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METHODS FOR THE DEVELOPMENT OF STOCHASTIC COMPETENCE IN MATHEMATICS LESSONS AT SCHOOL

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ABSTRACT

Stochastic Oscillator is the full name of one of the most popular technical indicators, which is included in 80% of all existing trading strategies, if not more. It is a favorite tool for identifying trend reversal points for both beginners and seasoned pros. And all thanks to its simplicity and high efficiency. The following article investigates the ways to promote stochastic competence in a school setting.

KEYWORDS: *Stochastic Process, Probability, Random, Probabilistic-Statistical Material, Guesses.*

INTRODUCTION

The modern education system faces the goal of developing such personality traits that are necessary for the individual and society to be included in socially significant activities that require the use of methods of logical-variable thinking based on the laws of formal logic and obligatory evaluating all possible outcomes of observed phenomena and events.

In accordance with the requirements of the modernization of mathematical education, the basis for the formation of such thinking skills is strong logical knowledge (about general methods of thinking used by people of any profile to carry out their activities) and stochastic knowledge (about patterns associated with random phenomena).

Stochasticity (ancient Greek στόχος - goal, assumption) means randomness, "stochastic" literally means "able to guess", i.e. random, probabilistic [6].

In modern mathematical, methodological and didactic literature, the combination of elements of probability theory (Latin *probabilitas* - probability), combinatorics (Latin *combina* - to combine, combine), mathematical statistics (Latin *status* - state) and some other branches of mathematics (set theory, graph theory, mathematical logic, etc.) is called stochastics (Greek from *stochazomai* - to assume) - the theory of probabilities.

It is necessary to teach children to live in a probabilistic situation. That is, you need to teach them to extract, analyze and process information, make informed decisions in a variety of situations with random outcomes. Orientation on the multivariance of the possible development of real situations and events, on the formation of a personality capable of living and working in a complex, constantly changing world, inevitably requires the development of probabilistic and statistical thinking in the younger generation.

The universality of probabilistic laws

They became the basis for describing the scientific picture of the world. Modern sciences: physics, chemistry, biology, demography, sociology, linguistics, philosophy and the whole complex of socio-economic sciences are built and developed on a probabilistic basis. A teenager in his life is faced with probabilistic situations on a daily basis. Play and excitement are an essential part of a child's life. The range of issues related to the relationship between the concepts of "probability" and "reliability", the problem of choosing the best solution among several options, assessing the degree of risk and chances of success, the idea of fairness and injustice in games and in real life conflicts - all this, undoubtedly, is in sphere of interests of the teenager.

The changes taking place in modern society require its members to effectively solve problems, most of which are of a stochastic nature. Today, the entire cycle of natural and socio-economic sciences is built and developed on the basis of probabilistic laws, and without appropriate preparation it is impossible to adequately perceive and correctly interpret social and political information. In the modern, constantly changing world, a huge number of people are faced with problems in life, which are mostly associated with the analysis of the influence of random factors and require decision-making in situations that have a probabilistic basis. The presence of stochastic knowledge and ideas has become a necessary condition for creative work in many areas of human activity. Competencies in combinatorics, probability theory and mathematical statistics are becoming an essential prerequisite for socialization. Probability theory has won a very important place in science and applied activity. Its ideas, methods and results are not only used, but also literally permeate all natural and technical sciences, economics, planning, organization of production, communications, as well as such sciences as far from mathematics as linguistics and archeology. Without a good idea that the phenomena and processes with which we are dealing are subject to the complex laws of the theory of probability, productive activity of people in any area of society is impossible.

The inclusion of elements of statistics and probability theory in the school curriculum in mathematics is due to the role played by probabilistic and statistical knowledge in the general education of a modern person. The approximate program of basic general education in mathematics includes material that creates the basis of mathematical literacy, which is necessary both for those who will become scientists, engineers, inventors, economists and will solve fundamental problems related to mathematics, and for those for whom mathematics will not become a direct professional sphere. Activities. The program says that the section "Probability

and Statistics" is a mandatory component of school education, which enhances its applied and practical importance. This material is necessary, first of all, for the formation of functional literacy in students - the ability to perceive and critically analyze information presented in various forms, to understand the probabilistic nature of many real dependencies, and to make the simplest probabilistic calculations. Learning the basics of combinatorics will allow students to consider cases, enumerate and count the number of options, including in the simplest applied problems.

When studying statistics and probability, ideas about the modern picture of the world and methods of its research are enriched, an understanding of the role of statistics as a source of socially significant information is formed, and the foundations of probabilistic thinking are laid. Thus, the elements of stochastics are the very material without which it is impossible to form the correct worldview of students, since without a minimum probabilistic and statistical literacy it is difficult to adequately perceive social, political, economic information and make informed decisions based on it.

The age framework for studying stochastic material in the school course of mathematics

In addition to the relevance of studying the elements of probability theory and statistics, no less important are the questions of what exactly from stochastics, in what volume, at what age and how to study for schoolchildren in basic school. To answer these questions, one should, first of all, refer to the approximate curriculum of basic general education in mathematics and other methodological sources.

Considering the issue of choosing the optimal age range for starting the study of stochastic material in the school course of mathematics, the researchers (Bunimovich E.A., Tkacheva M.V., Vasilkova E.N., Chuvaeva T.V.), on the basis of the conducted experiments on the readiness students to study the theory of probability, note the following important points:

- at the age of primary grades, in the students' ideas about the world, a lot is still not sufficiently formed, and there is not enough mathematical apparatus to explain the concepts of probability (it is obvious that it is too early to start studying);
- starting the presentation of probabilistic material in high school, as the experiment showed, is already ineffective, it turns out that even a good knowledge and understanding of other sections of mathematics by schoolchildren of senior specialized grades, in itself, does not provide the development of probabilistic thinking (apparently, it is too late to start studying);
- at the age of 5th grade, children have a fairly high level of probabilistic thinking and most students in grades 5-6 are ready to perceive stochastic material and, it is very important then, during grades 6-8, to develop this level, otherwise the skills of solving probabilistic problems in children are significantly reduced. It is also advisable to teach children in grades 5-6 self-directed collection of information about the phenomena of life around them.

Due to the novelty for the school of probabilistic-statistical material and the lack of methodological traditions of teaching it, variability in its structuring is possible. The beginning of the study of this material can be attributed to both the fifth and seventh grades. In addition, its presentation is possible both within the framework of a mathematics course or an algebra course, respectively, or presented as a separate module. The latter option can only be realized if the

number of hours spent on mathematics is increased in comparison with the invariant part of the Basic Curriculum (educational) plan.

The stochastic competence will be further developed in the higher education and a student is expected to acquire certain skills after being introduced to the content:

Student with stochastic competence:

- When problems arise in their lives, they can solve them using stochastic methods;
- Can apply stochastic knowledge under conditions of uncertainty;
- can collect case data;
- can analyze, make the right decision while sorting out the problem of the assessment situation.

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