POSITIVE EMOTIONS OF STUDENTS IN THE CONTEXT OF DIGITALIZATION MATHEMATICS EDUCATION

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1. Introduction

Academician A.L. Semenov, considering the important role of digitalization in the future of secondary schools, writes: “Tomorrow humanity will be no less digital than it is today. The school will survive only if it manages to bridge the digital gap between it and the world around it” [1]. At the

same time, the new generation, as if confirming this idea, is actively involved in the process of assimilating digital technology and great efforts are required from parents to tear them away from various ICT means and direct their interest to the educational process. There is also an important psychological consideration in favor of digital technology. Children, especially boys, usually try to conceal their busyness with lessons or books since it is not acclaimed by some groups of students. On the other hand, knowledge of digital technology is encouraged everywhere and by everyone. It seems enough to show the need to involve digital technology in the field of teaching subjects. The problem is more relevant for the process of teaching mathematics, which is also considered important in the works [2-4].

At the same time, although the development of attention, memory, imagination, perception, thinking and intelligence of students is also considered important in conceptual approaches to the digitalization of education [5], in studies related to the digitalization of mathematical education, the problem of the formation and development of mental phenomena of students lacks for attention, despite the fact that the problem has been studied in the context of traditional teaching of mathematics [6, 7].

The most important mental processes are human emotions and emotional experiences. Man, as a biological creature has certain needs to survive. He receives signals aimed at satisfying these needs or at eliminating them through his emotional world - emotions and feelings. Emotions or emotional experiences are manifested as a result of satisfaction or dissatisfaction of these needs. Positive emotions express the satisfaction of a person's needs, while negative emotions - lack of satisfaction. [8,9].

The effectiveness of the educational process is largely due to the positive emotions of the students and how to keep them away from negative emotions. In [10], I considered the problem of emotions and emotional experiences of students in the process of teaching mathematics in the context of traditional teaching, depending on the aesthetics of the mathematical material and the teaching process. In this paper, I consider the same problem in the context of digitalization of the process of teaching mathematics. Moreover, considering the scale of the study, I limited myself to only positive emotions. The emotions of satisfaction were studied, as well as communication and intellectual emotions.

The process of teaching mathematics is certainly related to the signs of scientific beauty: it has a great potential for the formation of aesthetic values and the presence of aesthetic appeal significantly increases the effectiveness of the educational process [11-13]. It turns out that IR technology is also in best harmony with the objective and subjective signs of scientific beauty; besides, it imparts the

educational process aesthetic appeal, which becomes the reason for positive emotional experiences. It should be noted that the search for ICT means turns into an intellectual search, which is a sign of scientific beauty [11]. Thus, it becomes one of the main motives that attract children [14-16].

An important cause of emotions and emotional experiences of satisfaction is the process of cognition, so it was important to clarify the role of IC technology in the formation of levels of mathematical cognition. IC technology, which is available to all students, significantly contributes to the formation of two levels of cognition of Blum's taxonomy [17] - the first (knowledge) and the third (application). For the formation of the second level of cognition - understanding, which plays an extremely important role in the process of teaching mathematics, more significant ICT means are necessary which are no longer available to most students.

It is important to note the connection of IC technology with emotional experiences of pleasure: IC technology increases these experiences and tend to lead society towards a hedonistic lifestyle.

IC technology also activates intellectual emotions. Interest and surprise, guesswork and emotions of guessing are very important in improving the effectiveness of the learning process in mathematics. IC technology has a significant impact on it. In particular, the paper discusses the value of the emotional experience of guesswork in solving entertaining, historical tasks and problems in general.

An important issue is the effective use of ICT tools in considering an emotion that may seem far from mathematics and its teaching - entertainment. The work examines anecdotes, riddles, fables, khrakhchanakans of the famous Armenian mathematician of the 7th century - Anania Shirakatsi, as materials leading to this emotional experience [18].

2. Emotions of satisfaction

In the process of teaching mathematics, emotional experiences of satisfaction for students can bring emotions of satisfaction, pleasure and joy. E.P. Ilyin, as an emotion of satisfaction, singles out only satisfaction and joy [9]. However, here we also consider pleasure, as an emotion of satisfaction, as an emotion located between the two marked emotions.

Satisfaction is an emotional state, an experience that arises when human needs, desires and aspirations are fulfilled. The high levels of satisfaction are pleasure, enthusiasm, inspiration; the highest levels of satisfaction are admiration, delight, joy and ecstasy. In psychology, it is believed that for the emergence of full satisfaction, it is necessary to understand the cause and comprehend the essence of the phenomenon that leads to satisfaction [9]. In the process of teaching mathematics, the

reason for the satisfaction of the student can be: 1) the fulfillment of educational duties, 2) cognition of the educational material.

