



**INCREASING THE EFFECTIVENESS OF THE LEARNING PROCESS FOR THE USE OF
INFORMATION AND COMMUNICATION TECHNOLOGIES**

Yahyokhonova Muhiba Mahmudjanovna

Shahrisabz Branch of Tashkent State Pedagogical University Named after Nizami,

Teacher of Information Technology in Education;

e-mail: muhiba8083@mail.ru;

The source of our knowledge is intuition.
They do not give false information. Only a person
Can make a mistake in drawing conclusions.
(Epicurus)

Annotation

The article discusses the mechanism of the cognitive process and the factors that improve it. Provides information on the role of sensory channels for cognition and perception. Emphasis is placed on the role of attention in the learning process and on what is important to focus on to improve attention. It is based on the fact that data visualization and information and communication technologies can be a key task to increase the efficiency of the learning process.

Keywords: Knowing, indirect knowing, perception, imagination, brain, creativity, attention, curiosity, essential, purpose, image, computer.

Introduction

Knowing is the ability to identify, study, and master the objective laws of existence. [1]

Knowledge - Information about objective existence, a set of concepts, science, confirmed in practice. [2]

Sometimes it is necessary to draw logical conclusions based on the results obtained in order to gain direct knowledge.

Indirect knowledge is knowledge obtained by any means.

It is the knowledge gained by strengthening the human senses or making it easier to observe. For example, knowledge gained through modeling or experimentation is indirect knowledge.

Human cognition is related to the sense organs. It is:

- to the external environment (extra-external) exteroceptive system (perceived by sensitive-sensitive-Latin sensations) system (sight, hearing, taste, smell, skin) and
- focused on the internal physiological (inter-internal) state (interceptive);
- has a system of emotional cognition.
- Man is given the ability to think in order to know the real reality. Thinking is based on thinking. This is a factor that does not feel limited by its physiological properties. It was this thinking that made it possible to look at the composition of the nucleus from a distance of 10-15 m. [3]



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It should be noted that physiological limitations have often benefited mankind. For example, a person who could not see molecules with his eyes had to make many more discoveries in order to create an electron microscope.

Rose Townsend cites the following about human information channels: Data: 1% - taste, 1.5% - taste, 3.5% - smell, 11% - hearing, 83% - sight accepted.

A person: - remembers 10% of what he reads, 20% of what he hears, 30% of what he sees, 50% of what he sees and hears, 80% of what he says, 90% of what he says with actions. [4]

As mentioned above, man receives the first information about things through his senses (emotional cognition). For example, we see the color and shape of an apple, smell it, and taste it. Only then is this information collected (systematized) at one point in the brain using low-frequency electrical signals transmitted through synaptic nerve fibers and perceived (the final conclusion about the apple).

By the perceptual information and perception form imagination of the apple.

Modeling-Analogy-based method. In this case, an object that is difficult to study is replaced by another object that is similar to it, but easier to study. The knowledge gained from studying the model is applied to the initial object. This method is used to study objects that are difficult to study directly. (For example, micro and macro worlds that are difficult to see).

Improving knowing efficiency

It is known that people have different intellectual abilities. What is the reason for this? Genetics (human biological nature) or environment and upbringing?

In general, the genetic code passed down from generation to generation plays an important role in the formation of the human intellect. Our DNA is irreversible and unique and cannot be changed at this time. At the same time, scientists acknowledge the unique role of education in the formation of personality. According to them:

Intensive teaching methods can develop children's thinking skills and improve their memory dozens of times. Thus, although the role of genetics in a person's intellectual potential is unique, the impact of the environment in which he or she grows up is also significant. This effect is felt in the mother's womb and intensifies after birth. Education plays an important role in a child's intellectual development.

What changes take place in the human brain during training? Neurobiologist and biochemist Erik Kandel (winner of the 2006 Nobel Prize) has shown that the "conductor" (neuron) of the human brain changes during education. Even the smallest detail can change the structure of a neuron. When a baby is born, its brain is partially formed. The final formation will take place in the coming years. The main work is completed by the age of twenty. At the age of forty, it becomes complete. In general, when a baby is born, it has the same number of connections in the brain as an adult. At the age of eight, children have the same number of neural connections as adults. [5]

Are people's brains the same or different in general? Each human brain is made up of the hippocampus, the pituitary gland, and the cerebral cortex, the world's thinnest store of electrochemical knowledge. Their functions in any brain are the same. So what is the individuality of each human brain?

