SOME CONSIDERATIONS FOR TEACHING PROBABILITY THEORY AND MATHEMATICAL STATISTICS

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ABSTRACT

The article highlights the importance of attention for students to effectively master the subject of probability theory and mathematical statistics, the factors that determine attention, the importance of logical thinking and attention in solving problems in this subject.

Keywords: *attention, geometric definition of probability. Statistics*

АННОТАЦИЯ

В статье подчеркивается важность внимания для учащихся к эффективному овладению предметом теории вероятностей и математической статистики, факторы, определяющие внимание, важность логического мышления и внимания при решении задач по этому предмету.

Ключевые слова: *внимание, геометрическое определение вероятности. Статистика*

INTRODUCTION

Initially, attention becomes a kind of vigilance, a willingness to perceive an object, gradually becoming its contemplation and in-depth study.

Attention is manifested in various mental processes. Because it does not have a specific content, attention accompanies any activity. Attention that describes the dynamics of cognitive processes (focus, selectivity) is inseparable from them. On the one hand, it manifests itself as a complex cognitive process that is closely related to mental processes, especially cognition, memory, thinking. Attention, on the other hand, is a state of mind that results in improved cognitive activity. Attention is not only generated as a result of activity, but also accompanies it. Behind it are always needs, interests, desires, relationships, the direction of the student's personality and, most importantly, the human mind. The more attentive the student is, the easier it will be for him to acquire knowledge.

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The importance of attention in the professional activity of a teacher is especially great. First, it has a direct impact on the performance of its functional functions. Second, the teacher's ability to accurately determine the quality of students' attention helps to assess their knowledge, skills, and abilities more objectively.

Among the factors that determine attention, we can point to two groups of key factors that ensure the selective nature of cognitive processes, the volume and stability of conscious activity.

DISCUSSION AND RESULTS

External factors that determine the focus. These primarily include the intensity (strength) of the stimulus. Any strong stimulus (sharp sound, animation, live lesson, fun for students, etc.) attracts the student's attention.

The contrast of stimuli plays a special role in attracting attention. Therefore, if a subject claims that he or she did not pay attention to any strong stimulus, it may indicate that he or she is in some abnormal psychophysiological condition or that for some reason he or she does not want to talk about what he or she knows .

Another external factor affecting the quality of attention may be the novelty of the stimulus (absolute or relative) or the complete absence of the usual stimulus.

One of the external factors that positively affects the overall level of attention is the systematic organization of stimuli that affect different analyzers. It is therefore necessary to provide the most reasonable forms of organizing the reception of information in the course of any activity.

This recommendation is especially important for young, inexperienced educators, especially if the ability to organize attention ensures their high-quality performance. The subjective factors that determine the focus in mathematics lessons are important. These include, in particular, the suitability of external stimuli for human needs, and its emphasis on these warnings. Subjective factors influencing attention retention also include an individual's interest in the phenomenon being studied. Strong interest dominates the corresponding signals. Subjective factors, especially during the lessons of each student, indicate the need to focus on homework, independent work, focus on problem solving. During the activity, the intensity of attention changes and voluntary action is required to keep it at the desired level. In such cases, they are the most developed, sustainable, socially conditioned form of attention — post-voluntary attention is important. It controls the cognitive processes in the activity that are important to the individual without any tension.

The peculiarity of attention. Attention is a complex mental phenomenon, it has a number of characteristics that characterize it, among which the first thing to

emphasize is the amount of attention. It is determined by the number of isolated elements perceived by the subject at the same time. For adults, the focus area covers approximately 7 ± 2 elements. If semantic connections are established between these elements, then the amount of attention can increase. However, an excessive increase in attention volume can negatively affect its intensity and therefore does not affect activity results in the best way. It is necessary to look at the solution of the problem, to pay attention to theoretical concepts. The desire to complete the work faster by expanding the scope of attention, the full mastery of the rules, concepts leads to the independent solution of scientific problems.

It is also important to focus and concentrate on the learning process. The student's mind is focused on one object or directs one type of activity - this represents concentration. However, focusing on one object, if the subject is able to move to other objects in a timely and consistent manner, leads to a positive outcome, so features such as concentration, distribution, and volume of attention are closely related.

Distribution of attention allows the student to perform several actions at the same time, to observe several independent processes. The ability to distribute attention is an important professional quality of a teacher. He must teach at the same time, control what each student is doing, write on the board correctly, work in an environment that does not miss the time.