In the first case, important motivational circumstances are the prospect of being noticed in class, receiving encouragement, high teacher appreciation or parental praise. Such motivation pushes the student to comprehension/knowledge of the educational material. However, in the accepted scientific standards [17], knowledge is only the first level of cognition, followed by the level of understanding; knowledge without understanding does not mean knowing. This simple truth is generally not comprehensible in education system. Moreover, it is common to characterize education as the education of knowledge. According to this, the result of education, including the written and oral speech of the student, the levels of speech culture are characterized and evaluated according to the knowledge accumulated by him. In our country, state and some intraschool exams in the form of assessment tests are aimed to achieve this result, where only the knowledge of students can be manifested: the ability to memorize facts, while higher levels of the cognitive process remain out of sight.

In the case of mathematics, the problem is more complicated. Often, even mathematics students at university during the exam in their specialty reproduce rather complex knowledge, but do not understand its meaning. They don't cheat, they just memorize the relevant material. I remember my high school maths teacher training students how «to cheat» which could not be controlled by the teacher. He said: "Copy from the book into your head and copy from your head into your notebook in the exam."

Those who follow this "method", in fact, memorize knowledge, can accurately reproduce it, but do not understand the meaning, content. Accordingly, this is a kind of cheating which is not actually controlled by a teacher. Such knowledge is not understood by a student and cannot either be applied in practice or meet the requirements of this and higher levels of cognition.

At the same time, speech reproducing such knowledge is only the result of the memory process and does not require significant involvement of thinking. That is, the process of teaching mathematics does not fulfill its most important function of forming and developing the logical thinking of students. I want to note the peculiarity of mathematical cognition once more: knowledge, memorization, being the lowest level of cognition, can even get a negative connotation if it is not fixed by the level of understanding; in this case it is characterized as rote-learning or learning by heart.

Nevertheless, by accumulating knowledge and doing the teacher's assignment, the student is thought to have completed his academic duties and expects a positive reaction from both the teacher

and the parents. Here, the mental state accompanying the process is an emotional experience of satisfaction which can also inspire the student.

In the second case, when the source of the student's satisfaction is the cognition of the educational material, the understanding of the essence comes to the fore, since without understanding knowledge cannot be complete. The student begins to be interested in the educational material, he learns to ask himself the question "why?" and find an answer or receive it from a teacher or classmates. In the second case, communication is an additional source of emotional experiences of satisfaction; accordingly, emotional experiences of satisfaction rise to a higher level, turning into pleasure and joy.

Understanding knowledge is also an important prerequisite for securing the next level of cognition - the level of application. Application of knowledge already anchors emotional experiences of satisfaction, pleasure and joy and makes them long-lasting and persistent.

What can digitalization of mathematics education contribute to this situation? When it comes to the first reason for motivating satisfaction, which is the performance of academic duties, then ICTs can increase emotional experiences of satisfaction. These are additional and better means of demonstrating knowledge that can and do serve successfully as tools for testing knowledge. It should also be noted that ICT-assisted inspections convey an additional signal of satisfaction because of their unbiased principle.

How is the problem of ensuring the levels of knowledge solved in the case of ICT application? First, we note that the possession of ICT presupposes the implementation of some algorithms and is mainly associated with the first level of cognition - knowledge. Demonstration of mathematical material with their help - an electronic board, presentation, arrangement of slides in it, interesting design, etc. also contributes to memorization in the best way, that is, the accumulation and consolidation of knowledge.

Meanwhile, the problem of understanding remains unresolved. Indeed, mathematics and knowledge of its abstract material require introspection, free and uninhibited activity of thinking, imagination, which can be hindered by ICT. Here one might think about getting satisfaction through a level of understanding by using more sophisticated ICT tools. For example, the dynamic mathematical program GeoGebra makes it possible to see in motion and understand the essence of geometric theorems or the mechanism for solving a problem [14]. However, no tangible progress has been made in obtaining an answer to the question “Why?”, that is, in finding evidence. The same applies to solving math problems.

ICT tools provide ample opportunities to demonstrate the applications of mathematical materials. The possibilities of the Internet are invaluable here, the use of which can become an important source of emotional experiences of satisfaction.

