

Technology for Developing "Non-Standard Thinking" Skills

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Abstract:

In connection with the rapid development of science and technology, the creation of intelligent robots, the problems of their training are studied, taking into account the increasing need for specialists with "non-standard thinking" skills. It is based on the fact that the training of such specialists can be carried out with the use of mind maps, a tool that visualizes data and activates information of the right hemisphere of the brain and the subconscious. Taking into account the fact that children between 5 and 11 years of age have good symbolic-spatial imagination, it is suggested to organize the educational process for the pupils of "Preschool educational organizations" and "Primary class" students on the basis of "Pedagogical technology for the formation and development of non-standard thinking skills".

Keywords: Expert, creative thinking, standard thinking, non-standard thinking, complete thinking, imagination, analogy, metaphor, skill, intuition, new idea, mind map, mother tongue, learning environment, subconscious.

Introduction. In the era of rapid development of science and technology, the demand for specialists with "creative thinking" skills, who can solve the problems that arise, increases. The World Economic Forum held in Davos in 2023 also predicted that by 2025 there will be a high demand for professionals with "creative thinking" skills. Such specialists are trained in educational institutions based on modern educational methods. As the President of the Republic of Uzbekistan, Sh.M. Mirziyoyev, noted, "It is necessary to take into account the student's worldview, logical and creative thinking, non-standard solutions in addition to the rules limited by the curriculum on the given issue" [1]. That is, it is necessary to introduce methods of formation and development of logical and non-standard thinking skills into education.

Methods. "Creative thinking" should be divided into two - standard and non-standard thinking. Standard thinking is thinking "in the box". It is carried out according to the chain of cause and effect, and all thinkers come to the same conclusion. A practical solution to the problem is found in such creative thinking based on logic and analysis. It is often the result of applying prior knowledge to a new situation. This is especially useful in solving technical and natural science problems. Default thinking is easy and convenient. Because such thinking is walking on the path of "thinking" that others have gone through. Such thinkers can be engineers, entrepreneurs, politicians, and task managers. But it is difficult for them to become great inventors. Non-standard thinking (non-standard thinking) is a process of free creative thinking in unusual ways. It is finding unusual ways to solve problems. Non-standard thinking is the unique thinking of each individual and is guided by feelings (intuition, fantasy). Non-standard thinking serves to reveal a strong talent. Their non-standard way of thinking has led to the discovery of solutions that are not yet known to mankind, and as a result, they have achieved great success in business, science or art. Currently, there is great interest in non-standard thinking. Because even computers can be taught standard (linear) ways of thinking. So soon robots with artificial intelligence, standard thinking will appear. Humans can stay ahead of robots only with non-standard thinking skills. Robots cannot be taught non-standard thinking elements.

In general, people want to think in a certain way and follow the tried and tested path. Non-standard thinking can be likened to an arrow that directs the echelon to a different path. The more a logical algorithm is followed, the more it prevents the birth of new ideas. Thinking in a habitual pattern gradually trains the brain to become lazy, weakens, and eventually declines.

On the contrary, breaking out of the mold, non-standard thinking gives a person a passion for living, the joy of creativity, self-confidence, self-pride and feelings of inner joy. Those who want to develop as a person should learn non-standard thinking. Nonstandard thinking is characteristic of great scientists, artists, entrepreneurs, and leaders. It encourages finding new solutions, the birth of creative ideas, and the creation of innovative products. A. Einstein, N. Tesla, T. Edison, I. Musk could not have achieved such success if they did not have non-standard thinking skills.

Applying knowledge in analytical and logical thinking, that is, looking for a practical solution to a given problem, looking for a non-standard solution to a problem, a new idea, with the help of thinking based on imagination and intuition. Such a solution can have a significant impact on the development of science and technology. Examples include the discovery of radioactivity and X-rays, the planetary model of the atom, and many discoveries related to semiconductors.

According to Sperry Rodger's discovery of the relationship of brain hemispheres to specializations, creative thinking based on analytical and logical thinking is a product of the left hemisphere of the brain, and non-standard thinking based on imagination, analogy, metaphor and intuition is a product of the right hemisphere of the brain [2].

Analogy (similarity). It is one of the methods of knowledge, the use of known properties of an object or event to study the properties of an unknown object or event, and plays an important role in the birth of new ideas.

Metaphor (transfer of meaning). It means transferring a meaning from one thing to another based on similarity. Metaphor is a universal technique in language.

Intuition. Knowing the meaning of an event or problem or coming to a new conclusion by prediction or gut feeling. Looking at the problem with an unexpected new perspective. Intuition is a foreknowledge of the future based on past experiences. It is finding a solution with non-standard methods that do not conform to the usual rules without entering into the scheme of finding a logical solution to the problem.

Results. The combination of standard and non-standard thinking, that is, the joint activity of the right and left hemispheres of the brain, thinking with the whole brain is called "whole brain thinking" [3].

Teaching critical thinking begins with developing students' imaginations. No creative product is without imagination [4].