This quality of attention is determined by the duration of the concentration of consciousness on any object. It is known that attention is subject to periodic involuntary oscillations associated with fatigue and emotional adaptation. In terms of solving practical problems, we are more interested in the fluctuations of attention that occur when a student is engaged in any activity for a long time. In such conditions, it is noted that involuntary distraction from the object occurs after about 15-20 minutes of work. The simplest way to maintain attentional stability is the usual voluntary action, but it lasts until the mental capacity is exhausted, after which a state of fatigue inevitably arises, in which case the educator can improve the situation with short-term "lyrical retreats," especially the lecture. If the lessons are monotonous, it can have a significant negative effect on the concentration of students. The absence of such cases depends on the skill of the teacher, the attractiveness of his speech and a number of other factors. The stability of attention can be extended for a certain period of time, if the teacher is able to apply new, innovative approaches to this or that lesson, look at it from the outside, from a different angle. Otherwise, our consciousness comes "as if the head has fallen into a dead-end street" and then

"preconditions are created for easy distraction, and vibrations of attention inevitably occur". Thus, it is possible to maintain the desired level of attention to the object under study, as if it forces the object to "open before our eyes", so that each time it reveals its new content in front of us. "Only changing and updating content can hold attention"

Exchange of attention. The stability of attention does not exclude its flexibility, variability, which is the basis of the subject's ability to move in a timely manner in a changing environment, to reconstruct in the process of work performed.

In Probability Theory and Mathematical Statistics, students' interest in and interest in the subject is important in the study of this subject.

The following problem is given: From the square with points (-1; -1), (-1; 1) (1; -1) and (1; 1) a point (c; q) is taken from the square.

$$x^2 + cx + q = 0.$$

Roots of quadratic equations

a) Existence of real numbers

b) The existence of abstract numbers

c) The presence of positive numbers

d) The presence of numbers with the same sign

e) The presence of numbers with different signs

find the probabilities of the events

The condition of the problem indicates that in order to solve it, the student must focus on choosing a method to solve the problem. If the student is able to think correctly, he understands that to solve this problem, first of all, it is necessary to use the geometric definition of probability. For a given quadratic equation to be real numbers, the discriminant of the quadratic equation must be positive, ie

$$c^2 - 4q > 0$$

must be We draw the given square and the above inequality in the Cartesian coordinate system: according to the definition of geometric probability, the probability that the roots of the quadratic equation are real numbers is equal to the ratio of the hatched surface to the square surface:
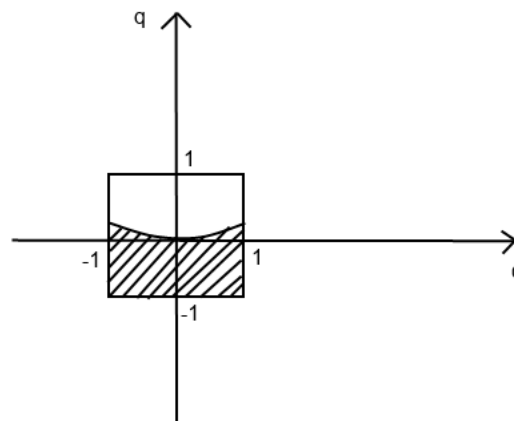
$$p = \frac{S_{shtrix}}{S_{kvadrat}}$$

using the formula. We use the exact integral to find the hatched surface:

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$$S_{shtrix} = \int_{-1}^{1}\left(\frac{x^2}{4} - (-1)\right)dx = \left(\frac{x^3}{12} + x\right)\Big| = \frac{1}{12} + 1 - \left(\frac{-1}{12} - 1\right) = 2 + \frac{1}{6} = 2\frac{1}{6}$$

Putting the found number in the above formula

$$p = \frac{S_{shtrix}}{S_{kvadrat}} = \frac{2\frac{1}{6}}{4} = \frac{13}{24}$$

The probability of the event that the roots of the quadratic equation are abstract numbers can be calculated in two ways, that is, in the first method - condition