The next emotion that gives emotional experiences of satisfaction is ***pleasure***. Pleasure is a positive, more emotional than satisfaction, condition that results from the satisfaction of important human needs. Buddha considered pleasure as a passion, and avoiding it as the path of immortality. It was followed by the Stoics, who believed that pleasure can be addicted with the object of pleasure. Epicurus, on the contrary, equated pleasure with happiness which was later adopted by representatives of the philosophical direction of hedonism [19]. One of the four principles pledged in Freud's theory of the work of the human psyche/mind is the principle of pleasure which shows the desire of the human psyche to reduce human stress to a minimum [20].

The above shows the importance of pleasure and its emotional experiences in the educational process. The whole process of teaching mathematics is accompanied by the active activity of the mind and consciousness of the student; with the correct organization of training, the emotional state of pleasure can be one of the frequent manifestations of the psyche of the student. However, not all students actively participate in the mathematics lesson and only a few students enjoy math classes. Most students not only do not have emotional experiences of pleasure, on the contrary, a math lesson is a source of unpleasant emotions for them. In [10], the involvement of the aesthetics of mathematics is proposed as a way to fill this gap.

Can the digitalization of mathematics education be a solution to the problem, directly increasing pleasure received from a math lesson or achieve this by increasing the aesthetic element in the teaching process?

The issue is also important from the point of view of the relationship between the digitalization of education and hedonism. Undoubtedly, literature and books were and are an important source of pleasure. However, the number of people enjoying books in the past was small and now it is even smaller. On the other hand, ICT influences almost the entire society.

The same can be said for the school. The fact that at present IKE tools have become appealing for the younger generation and communication with their children has become a problem for parents, proves the attractiveness of ICT and the pleasure obtained from the process of interacting with them. The Internet is full of pictures, games, videos, films, virtual communication, etc. that attract children. These objects, if they work well, can also be of a mathematical nature, with impeccable technical performance and color saturation, as well as with a variety of choices.

The possibilities of the Internet to fill the student's shortcomings in the matter of "memorizing" and assimilating the processed educational material can be added as sorces of pleasure.

The Internet can show many excellent and unexpected examples of the manifestation of symmetries, proportions, the golden ratio and ather objective signs of scientific beauty in general from everyday life, art and nature. Finding them is not just entertainment, but an intellectual search - a subjective sign of scientific beauty [13], which gives finding a certain aesthetic appeal and turns it into a pleasant experience. During the search, such subjective signs of scientific beauty as unexpectedness, unpredictability, etc. may also appear, which also increase emotional experiences of pleasure. Thus, we can note that the involvement of ICT can increase the emotional element of pleasure in the process of teaching mathematics, expanding both qualitatively and quantitatively the scope of influence.

Speaking of the philosophical manifestations of the digitalization process, we can note that digitalization tends to direct the entire society towards hedonism or a hedonistic lifestyle.

The next emotion that gives emotional experiences of satisfaction is ***joy***. Joy is a positive state, more emotional than pleasure. It arises as a result of the satisfaction of more significant human needs. A source of joy can be food, drink, movement, communication with people, play, as well as cognition or knowledge, beauty and life in general. In a mental state of joy, a person feels confident and significant, becomes active, easily joins in relationships and activities. In the opposite emotional state of joy - sadness, when significant needs are not satisfied, the person is passive, he does not communicate with people, is reluctant to perform his activities or avoids it. A person experiences emotional states of joy or sadness when he achieves or fails to achieve his goals, solves or fails to solve plans and tasks.

These emotional states are specific to the learning process for each school discipline. However, unlike other disciplines, each mathematical lesson is distinguished by a variety of problems and the crispness of their solutions and answers. The variety of problems offered in a mathematical lesson contributes to the frequent manifestations of joy or sadness, their crispness and search of solves gives a certain aesthetic color to the process of teaching mathematics and makes it similar to a game. The joy of solving a math problem is similar to the joy of winning the game. However, the bitterness of defeat in the game and the sadness of solving a problem in mathematics are significantly different emotions In the former- an element of comparison with another is manifested, in the latter- a negative assessment of one's own abilities [10].

The involvement of ICT in the process of teaching mathematics make the abstract material of mathematics into a more objective one. Usually, students successfully overcome the technical side of

using these tools and the above math game becomes more interesting and attractive, bringing joy to the participants. In the process of teaching mathematics, as a result of the involvement of ICT, objective and subjective signs of mathematical beauty, the external aesthetics of mathematics [13], the applied environment of mathematics receives new opportunities and becomes a great source of emotional experiences of joy.

