathematics lessons of the results related to the problems posed in the main course, but obtained in the elective.

A useful form of work is the preparation of abstracts. The fulfillment of such tasks is important, first of all, in relation to the development of self-education skills, satisfaction of the individual interests of students. One should strive to ensure that the reports prepared are heard and discussed. To prepare the report, you can involve several children who have studied it in advance. They can play the role of assistants, lecturers, or opponents. For abstracts, you need to select topics for which there are readily available sources. You can invite the student to draw up an essay plan on their own, then check it and give recommendations for working with literature.

However, the teacher should not give preference to any one form or method of presentation. At the same time, it must be remembered that in the extracurricular classes in mathematics, the independent work of students should take a leading position.

When choosing methods and techniques of teaching in optional classes, it is necessary to take into account the content of the optional course, the level of development and preparedness of students, their interest in certain sections of the program. One of the most important requirements for the methods is the activation of students' thinking, the development of independence in various forms of its manifestation.

The selection of tasks is very important for the success of the assimilation of the material. Introductory tasks in elective classes are aimed at including students in independent creative work; sometimes the teacher can deliberately lead a problem that can confuse students. Problem tasks, cycles for independent solution, tasks for consolidating and developing skills, research tasks should also be provided in the right places in the presentation. The time allocated by the program for solving problems of increased difficulty can be distributed throughout the academic year. More complex tasks can be explored in the final topic-based sessions. In the same classes, it is advisable to acquaint schoolchildren with the entrance examination programs and the peculiarities of education in universities.

Conclusion. Thus, elective classes in mathematics are a natural field for using a variety of methods and techniques of teaching in new, more flexible combinations and in contexts unusual for

the general course of mathematics. The theoretical development of these richest opportunities, characteristic of the practice of the best teachers of elective groups, should become the property of all teachers of mathematics, should be reflected in the new teaching aids for elective courses. In this article, we deliberately left aside the important issue of the relationship between teaching methods and the content of an elective. This issue is covered with sufficient completeness in the methodological literature.

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QUESTIONS OF PHYSICAL CULTURE IN THE WORKS OF ALISHER NAVOI

Kurbanov Djurabek Ismatovich

teacher at the department of theory and methods of physical culture, BSU

Abstract:

Background. *The article reveals the physical culture in the works of Alisher Navoi, reveals their moral education of the participants, the roles of games for the generation. In these works Alisher Navoi mentioned the importance of physical culture, physical education, folk games to strengthen human health. It is proven by the work “Lyson ut-tayr” which is described the games of chess. It is substantiated that the study of the work of Alisher Navoi in the future can lead to an increase in the moral education of our young generation.*

The standard of living of people, the development of science and culture. This development depends on the educational work. Education and upbringing of young generation can be improved by teaching the works of Alisher Navoi.

Thirdly, Alisher Navoi, as a thinker who introduced the Uzbek people to the world, expressed our nationality, justified the possibilities of the Uzbek literary language, described the harmony of teachings, Islam and mysticism with harmonious physical education.

Fifth, the works of our great ancestor, in essence, serve to form in young people a sense of national pride and national pride. If we study his works again and again, it becomes clear that there are more and more undiscovered aspects.

The reason for independence is the analysis of the means of spiritual and physical education in the formation of harmoniously developed young people with their own thoughts, views and civic position in the epics of Alisher Navoi, whose work has acquired a completely new meaning.

The scientific significance of his work The results of this article can be used as a scientific source in the conduct of educational work in educational institutions, such as ethics, literature, national ideas and spirituality, etiquette, sense of homeland, as well as spiritual and educational activities.

Methods. *The article is wed component, differential semantic, observation methods to determine the place of Alisher Navois works in the education for the children.*

The relevance of the topic is reflected in the following: firstly, the spiritual, moral and socio-political views of Alisher Navoi instill in people universal human qualities, such as patriotism, self-awareness, humanity, honesty and purity, self-control, patience and maturity, the spirituality of a harmoniously developed generation. It is important for him to realize that high spirituality is an invincible force.