THE LEARNING ACTIVITY OF THE PERSONALITY AND HIS FEELINGS

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Abstract. *The article clarifies the connection between the activity of the human person and the emergence of his feelings. The higher feelings, which are moral, aesthetic, intellectual and practical, are considered. The intellectual and practical feelings are of interest above all for the educational practice. It is pointed out why creation of intellectual feelings contributes to the highest degree to achieving the goals of education and upbringing of the individual, for his mental development and making him an active member of modern society. Specific examples that can contribute to the expression of different feelings in students in mathematics education are presented.*

Key words: activity, personality, feelings, education, upbringing.

Each human activity is constantly connected with thinking. The first elements of thinking are sensations, perceptions, ideas, etc. "In the first years of human life the mental structure of person is moved from his lower intellect, from sensations and perceptions". [8]. In the primary school age, figurative thinking is increasingly developed as a visual action based on the learning process. Further, the thinking of the individual is increasingly enriched by the formation of concepts, formulation of judgments and conclusions, as a result of which the development of abstract logical thinking is reached. Of course, person's thinking has a direct connection with his emotions and feelings. A number of authors consider the problem of emotions and feelings in their publications [3, 4, 5, 6, 7, 9, etc.]. "Emotions and feelings are related to actions and provoke actions, but these actions are not a function, as Freudians claim, only of emotions, but also of needs, motives and consciousness" [9].

There are several opinions in science about the difference between the concepts of emotions and feelings. Some authors believe that emotions and feelings are different mental processes. Mihailova and Kolarov consider that "Feelings, unlike emotions, perform functions necessary for a person's social life, for his adaptation to the social environment and change of this environment in terms of the interests and needs of the individual, of society" [3]. They emphasize that feelings are always related to consciousness. Their characteristic feature is that the cause that gives rise to them is always clearly defined. We will also note that knowledge is of great importance for feeling nurturing. "The object of human feelings, as a rule, are the spiritual needs, which are essentially the relations between people" [3]. The present article emphasizes that feelings cannot exist outside of their emotional manifestation. It is interesting to note that human emotions are possible only in unity with the feelings that are nurtured in a person from the first days of his life in communication with the elderly. The authors, mentioned above, clarify in their publications that the feelings that a person, as a living organism and a member of society, reflects in his brain, are the result of objective relationships, i.e. feelings are a reflection of a person's real relationships in his brain. "The word feeling is used in many senses in everyday life and in literature. For example, by feelings we mean sensations, sometimes inclinations and desires, the presence of consciousness, etc." [6]. In his practical and theoretical activity, the individual is forced to control his feelings constantly. We will also note that not every feeling can arise and exist outside a certain subject. Although subjective, the feelings are recognizable. The feelings are extremely diverse in their content. As we have noted, the person is a social being and therefore the content of his feelings expands. To the content of feelings, we can point out, for example, enthusiasm and anger, joy and bitterness, passion for work and boredom, fear and fearlessness, etc. Feelings can change from progress in their development to their extinction. A. Petrovski points out that the teacher, who, in order to attract the attention of the class, applies systematically various "powerful means as a technique (raising his voice, hitting the table with his index finger, screaming, etc.) can rely for some time to the resulting emotions and fear in students. However, the frequent repetition of such influences ultimately makes students emotionally insensitive and the effectiveness of a certain "pedagogical technique" turns out to be zero." [6].

T. Samodumov emphasizes that "the mental process is under a strict influence of feeling. It is a constant advisor of thought, although in a biological sense it is more appropriate to say that thought is an advisor of feeling, because feeling determines the goals, and the mind illuminates the means." [8]. The author draws attention to the fact that "to a greater or lesser degree we are always under the influence of feelings, stronger or weaker, permanent or transient, but with their help we think, act and try to find our place in the universe. In general, our contradiction or agreement with others depends more on the prevailing feelings. Therefore, in order to understand others, we must put ourselves in their position, think with their feelings, not with our moods." [8].