From the perspective of the relationship between the internal and external aesthetics of mathematics, for example, I consider the following material with mathematics students. I draw three drawings on the blackboard, two of which are circles with one line crossing it and the other not crossing it. In the third picture, there is a circle with a tangent. To my question: "Which drawing is more beautiful?" - the students point at the circle with a tangent. Then I ask: "Can we say that in that picture the straight line loves a circle and vice versa?" The students agree. I erase everything from the board and draw three cases of the relative position of the circle and the triangle, where only in one drawing the circle touches all the sides of the triangle. The students choose this drawing as the most beautiful and agree that here the circle and the triangle love each other.

To my next question, which of the drawings is a boy and which is a girl, everyone, led by the girls, answers that the circle is a girl, while the triangle is a boy. I agree and propose to formulate a well-known geometric theorem (in any triangle you can inscribe a circle and only one) in this language of love. The answer is immediate. It goes like this: every boy loves one and only one girl. My next question is already confusing the students: "How many boys can a girl love?" Boys answer: every girl can love an infinite number of boys. Taking into account the Armenian moral approaches, this answer shows that the girls were wrong with the choice of the circle. Of course, the emotional atmosphere in class can be only joyful.

This training episode was more interesting and more effective for those groups where the lesson was conducted using the e-board.

3. Intellectual emotions

The process of learning mathematics is accompanied by positive intellectual emotions and emotional experiences. Interest, guesswork and surprise are inseparable from this process and are the most important indicators that determine the effectiveness of learning.

Interest is an important intellectual emotion. K. Izard considers interest to be a positive emotion which a person experiences more often than any other emotion. He believes that there is some kind of inner emotion of interest in a person, which provides a selective stimulus to the processes of perception

and attention, stimulates his cognitive activity and regulates it. Interest contributes to a person's performance. It is biologically necessary for the implementation of creativity [8].

Changes, inspiration and novelty are the main factors for activating interest [9, p. 103-112]. In [16], we show that the use of ICT significantly increases each of the factors that stimulate interest. There is also a difference between short-term and long-term interests. The former is combined with some tension, impatience to find out the result, whereas the latter is emotional and motivational experiences aimed at cognizing the object [9, p. 215]. ICT tools also facilitate the effective expression of these two types of interest.

The activation of students' interest is mainly due to the educational material, the degree of involvement of the applied environment, the system of tasks, methods and means of teaching. If we start from the end, it should be noted that ICT tools, an electronic interactive whiteboard in particular, have tremendous opportunities to make the presentation of educational material in mathematics interesting. For this purpose, it can be useful to practice the alternation of the presentation of abstract-theoretical educational material of mathematics with applications in everyday life, science and various fields of technology. It can be also purposeful to use applied and entertaining tasks, the widespread inclusion of which in the educational process is also possible through the Internet and electronic board.

In [16] we show the indicators of interest of students with the humanitarian bias in conditions of traditional teaching of mathematical material and aesthetic value-oriented teaching both with the use of ICT and without it. The experiment was carried out according to the technique proposed by V. S. Cherepanov [21]. In the first of the selected three groups, where mathematics was taught according to the traditional method, the indicator of interest was 0.3 (not very interesting). In the second group, where attention was paid to the aesthetic value orientation, the indicator of interest was 0.6 (interesting); in the third group, where the aesthetic value orientation was given priority in the context of the use of ICT, the indicator was 0.75 (very interesting).

Thus, the results of the experiment showed that the digitalization of mathematics education, increasing the aesthetic appeal of the educational process, becomes an additional incentive for enhancing students' interest in the mathematical material being taught.

The next important intellectual emotion is ***guesswork***. Guesswork is a preliminary answer to the question posed. In the process of finding a guess, a person has a corresponding experience - the emotion of guessing [9]. Guesswork and the resulting emotions are important principles of organizing life. They play an important role in the self-realization of a person, in the performance of creative activities.

Guesswork is also an essential element of such signs of mathematical beauty as signs of intellectual search, finding and discovery. The emotion generated as a result of their manifestation is the motive that gives an aesthetic shade to a mathematical object and that is why Von Neumann believed that mathematics developed mainly due to aesthetic motives [13].

A guess is an assessment of some new, not realized, result of solving a problem. In general, during problem solving, emotional manifestations of guesswork occupy an important place in ensuring mental activity. The entire process of solving a problem is based on intuitive guessing processes and emotional experiences emanating from them. An experienced teacher often involves theorem proving in this emotional area.

Entertaining and historical tasks can be an important source of the emotion of guesswork. It is known that the "first European" Charlemagne laid the foundations of modern Europe in the capital of his great empire Aachen by founding an academy; he invited Alcuin of York- an English scholar, clergyman, poet and great thinker of the time- to head the academy. One of the first steps in that position was the compilation of a problem book of entertaining mathematical problems "For training the mind." These tasks, together with their main function, are still an important source of entertainment.

