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**CONFERENCE ARTICLE****Improving The Methodology Of Teaching Mathematics And Implementing Integrated Education In Academic Lyceums****Xolmatov Axrorjon Xakimovich**Teacher, 2nd Academic Lyceum under Fergana State Technical University, Uzbekistan

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**Abstract:** This thesis analyzes the modernization of teaching methodology in advanced mathematics groups within academic lyceums, highlighting the role of problem-based and integrated learning approaches in enhancing students' intellectual potential. Furthermore, it addresses the challenges of linking theoretical knowledge with future professional specializations and fostering independent research skills among students.

**Keywords:** Academic lyceum, advanced education, mathematics methodology, professionally oriented education, independent thinking, research competence.

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**Introduction**

Academic lyceums serve as an essential bridge between general secondary education and higher education. The students studying in these institutions have consciously chosen a specific direction (exact, natural, or social-humanitarian sciences) and possess high intellectual motivation. Therefore, the methodology of teaching mathematics in academic lyceums must fundamentally differ from that of general secondary schools; it should not be limited merely to teaching standard problem-solving schemes. Modern lyceum educators are tasked with complex responsibilities, such as highly developing students' abstract-logical thinking, preparing them to master higher mathematics courses, and guiding them toward scientific research activities.

**1. Professionally and Specialization-Oriented Methodology**

The primary criterion for increasing lesson effectiveness in academic lyceums is the seamless integration of mathematical concepts with the specialization (profile) chosen by the students. An educator teaching in exact sciences groups (engineering, technology, ICT) must demonstrate the practical importance of mathematical models in programming languages, mechanics, and economic processes.

Conversely, in humanitarian or natural sciences groups (chemistry, biology), the role of mathematics should be explained through examples of statistical analysis, genetic regularities, and population dynamics. This methodology helps students understand how powerful of an analytical tool mathematics is in their chosen field, thereby significantly increasing their intrinsic motivation to master the subject.

**2. Problem-Based Lectures and Heuristic Discussion Methods**

The age characteristics and preparation levels of academic lyceum students allow for the integration of higher education elements into lessons, particularly problem-based lectures and heuristic (inquiry-based) discussion methods. During the lesson, the teacher should not simply write ready-made theorems and their proofs on the board, but should encourage students to arrive at these conclusions collaboratively.

By raising open-ended questions during the class process, such as "Why exactly is it so?" or "How would the result change if this

condition were modified?", a scientific debate (discussion) is organized among students. This method trains students to construct hypotheses, identify contradictions, and logically justify their opinions. Consequently, a knowledge base founded on deep understanding—rather than rote memorization—is established.

**3. Independent Research and Project-Based Activities**

Another crucial direction for improving mathematics methodology in lyceums is project-based learning. Students are assigned long-term, small-scale scientific research topics to complete individually or in small groups. Working on topics like "Mathematical Models in Environmental Protection" or "The Role of Probability Theory in Predicting Economic Crises" requires students to independently search for literature, analyze data, and draw conclusions.

In this process, the pedagogue acts solely as a facilitator (consultant). Students, in turn, defend their research findings in the form of a project. This method serves to foster early skills in young people for independently writing scientific articles and course papers in higher education institutions in the future.

**Conclusion**

In conclusion, it is a demand of the times that the methodology of teaching mathematics in academic lyceums possesses deep substance and high creativity. Limiting lessons solely to tutoring styles—namely, test-solving techniques—does not correspond to the status of an academic lyceum. Systematically applying problem-based, integrated, and project-based learning methods in lyceum classes is the sole guarantee for nurturing capable cadres who think independently, possess developed analytical thinking skills, and are able to study successfully in higher education.

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