Literary sources state that "higher feelings are typical only for people, they arise from social reality, from culture, science, history, in general from the social way of life." [9]. Higher feelings are moral, practical, aesthetic and intellectual. To moral feelings, psychologists include, for example, the following: a sense of duty and responsibility, love and friendship, and others. They are "connected with morality, with the moral norms of society, with the social system, the class, the party. That is why moral feelings have a class character." [9].

Practical feelings arise from the activity of the individual in the respective professional field. They can be positive or negative.

Aesthetic feelings arise in the perception and empathy of beauty natural beauty or recreated in various art forms. Therefore, the development of aesthetic feelings in the person from the earliest childhood is the goal of his upbringing and education, because it achieves the formation of appropriate habits for aesthetic sense of beauty, respect for beautys creator, as well as a pursuit of his own creativity of aesthetic values.

Intellectual feelings arise in the process of carrying out intellectual activity. Psychologists refer to intellectual feelings the following ones: curiosity, amazement, admiration, satisfaction and joy of what has been achieved, the acquisition of self-confidence. That is why the creation of intellectual feelings contributes to the highest degree to the achievement of the goals of education and upbringing of the individual, for his mental development and making him an active member of modern society. Different feelings arise during different periods of personality development (from childhood to adolescence). All this leads to the need for participation of both parents and teachers in their formation.

Having in mind all this, it is appropriate to look for effective ways to express positive feelings in students in mathematics education.

In this article, we suggest some specific examples that can help to express different feelings in students.

For example, when considering the relationship between the arithmetic mean and the geometric mean of two positive numbers, an appropriate system of various algebraic and geometric problems can contribute to the manifestation of different feelings in students. For better orientation of the reader, we will structure and present the problems in appropriate groups.

I group. Proving inequalities.

If $a > 0$, $b > 0$, $c > 0$, $d > 0$, prove, that:

a) $(a+b)(b+c)(c+d) \geq 8abcd$;

b) $(a+b)\left(\frac{1}{a}+\frac{1}{b}\right) \geq 4$;

c) $\frac{a}{b}+\frac{b}{c}+\frac{c}{a} \geq 3$;

d) $\frac{1}{\sin x}+\frac{1}{\cos x} \geq 2\sqrt{2}$, if $0 < x < \frac{\pi}{2}$ [2].

II group. Solving equations.

1. Solve the equation

$$\sqrt{3x^3+2x^2+2}+\sqrt{x^2-3x^3+2x-1} = 2x^2+2x+2.$$

In this problem, students can show interest and express a sense of responsibility (accepting it as a challenge to find solutions), a sense of satisfaction with a successful result, a sense of curiosity that could arise when looking for applications of Cauchy inequality – the inequality between the geometric mean and the arithmetic mean of two non-negative numbers. For this purpose, students should consider that it is appropriate to transform each of the radicals in the equation so that it is possible to apply the Cauchy inequality.

Indeed, by writing the first radical in the following form

$$\sqrt{3x^3+2x^2+2} = \sqrt{(3x^3+2x^2+2).1},$$

then according to Cauchy's inequality, will be satisfied that

$$\sqrt{(3x^3+2x^2+2).1} \leq \frac{3x^3+2x^2+2+1}{2},$$

whence it follows that

$$\sqrt{3x^3+2x^2+2} \leq \frac{3x^3+2x^2+3}{2} \tag{1}$$

If we do the same with the second summable in the given equation, the following inequality is obtained as a result

$$\sqrt{x^2 - 3x^3 + 2x - 1} \leq \frac{x^2 - 3x^3 + 2x}{2} \tag{2}$$

By adding together the one-way inequalities (1) and (2), follows

$$\sqrt{3x^3 + 2x^2 + 2} + \sqrt{x^2 - 3x^3 + 2x - 1} \leq \frac{3x^3 + 2x^2 + 3}{2} + \frac{x^2 - 3x^3 + 2x}{2},$$

i.e.

$$\sqrt{3x^3 + 2x^2 + 2} + \sqrt{x^2 - 3x^3 + 2x - 1} \leq \frac{3x^2 + 2x + 3}{2}.$$

From the result obtained, it can be concluded that the left side of the given equation is not larger than the expression $\frac{3x^2+2x+3}{2}$. Therefore, in order for the given equation to have a solution, its right-hand side must also possess this property, i.e. the inequality $2x^2 + 2x + 2 \leq \frac{3x^2+2x+3}{2}$ must also be met. Simplifying this inequality, the quadratic inequality $x^2 + 2x + 1 \leq 0$, is received, which the resourceful student will write in the form $(x+1)^2 \leq 0$. However, it is fulfilled only when $x = -1$. It can be checked immediately, that $x = -1$ is really a solution of the given equation.