Two centuries before Alcuin in small Armenia, Anania Shirakatsi wrote his problem book in mathematics [18]. Although the tasks from this book did not have the aesthetic charm of Alcuin's tasks, they were incomparably superior to him in mathematical content, depth of applicability and educational purpose.

Moreover, behind the simplicity of Shirakatsi's problems and their solution, there was often hidden logical depth and surprise- signs of scientific beauty, which gave additional aesthetic charm to mathematical material. We can learn about Alcuin and Shirakatsi, the countries and periods they lived in from the Internet. Such observations are very effective ways to familiarize students with national and universal values through value oritnted learning [22, 23].

The emotional experiences of guessing include a variety of riddles and fables, which we will consider later in the section on entertainment.

An important intellectual emotion is ***surprise***. Surprise expresses an encounter with an unknown, unusual object or phenomenon; this is the emotional state when the expected and received results or impressions of the object or phenomenon do not coincide. The greater their difference, the greater the surprise. If the positive expectations are greater than the received ones, the emotion is negative, otherwise the emotion is positive. Positive emotions of surprise stimulate the activation of human activity, increase his interest [9].

Surprise is extremely important in the learning process of mathematics, because "learning mathematics begins with surprise." As in the case of interest, the reason for surprise can be, first of all, the teaching material, its applications, tasks, methods and means of presenting the material. Mathematical teaching materials have different potential for causing surprise. In some materials, this potential is quite large. Such materials are tasks of construction, theories of probability and combinatorics, separate problems of written and oral counting, etc. Here, the role of problems that reduce to an obviously incorrect solution through the deliberate and veiled use of certain mathematical facts is especially important. Similar problems can be proposed within the framework of any mathematical material, which the author did in the textbooks [24–26]. The title of these tasks is enticing, which already prepares for surprise - "Find a mistake."

When teaching some topics, one can consider mathematical sophisms - Zeno's aporias, etc. Experience has shown that they are surprising even among students with low academic performance in mathematics. Before giving the definition of an infinitely decreasing geometric progression, in textbooks [26] I considered the aporia of Fast Achilles and the tortoise. Here you can brighten up the example with animation. In general, ICT tools make it possible to make the expected and obtained results obvious and increase the emotional charge of surprise.

For example, before going through the Pythagorean theorem, we can fix one of the corners of the triangle and calculate the sums of the squares of the adjacent sides and the square of the opposite side. Then we gradually change the value of the angle and continue the comparison. As a result of such comparisons, students will come to an unexpected and surprising conclusion: from the expressions obtained, the first is greater if the angle is acute, the second is greater if the angle is obtuse. They are equal only if the angle is right.

4. Communicative emotions

Although mathematics and the process of its teaching are competitive in nature, which causes negative communicative emotions - embarrassment, shame, guilt and contempt, nevertheless, communication can also play a certain positive role in increasing the effectiveness of learning. Here I consider communicative emotions and emotional experiences of entertainment and a sense of humor in the context of digitalization of the process of teaching mathematics.

It seems that the process of learning math has nothing to do with the emotional manifestations of ***entertainment***. However, at different times entertainment and comedy were used as factors to soften the essence filled with the seriousness of the mathematical activities.

Entertainment in mathematics activities is largely due to unexpected mathematical judgments. Moreover, as Montesquieu notes, “to give the phenomenon a comical, entertaining shade, the unexpected must be ugly” [27]. In the case of mathematics, this ugly one may be an obvious error which was obtained with the help of "exact" mathematical judgments. It is clear that such judgments contain veiled errors that are difficult to notice at first glance and the discovery of which becomes the cause of entertainment. Similar judgments were observed in ancient Greece by sophists who tried to "prove" obviously false statements. They caused both surprise and bewilderment among pupils (and not only pupils), as well as entertainment and laughter. The same goal is pursued by latent erroneous judgments used in mathematics itself and in the process of teaching it. Here, as in the case of the emotion of surprise, the role of problems that reduce to obviously erroneous results through the deliberate and latent misuse of certain mathematical facts is especially important.

In general, the proposal of a task or riddle and their solution, together with the emotional experience of guesswork, also contain shades of comic and entertainment and thereby contributes to overcoming the daily routine. Our ancestors also guessed this and widely used the practice of proposing-solving problems and riddles in everyday life, turning them into an important component of the traditional feast. This applies to all social strata of Armenian reality, from the king to the ordinary peasant. For example, the feast of the Armenian kings consisted of three parts: a meal, a drink and a spiritual part. During the latter, tasks and riddles were asked [28].

