Methodology Of Teaching Economic Problems Based On Mathematic Modeling In Mathematics Courses

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ABSTRACT

This article discusses the methods and techniques for solving mathematical problems that develop students 'economic skills and competencies in the teaching of mathematics in general secondary schools in today's educational process. The use of practical issues in economic interpretation in the teaching of mathematics is a key stage in the development of vocational training in students. It shows how to teach and solve practical economic problems based on mathematical modeling. It also aims to further improve the quality of continuing education, to teach students to think independently in mathematics lessons, to strengthen their socio-economic, scientific and technical knowledge of mathematics. In addition, the emphasis on the use of economic issues in the formation of scientific and theoretical thinking in the teaching of mathematics will expand the opportunities for educating students as a person with knowledge, professional training and spiritual maturity.

KEYWORDS

Teaching methods, mathematics teaching methods, modeling, induction, deduction, innovative technologies.

INTRODUCTION

Continuing education is the basis of the system of training, ensuring the socio-economic development of the Republic of Uzbekistan, a priority area that meets the economic, social,

scientific, technical and cultural needs of the individual society. Therefore, in the process of education today, the main task of every science teacher is not only to educate students, but also to apply them in practice, to teach them to think independently, to develop their abilities, and to educate them based on national and universal values.

Advanced teaching experience shows that in order to achieve students' active participation in market relations by equipping them with economic knowledge, as well as to teach them the science of "property and entrepreneurship" in-class and extracurricular activities New forms and methods of developing economic culture in students are being used to explain economic knowledge, information about the life and economy of our country.

LITERATURE ANALYSIS AND METHODOLOGY

Any problem with a clear solution can be solved in several ways. If the problem to be solved is expressed by mathematical relations with sufficient accuracy, this problem can be solved using the method of mathematical modeling. Solving the problem in this way is called the process of mathematical modeling.

The expression of the properties and properties of the object under investigation through mathematical relations is called the mathematical model of the object. The process of building a mathematical model and solving it is called mathematical modeling.

Economic thinking reflects socio-economic norms, rules, and the activities of various organizations.

One of the most common means of educating students in the spirit of economics in mathematics lessons is that there are issues that are directly related to production. In mathematics textbooks, we can observe such issues as economic concepts such as cost, productivity, productivity, rational use of land, optimal study of land order, determining the amount of technical support for agricultural production, the effective use of technology. indicators are widely used. Therefore, as much as possible, the teacher should conduct special educational classes and explanatory work on the importance of solving mathematical problems that correspond to economic knowledge, so that these ideas reach the minds of students.

The main components of economic thinking include:

1) Clear thinking (observation and experience);

2) Abstract thinking (analytical, logical);

3) Functional thinking.

In the process of teaching mathematics, clear thinking is demonstrated through visual aids and videos about the trade relations between different companies. Clear thinking plays an important role in the study of abstract concepts. Abstract thinking takes the form of analytical and logical thinking.

Analytical thinking is formed through a mathematical model of economic problems. We can take this problem as an example of analytical thinking:

The average family spends 7 hours a day watching TV. If a TV consumes 300 watts of electricity per hour, how many kWh of electricity does a family consume per month?

1) Let kWh be taken as x sum;
2) logical thinking in mathematics teaching is based on facts to theory, i.e., inductive, and vice versa, from theory to facts, i.e., deductive methods.
3) Deduction and induction are complementary methods, not contradictory or isolated. Here are the issues with these methods:

1. Arguments	induction	2. Laws or theory	3. Economic policy
	deduction		

4) At the market price of meat is 80 soums, the demand is 8 kg, and at 90 soums - 7 kg. If the price is 100 soums, calculate the demand in kg.
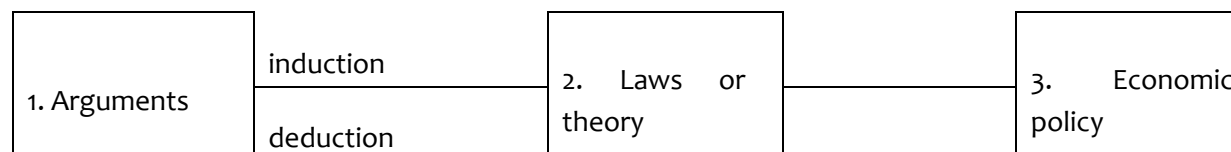
In this case, the transition from private to general, that is, the inductive method is used.