2. [2] Solve the equation

$$\sqrt{x^6 + x^5 - 2x^2 + 2x - 1} + \sqrt{3x^2 - x^6 - x^3} = \frac{3x^2 - 2x + 3}{2}.$$

III group. Solving some geometric problems.

1. Prove that for the right triangle the following inequality $R + r \geq \sqrt{ab}$ is satisfied, where a and b are the lengths of the legs, and R and r are the lengths of the radiuses of the circumscribed and inscribed circles for this triangle, respectively.

Proof. Having in mind the given in the problem: $R + r \geq \sqrt{ab}$ and the conditions $a > 0$ and $b > 0$, it is natural for the student to focus on using Cauchy inequality

$$\frac{a+b}{2} \geq \sqrt{ab}. \tag{3}$$

In addition, in connection with this thesis is the following characteristic equality for the right triangle:

$$a + b = 2R + 2r. \tag{4}$$

After replacing (4) in (3), the following result is obtained $R + r \geq \sqrt{ab}$.

2. Prove that for the right triangle the following inequality $ab + bc + ca < 2c^2$ is satisfied, where a and b are the lengths of the legs, and c is the length of the hypotenuse.

3. Prove that for the volume V of a truncated pyramid the following inequality $V \geq H\sqrt{B.B_1}$ is satisfied, where B and B_1 are the areas of its bases, and H is the length of its altidude.

Proof. Having in mind the basic idea – applying the Cauchy inequality, here the students can focus on the fact that from $B > 0$ and $B_1 > 0$ follows the inequality $\frac{B+B_1}{2} \geq \sqrt{B.B_1}$, i.e.

$$B + B_1 \geq 2\sqrt{B.B_1} \tag{5}$$

In order to apply the formula for the volume of a truncated pyramid, the following expression must be constructed $\frac{H}{3}(B + B_1 + \sqrt{B.B_1})$. This recalls, that it is appropriate to add the expression $\sqrt{B.B_1}$ to both sides of inequality (5), as a result of which the inequality $B + B_1 + \sqrt{B.B_1} \geq 3\sqrt{B.B_1}$ is received. Then it remains to multiply by $\frac{H}{3}$, from which it follows, that $\frac{H}{3}\left(B + B_1 + \sqrt{B.B_1}\right) \geq H\sqrt{B.B_1}$.

This proves the thesis in the problem, namely: $V \geq H\sqrt{B.B_1}$.

Solving problems of the suggested groups contributes to the formation of moral qualities, namely a sense of duty and responsibility for the set tasks. At the same time, in the performance of the set tasks, in the process of intellectual activity, which is accompanied by a significant dose of resourcefulness, other intellectual feelings arise. For example, there is a sense of satisfaction and admiration for finding a solution to a particular mathematical problem, and this leads to the acquisition of self-confidence. Many students also experience aesthetic feelings from discovering the inner beauty of mathematics itself, from the harmony in the formulas applied, from finding various rational ways to solve the problems.

We will note that the use of different problems both in plot and in the way of solving, as well as the obtained results, cause different feelings in the individual (the student), which motivates him for new searches, appearances and discoveries.

We will also mention about some geometric problems, in the solution of which algebraic knowledge can be used (for example, creating and solving equations). In some geometric problems it may happen that the figure is not uniquely defined with the given elements, because all the found roots of the created equation are positive numbers that satisfy, for example, the requirement for the existence of a triangle. We have discussed such problems in another article [1]. Of course, there are geometric problems in which it may happen that the solutions of the created equation are not a solution of the given geometric problem, because there is no such geometric figure the wanted elements of which are the obtained roots of the equation.

We will not dwell on such problems in the present article. They will be a subject of another development.

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