As H. Petrosyan notes: “more than once, medieval Armenian thought widely used various aspects of the people's worldview, customs and rituals to disseminate cultural, spiritual and moral ideas” [28]. To implement such ideas, both already created cultural values and works created for this purpose were used. From this perspective, the riddles of Nerses Shnorali, the fables of Mkhitar Gosh and Vardan Aygektsi, the hrakhchakani - the entertaining tasks of Anania Shirakatsi are noteworthy

Here is one of the fables of Mkhitar Gosh - an Armenian legislator, fabulist, educator and public figure of the 12th century. A wise man asked the trees: "Why, the higher you get, the deeper your roots become?" They answered: “How can you, a wise man, fail to know that we cannot carry so many branches and withstand the winds without deep roots? Look, our kin beeches and pines, have many branches, but cannot resist, because they do not have deep roots" [29].

Here is one of the fables of Vardan Aygektsi - an Armenian theologian, chronicler, fabulist, preacher and public figure of the 13th century. The hurricane wipes everything around the earth, even a giant oak tree. All that remains is reed. When they ask the reeds how he managed to withstand the terrible disaster, he replies: "By bending, bending" [29].

Here is the riddles (about the book) of the Catholicos of All Armenians, theologian, sweat, musicologist, composer, historian of the 12th century Nerses Shnorhaly.

White house, spacious

With black chicks

They say and they say

Like people with languages.

Both fables and riddles contain a large emotional charge and can generate a lot of interest among students. They also provide an opportunity to consider values, value oriented learning [22, 23]. Unfortunately, teachers do not use these excellent materials to energize the learning process. One of the reasons is their absence in curricula, although, together with mathematics, they perform the same function of the intellectual development of the student. The next reason of a technical nature is associated with the difficulties of searching them, finding and involving in the educational process. ICT tools provide an excellent environment for overcoming these challenges.

Nine hrakhchakans of Shirakatsi, which were offered to the participants of the feasts, have survived to us [18, p. 62]. The first one is remarkable.

Tell a friend, "I can guess when you want to dine and how much wine you want to drink." If he says to you: “Guess”, tell him: “Think in your mind the number of hours you want to have lunch. Double it up. Add five to it. Multiply by five, add ten and multiply by ten. Add the amount of wine you want to drink. " When he has done this, ask him what the number is. Always subtract 350 from this number, see how many hundreds are in the remaining number, this will be the time when he wants to dine, and the remaining number less than one hundred will be the amount of wine. If your friend is inexperienced and the amount of wine will be one hundred, then tell him that it is impossible to drink so much wine in an hour. "

Speaking in modern mathematical language, here Shirakatsi, in fact, reduces the modeling of the problem to an indefinite equation with two unknowns. However, Shirakatsi's solution is carried out not using known methods for solving indefinite equations, but using a combination of mathematical knowledge and of applied field. This approach has no analogues in mathematics education. The unexpectedness of the solution, together with joy and surprise, gives the task a certain aesthetic appeal.

The Khrakhchakans of Shirakatsi also performed the function of spreading and rooting spiritual values by graviting and complementing them with the value of truth. With the help of mathematical problems, a similar function was performed already during the Enlightenment in Holland, by placing mathematical problems to be solved on the pillars of cities. The solution of such a problem

contributed, for example, to the subsequent career of twenty-year-old French army soldier René Descartes in the field of science.

Times have changed and instead of feasts and pillars, today we have powerful means to achieve our goals. In particular, in the case above, ICT is also an important means of manifesting emotional experiences and entertainment. An important means of searching, collecting and demonstrating historical facts, including entertaining mathematical stories, problems, information about their authors, relevant times is an electronic interactive whiteboard, which is connected to the Internet. Students will enjoy doing the same actions via computer at home.

It should be noted that in the conditions of traditional education, it is technically difficult and time-consuming to include such materials in the educational process. The electronic interactive whiteboard, using the capabilities of the Internet eliminates these difficulties. The lesson becomes more interesting and livelier, involving more students.

Humor is an important factor in enlivening the lesson with entertainment. This is a good-natured, harmless, but at the same time 'toothless' laugh, a smile. Humor improves the phenomenon, cleanses from flaws, helps to reveal social value in it.

In the life of a modern person, anecdote-a type of humor, plays an important role. Anecdote increases the life potential of a person, transfers positive charges. Anecdotes are classified by topics. Here is an anecdote about Lenin.