$$P(\bar{A}) = 1 - P(A)$$

according to the formula

$$P(\bar{A}) = 1 - P(A) = 1 - \frac{13}{24} = \frac{11}{24}$$

can be found. In the second method, its discriminant is negative so that the roots of the quadratic equation are abstract numbers, ie
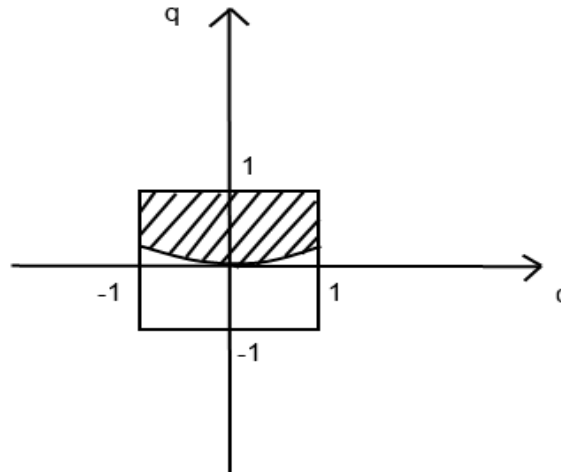
$$c^2 - 4q < 0$$

Solve ni with respect to q to get $q > \frac{c^2}{2}$. Let us express it in the diagram above

$$S_{shtrix} = \int_{-1}^{1}\left(1 - \frac{x^2}{4}\right)dx = \left(x - \frac{x^3}{12}\right)\Big| = 1 - \frac{1}{12} + 1 - \frac{1}{12} = 2 - \frac{1}{6} = 1\frac{5}{6}$$

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$$p = \frac{S_{shtrix}}{S_{kvadrat}} = \frac{1\frac{5}{6}}{4} = \frac{11}{24}$$

we   generate the answer.
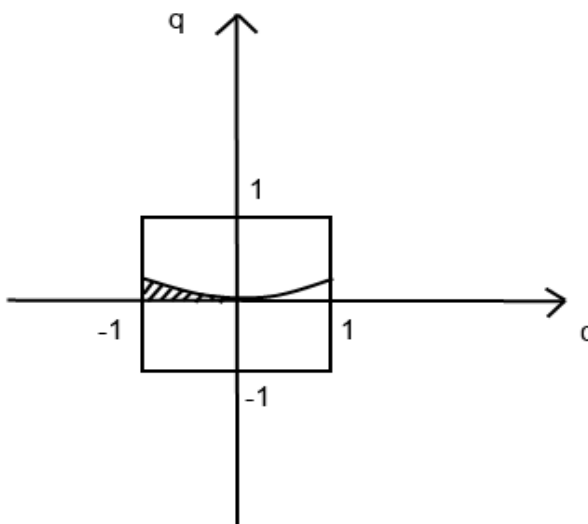

The discriminant must be greater than 0, c <0 and q> 0 for the event that the roots of the quadratic equation occur to be positive numbers. From these conditions

$$S_{shtrix} = \int_{-1}^{0} \frac{x^2}{4} dx = \left(\frac{x^3}{12}\right)\Big| = 0 + \frac{1}{12} = \frac{1}{12}$$

and

$$p = \frac{S_{shtrix}}{S_{kvadrat}} = \frac{\frac{1}{12}}{4} = \frac{1}{48}.$$

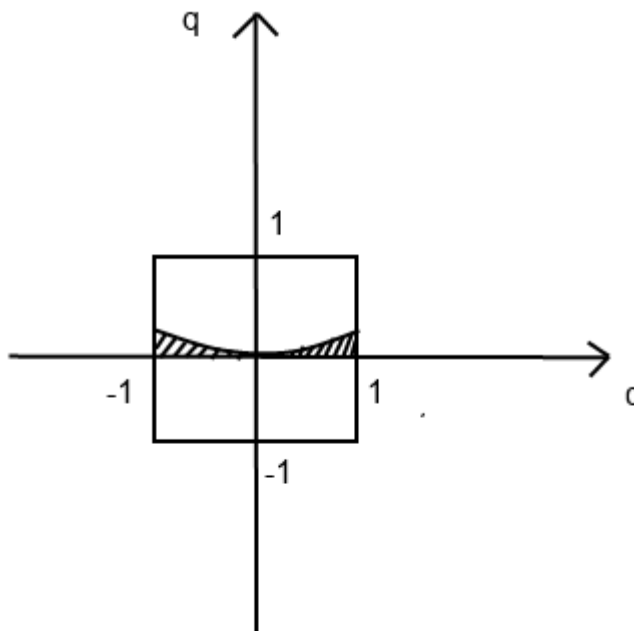The discriminant must be greater than 0 and q> 0 for the quadratic equation to have the

same sign. Having numbers with the same sign

$$S_{shtrix} = \int_{-1}^{1} \frac{x^2}{4}\, dx = \left(\frac{x^3}{12}\right)\Big| = \frac{1}{12} + \frac{1}{12} = \frac{1}{6}$$

is the probability that the roots of the quadratic equation will be numbers with the same sign