5) Demand functions for potatoes in Beshyogoch and Oloy markets, respectively

$$u = -\frac{x}{4} + 7; \quad u = -\frac{x}{4} + 6,$$

1) where is the demand for potatoes in kg per minute, x is the value of the price in soums. If 1 kg of potatoes is sold per minute in each market, what is the price of potatoes in Beshyogoch and Oloy markets?
2) In this case, the transition from theory to facts, that is, using the deductive method.
3) Functional thinking is characterized by the relationship between a model of an economic process and economic factors. Models of economic processes are also given using graphs or formulas.

Formulas or graphs help students visualize the economic relationships they need. Economists graphically express their theories and models. A graph represents the relationship between two variables. The graph serves as a visual representation of the relationship between the two variables. This table shows the relationship between income and expenses.

RESULTS

Following all the principles of didactics, we must reveal the connection between theory and practice. Every abstract mathematical concept that needs to be mastered needs to be given an economic meaning, an economic interpretation. Here are some examples.

A) In high school geometry, the definition of the scalar product of two vectors in the plane and in three-dimensional space and its properties are studied. Scalar multiplication has many applications in physics and mechanics, but it has many applications in economics, but problems in economics are not found in high school mathematics (basics of geometry, algebra and analysis). . Giving economic meaning to scalar multiplication makes it easier to understand the definition of scalar multiplication. For example, in three-dimensional space (three-dimensional economic space), the scalar product of two vectors can be explained in simple language as

follows: Let a firm produce three different quantities a_1, a_2, a_3, the prices of these products are reasonable If v_1, v_2, v_3 soums, then the firm's income will be $a_1v_1 + a_2v_2 + a_3v_3$ (soums), ie $\vec{a} \cdot \vec{v} = a_1v_1 + a_2v_2 + a_3v_3$ (where $\vec{a}(a_1, a_2, a_3)$, $\vec{v}(v_1, v_2, v_3)$). But not all firms are engaged in production.

There are also companies that sell products made by other companies. In this case, the number $a_1v_1 + a_2v_2 + a_3v_3$ indicates the amount of cost for the purchasing firm. Thus, the scalar product of the two vectors represents the income for the seller and the cost for the buyer. So the economic meaning of the scalar product of two vectors is income or expense.

B) The economic meaning of the product can be explained as follows. If we define the firm's net profit from the sale of the quantity x of its output as U, then it is a function of x, i.e.
$$U = U(x)$$
Let's say that if the volume of output increased by x, then by the quantity of output
$$\Delta U = U(x + \Delta x) - U(x)$$
benefits match.

$\Delta \lim_{x \to 0} \frac{\Delta U}{\Delta x} = U'(x)$ we call the limit marginal net profit. For example, the demand function for a commodity is given by the formula r = 20 - 2 x, where x is the demand and r is the price. Net profit from the sale of goods $U = x(20 - 2x) = 20x - 2x^2$, $U' = 20 - 4x$, if $x = 2$, then $U'(2) = 12$.. This means that if the demand increases from 2 to 3 units, then the net profit increases by an average of 12 units. So, we come to the conclusion that the economic meaning of the product is labor productivity.

C) The economic meaning of the integral can be explained as follows: it is known that according to the average value theorem, the average value of the function F (x) in the interval (a, v)

$$M = \int_a^v F(x)\, dx\, / (v - a)$$

It is calculated from this formula. In practice, labor productivity, average power of electric motors, average values of motion are found in the above formula. For example, the variable cost of production is found using the formula u = 3x, where x is the quantity produced. If the production volume is 3 to 5, what is the average cost of production? The average value of the function

$$\int_3^5 3x\, dx \,\big|\, (5 - 3) = \frac{3}{2}\int_3^5 xdx = \frac{3}{2} \cdot \frac{x^2}{2}\,\big|_3^5$$
$$= 12,$$

Since $u = 3x$, $12 = 3x_0$, where $x_0 = 4$.

The average cost is 12 units. This means that the average value of the integral is used to calculate the average cost, the average income of the firm, and the average labor productivity. If the function F (x) represents the cost, then the average value of the integral represents the average cost, if F (x) represents the income, then the average value of the integral represents the average income, that is, the economic meaning of the integral is cost or income.

CONCLUSION

In short, by studying the theoretical foundations of mathematical modeling, we realized that it is possible to understand its role

and importance in various fields through modeling, modeling concepts, and the method of mathematical modeling. The importance of the use of mathematical modeling in the field of economics is to carry out extensive explanatory work on the life and economy of our country and to develop the economic skills of young people.

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