After long discussions, God and the Devil decide to send Lenin's soul to hell. After a while, the Devil complains to God: "Take Lenin to you, since my devils have raised a rebellion and want heavenly life instead of hellish work." God agrees. After a while, the Devil again meets God and asks: "Well, how is Lenin?" God begins to get angry with the Devil: "Firstly, not God, but comrade God, secondly, there is no God, and finally, do not hold me back, I am in a hurry to the meeting."

The topic of the Armenian radio is widespread. Here's an example. The Armenian radio is asked: "Is there life on Mars?" Armenian radio replies: "And not there either."

Anecdotes about mathematics are also widespread. Here are some of them.

"When are you going to correct 'poor' in math?" “I don’t know, Mom! The teacher carries the register with her all the time! "

Three mathematicians went hunting. Seeing the boar, the first mathematician fired and missed one meter to the right. The second shot and missed a meter to the left. The third carefully looked at all this, thought something in his mind and happily said: "Guys, everything is ok, on average we shot him!"

The balloon landed on the field and the people in the balloon asked the only person on the field, "Where are we?" "In a balloon," the man replied. “He's a mathematician,” said one of the people in the

balloon. “How did you know?” They asked him. “Only a mathematician could give such a precise and useless answer,” he replied.

Both in the search for entertainment and humor, anecdote, the role of the Internet and the computer is important. People usually find it difficult to remember an anecdote. In this case, the computer can help. The Internet promotes the search for anecdotes and humorous stories. It should be noted that such a search in this case has an intellectual character. If the student fulfills the teacher's task, then the obstacle can be difficult and complicated, but it can always be overcome. That is, when examining, searching for humorous materials, several signs of mathematical beauty appear, which give the processes a great aesthetic appeal and a great emotional charge.

The teacher can sometimes ask students to find humorous stories, anecdotes on math topics. He and his students can find similar stories on the Internet together. Joint searches, finding, discovering fables, riddles, their interpretations, solutions with students are manifestations of the aesthetic sign of intellectual search. On the other hand, they are important actions of joint learning, returning the student to the natural channel of learning, and correspond to the ideas of academician A.L. Semenov on the pedagogical approach "learning to learn" [4].

5. Conclusions

The problem of the formation of positive emotions and emotional experiences of students in the process of teaching mathematics is closely related to the digitalization of the process of teaching mathematics. Here, IR technologies are in good harmony with the signs of scientific or mathematical beauty, which becomes one of the main reasons for the manifestation of positive emotional experiences of students.

Emotions and emotional experiences of satisfaction play a large role in the formation of cognition. Here, IR technologies, which are available to all students, significantly contribute to the formation of two levels of cognition of Bloom's taxonomy - knowledge and application, and for the formation of understanding and higher levels of cognition, more significant ICT tools are needed. IR technologies increase emotional experiences of pleasure and have tendency to lead society towards hedonistic lifestyles.

IR technologies significantly increase the interest of students in the process of teaching mathematics, which is also confirmed experimentally. IR technologies also activate the intellectual emotions of surprise and guesswork, which are of great importance for improving the effectiveness of the process of teaching mathematics.

ICT tools can be used to activate the emotions of cooperation and thus increase the effectiveness of the learning process in mathematics. To do this, you can use historical tasks, fables, riddles, anecdotes.

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ՍՈՎՈՐՈՂՆԵՐԻ ԴՐԱԿԱՆ ՀՈՒՅԶԵՐԸ ՄԱԹԵՄԱՏԻԿԱԿԱՆ ԿՐԹՈՒԹՅԱՆ ԹՎԱՅՆԱՑՄԱՆ ՊԱՅՄԱՆՆԵՐՈՒՄ

Միքայելյան Համլետ Սուրենի

Ամփոփում: Աշխատանքում քննարկվում է մաթեմատիկայի դասավանդման գործընթացում սովորողների մոտ դրական հույզերի ակտիվացման խնդիրը՝ կրթության թվայնացման համատեքստում: Որպես ակտիվացնող գործոններ դիտարկվում են մաթեմատիկայի և նրա ուսուցման գործընթացի գեղագիտական գրավչությունը և ՏՀՏ գործիքակազմը: Դիտարկվում է ՏՀՏ միջոցների դերը բավարարվածության հույզերի և հուզական ապրումների դրսևորման մեջ՝ ճանաչողության տարբեր մակարդակների ձևավորման համատեքստում: Ցոլյց է տրվում հաճույքի հուզական ապրումների հետ ՏՀ տեխնոլոգիաների կապվածությունը. ՏՀ տեխնոլոգիաները ավելացնում են նշված ապրումները և ունեն հասարակությունը դեպի հեդոնիստական ապրելակերպ տանելու միտում: ՏՀ տեխնոլոգիաները ակտիվացնում են նաև ինտելեկտուալ հույզերը: Ինչպես հետաքրքրությունը ու զարմանքը, կռահումն ու կռահման հույզերը շատ մեծ նշանակություն ունեն մաթեմատիկայի ուսուցման գործընթացի արդյունավետության