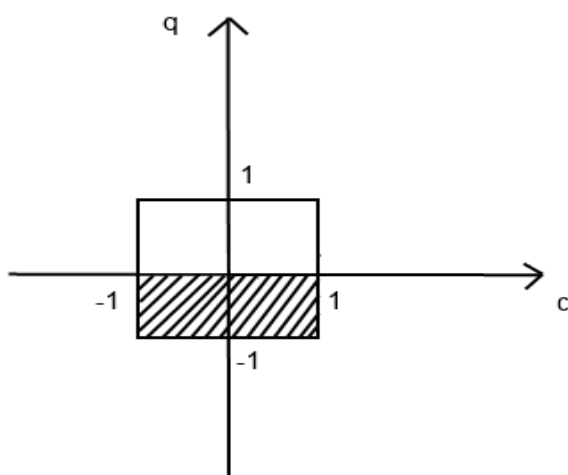$$p = \frac{S_{shtrix}}{S_{kvadrat}} = \frac{\frac{1}{6}}{4} = \frac{1}{24}$$

we find that

The discriminant must be greater than 0 and q <0 for the event that the roots of the quadratic equation have different sign numbers. According to the drawing

$$p = \frac{S_{shtrix}}{S_{kvadrat}} = \frac{2}{4} = \frac{1}{2}$$

we find.

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The solution to the above problem has shown the importance of logical thinking, concentration.

Subjective factors, in particular, indicate the need for each student to concentrate during the lesson, homework, independent work, to focus on problem solving. In the process of activity, the intensity of attention changes and voluntary actions are required to keep it at the desired level. In such cases, they are the most developed, stable, socially conditioned form of attention — attention after voluntary attention, which controls the cognitive processes in the activity that are important to the individual.

Attention is a complex mental phenomenon and has a number of characteristics that characterize it, among which the amount of attention should be emphasized in the first place. This is determined by the number of isolated elements perceived by the subject at the same time. For adults, the focus area covers approximately 7 ± 2 elements. If semantic connections are established between these elements, then the amount of attention can increase. However, an excessive increase in attention volume can negatively affect its intensity and therefore does not affect activity results in the best way. When reviewing the scene of an accident, this specific feature of attention should be taken into account when conducting a search. The desire to get the job done faster by expanding the scope of focus leads, as a rule, to smaller things, different traces, and so on.

Concentration and distribution of attention. If necessary, a person's mind is, as a rule, focused on a single object or directs one type of activity - this represents concentration. However, focusing on one object leads to a positive result if the subject is able to move to the face and other objects in a timely and consistent manner, so the characteristics of attention, such as concentration, distribution, volume, are closely related.

Distribution of attention allows a person to perform several actions at the same time, to observe several independent processes. The ability to distribute attention is an important professional quality of a lawyer, especially in an environment of increasing workload

Stability of attention. This quality of attention is determined by the duration of the concentration of consciousness on any object. It is known that attention is subject

to periodic involuntary oscillations associated with fatigue and emotional adaptation. In terms of solving practical problems, we are more interested in the fluctuations of attention that occur when a person is engaged in any activity for a long time. In such conditions, it is noted that involuntary distraction from the object occurs after about 15-20 minutes of work.

The simplest way to maintain attentional stability is the usual voluntary movement, but it lasts until the psyche's capacity is exhausted, after which a state of fatigue inevitably arises, which can be prevented by short interruptions in work, especially monotonous and if it is the same. If it is associated with significant psychological overload.

CONCLUSION

The stability of attention can be extended for a certain period of time, if you try to find new characters in this or that object, look at it from the outside, from a different angle. Otherwise, our consciousness comes "as if the head has fallen into a dead-end street" and then "preconditions are created for easy distraction, and vibrations of attention inevitably occur". Thus, it is possible to maintain the desired level of attention to the object under study, as if it forces the object to "open before our eyes", so that each time it reveals its new content in front of us. "Only changing and updating content can keep the focus."

Exchange of attention. The stability of attention does not exclude its flexibility, variability, which is the basis of the subject's ability to move in a timely manner in a changing environment, to reconstruct in the process of work performed.

Prudence is an important professional quality of a lawyer, which is formed in the process of active participation in the professional activity, as a result of the lawyer's will, dedication, understanding of the importance of the tasks to be solved.

This recommendation is especially important for young, inexperienced educators, where the ability to organize attention ensures their high-quality performance.

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