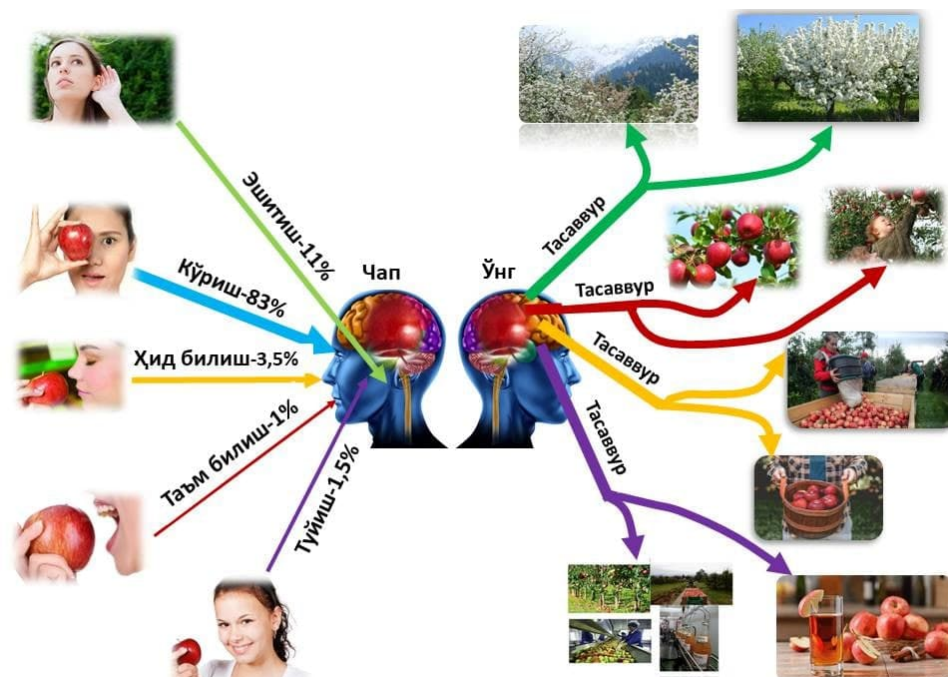
Imagination is a special form of the human psyche that is between perception, thinking and memories, different from other mental processes [5]. Imagination is the basis of creative thinking and helps a person to solve problems even without practical activities. Its difference from perception lies in the fact that the viewed images are not always real images, but also elements of fantasy.

A. In the words of Einstein, logic can take us from point A to point B, and imagination can take us anywhere. R. Feynman said, "To think about something that was not known before, you need to have a strong imagination."

There are many ways to develop imagination and non-standard thinking skills. Below, we will get acquainted with the importance of Mind Map, one of the modern methods, in education [7].

Color. Multi-color helps improve a person's memory and creative thinking. It enlivens the image and increases its attractiveness. It helps to keep information in memory for a long time.

Image. The brain perceives images faster than words. Because it processes visual information 60,000 times faster than verbal information. The image develops the imagination and encourages the right hemisphere of the brain to work actively [9].



“Imagination” Mind map

The map of imagination intelligence shows the information received from sensory channels and the birth of different ideas in the right hemisphere of the brain based on them [10]. On one side, the mechanism of imagination is emphasized, and on the other side, the birth of imagination is described. The information coming from sensory channels is perceived by the left hemisphere of the brain and the exact shape of the object is formed. On the basis of this information, the elements of imagination are formed in the right hemisphere of the brain, which is the basis for full thinking.

Why is it proposed to use "Intellect map" as a means of developing imagination and non-standard thinking. Intellect map transforms verbal information into visual information, activates the right hemisphere of the brain, and helps the birth of new ideas [11]. Experiments show that the intelligence map is a natural reflection of the thinking process that occurs in the human brain. In other words, human inner intelligence thinks with the help of a map, and it is directly related to human language [12].

Human language is the language of babies in the womb. All born know this language, and after three or four months they begin to look carefully at the faces of their parents. For them, their mother's face becomes the first central image (symbol). From this image, there are branches of feelings directed in different directions - food, love, health, sleep, calmness, trust and living.



“Human language” mind map

Therefore, the intelligence map can be compared to the processes occurring in the human brain (the connection of neurons using synapses), and therefore it can be the best tool for teaching imagination and non-standard thinking, and the most productive method of education [13].

Until now, the possibilities of developing imagination and full thinking skills of students using mind map during the teaching of natural and other subjects have not been sufficiently studied. In foreign countries, it was used only as a means of collecting, organizing and helping to store information [14]. Using the mind map as a tool for visualizing information and teaching critical thinking undoubtedly has a place in education. This method can be the basis for training highly qualified specialists with well-developed thinking skills. Its use in the teaching of physics, biology, chemistry gives good results.

According to the data obtained by Dj. Kunios and M. Biman using magnetic resonance imaging (MRT), the brain starts processing visual information, that is, analyzing them 300 ms before

thinking [16]. So, before thinking begins, new and previously existing information is analyzed in the brain and an image is formed.

Pupils (from 5.6 years old) have a high non-standard thinking ability. Children have flexible minds by nature and can come up with great ideas. Because there are no traces in their brains, that is, they are empty [17]. This allows them to freely fantasize. That is why it is appropriate to form and develop the skills of "non-standard thinking" from a young age.

NASA invited 1,600 4-5-year-old children to solve the problem in a new way. 98% of children solved the problem at the level of geniuses. This indicator decreased to 30% after 5 years, and to 12% after another five years. When these tests were conducted with 30-year-old adults, only 2% showed high levels of creativity [18].

Summary. The rapid development of science and technology and the creation of intelligent robots create a need for specialists with "non-standard thinking" skills.

- Pedagogical technology of training specialists with non-standard thinking can be created using a productive data visualization tool "Mind map".
- Specialists with non-standard thinking skills will make a worthy contribution to the development of science in the future.
- Due to the fact that the intelligence map is similar to the thinking process in the human brain, it ensures the activation of the right hemisphere of the brain.

The introduction of the pedagogical technology of "non-standard thinking" into the educational process makes it possible to prepare specialists who meet the requirements of the future.

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