բարձրացման համար։ Եվ ՏՀ տեխնոլոգիաները էապես ազդում են դրա վրա։ Մասնավորապես, աշխատանքում քննարկվում է հետաքրքրաշարժ, պատմական և ընդհանրապես խնդրի լուծման ուսուցման գործում կռահելու հուզական ապրումի նշանակությունը։ Դիտարկվում է առաջին հայացքից մաթեմատիկայից ու նրա ուսուցման գործընթացից հեռու համագործակցային մի հույզի՝ զվարճանքի դիտարկումը։ Աշխատանքում որպես հուզական այդ ապրումին հանգեցնող նյութեր, դիտարկվում են անեկդոտները, հանելուկները, առակները, 7-րդ դարի հանրահայտ հայ մաթեմատիկոս Անանիա Շիրակացու խրախճանականները։

Բանալի բառեր. Մաթեմատիկայի դասավանդման գործընթաց, կրթության թվայնացում, հույզեր, հետաքրքրություն, հաճույք, անակնկալ, գուշակություն, զվարճանք, հումոր, գիտական գեղեցկության նշաններ։

POSITIVE EMOTIONS OF STUDENTS IN THE CONTEXT OF DIGITALIZATION MATHEMATICS EDUCATION

Mikaelian Hamlet Suren

Summary. The article deals with the problem of activating positive emotions among students in the process of teaching mathematics in the context of digitalization of education. The aesthetic appeal of mathematics, its learning process, and ICT tools are seen as contributing factors. The role of ICT tools in the manifestation of emotions and emotional experiences of satisfaction in the context of the formation of different levels of cognition is considered. The connection of IR technologies with emotional sensations of pleasure is shown: IR technologies enhance these feelings and tend to lead society to a hedonistic lifestyle. IR technologies also activate intellectual emotions. Like curiosity and surprise, the emotions of guessing are very important for improving the effectiveness of the process of learning mathematics. And IR technologies have a significant impact on this. In particular, the paper examines the importance of the emotional form of guesswork in teaching fascinating, historical and problem solving in general. Considered at first glance away from mathematics and the process of learning the emotions of fun. Anecdotes, riddles, parables of the famous Armenian mathematician of the 7th century Anania Shirakatsi are considered as materials leading to this emotional experience.

Key words: The process of teaching mathematics, digitalization of education, emotions, interest, pleasure, surprise, conjecture, fun, humor, signs of scientific beauty.

ПОЗИТИВНЫЕ ЭМОЦИИ УЧАЩИХСЯ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ МАТЕМАТИЧЕСКОГО ОБРАЗОВАНИЯ

Микаелян Гамлет Суренович

Резюме. В статье рассматривается проблема активизации положительных эмоций у учащихся в процессе обучения математике в условиях цифровизации образования. Эстетическая привлекательность математики, процесса ее обучения и инструменты ИКТ рассматриваются как способствующие факторы. Рассмотрена роль средств ИКТ в проявлении эмоций и эмоциональных переживаний удовлетворения в контексте формирования разных уровней познания. Показана связь ИК-технологий с эмоциональными переживаниями удовольствия: ИК-технологии усиливают эти переживания и стремятся привести общество к гедонистическому образу жизни. ИК-технологии также активизируют интеллектуальные эмоции. Подобно любопытству и удивлению, эмоции от догадки очень важны для повышения эффективности процесса изучения математики. И ИК-технологии оказывают на это существенное влияние. В частности, в статье рассматривается значение эмоциональной формы отгадки в обучении увлекательным, историческим и решению задач в целом. Рассматривается на первый взгляд в стороне от математики и процесс обучения эмоциям веселый. В качестве материалов, ведущих к этому эмоциональному переживанию, рассматриваются анекдоты, загадки, притчи известного армянского математика VII века Анании Ширакаци.

Ключевые слова: Процесс обучения математике, цифровизация образования, эмоции, интерес, удовольствие, удивление, догадка, веселье, юмор, признаки научной красоты.

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