In the human brain, neurons that carry information open their own channels of movement. These canals are like trails. There are no two people in the world who follow the same path. Different parts of the human brain develop differently. No matter what we do or learn throughout our lives, it affects the



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shape and appearance of our brain. In other words, it changes its tracks. However, according to psychologist H. Gardner, there are seven types of intelligence. According to him, they are the "bases" of internal processes in the human brain. People have different intellects, and not all of them can be measured by an IQ test.

If children's brains are different, each brain's ability to learn will be different. Does it work to teach 30 children together? So you need to find ways to make your lessons as personalized as possible, and how do you do that?

Results, ways to increase knowing efficiency

There are many ways to increase the effectiveness of learning. Including:

- Reduce the number of students in the group. In this case, the teacher has a good control over the students and has the opportunity to work with them individually;
- Use of ICT in education. In this case, the information and assignments are given by computer. Students' learning is monitored in the same way;
- Organize classes based on "creative thinking" technologies. The teacher only raises relevant issues. And students will have to learn (discover) for themselves. If this is done with the help of ICT, the result will be more effective;

It will be more effective to use these methods together.

Creativity (lot) - the ability to create, to come up with unusual ideas, original solutions that differ from the scheme of human thinking. In other words, to create something different from what already exists.

To develop students' creative abilities:

- early start of creative elements (drawing, making,...);
- Involve students in an environment that encourages early creativity;
- freedom in creative activity;
- wise advice of adults;
- emotional organization of work.

Tasks that encourage "creative thinking" can be divided into the following groups:

1. Focused on "knowing". The goal is to gather the "creative" experience needed to know existence.
2. Focus on "creating". The goal is to gain experience in creating original creative products.
3. Focused on "change". The goal is to create models for changing objects, situations, and events.
4. "Use of new qualities". Purpose - to use objects, situations, events for other purposes, depending on the different perspectives. Convert the negative characteristics of the system to the positive characteristics by this method.

- Sleep stimulates cognitive activity. That's why it's important for students to sleep well important. For example, NASA researchers found that 26 minutes of daytime sleep increased a pilot's alertness by 34 percent. If a specialist working with complex techniques does not sleep for 1 day, his cognitive ability deteriorates by 30%, and if he does not sleep for 2 days, his cognitive ability deteriorates by 60%. Insomnia can affect attention, memory, thinking, and even movement. [8]

Attention to education is very important. The more carefully the data is received, the better it is encoded and the better it is stored in memory. Attentive students have always had a high level of mastery. How long can you stay focused? Studies show that even the most resilient people start leaving 15 minutes



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after the presentation. How long will it take for Dr. Medina to wait for the class to end? When asked, "Ten minutes later," they replied.

What can be done to attract the attention of the audience? What to focus on depends on memory and previous life experiences. Interesting information is also important to increase attention. Is it interesting? According to marketers - yes. Good advertising makes the product interesting. Also, at the end of the lesson, giving interesting information about the topic of the next lesson will increase the students' interest in the next lesson. Because it's important to know what it's about so that the topic gets our attention.

Events that evoke emotion are stored in memory for a long time and are well remembered. How does it affect the learning process? In any case, they use it effectively in advertising. So it can be used in education.

Studies show that emotional attention is focused on the "essence" of the event. The details are ignored. According to scientists, the memory stores the "most important", not the full details of the event. If you restore the "essential", the details will be restored. Special attention should be paid to this in education. The main task of the teacher is to convey to the students the "most important" parts of the topic.

Thus, in order to keep the students' attention, they should divide the topic into 10-minute sections and explain the essence ("most important") of this section before each 10-minute section. After 10 minutes, there should be a "retreat" to focus for the next 10 minutes. We believe that this withdrawal should be a "break in the imagination." But its subject matter should not be related to that subject (or science). Otherwise, it will not achieve its goal. Dr. Di Medina called these breaks a "trap". According to him:

- 1) The "trap" should evoke emotion.
- 2) It is better if it is historical or anecdote.
- 3) The "trap" is better if it connects 10-minute modules.

We suggest taking it as an "imaginary" break without objecting to the "trap" topics. This will make the lesson more "creative". Another advantage of the "trap" is that students are more interested in what happens in the next "trap" at the end of each 10 minutes. This will increase the interest in the whole lesson. You need to use as many senses as possible to keep the information in memory. They speed up reaction, increase accuracy, improve cognitive stimulation and coding during learning.

As mentioned above, the beginning of the session is important to start the thinking process. At this point, the student must be able to activate all the sensory channels. To do this, you need to make effective use of the elements of synesthesia (the science that studies the processing of sensory signals by the brain).

There are three essential things for human life: food, water and fresh air. You can live 30 days without food and one week without water. But if the human brain is deprived of oxygen for five minutes, serious problems can arise.

Physical activity promotes good blood circulation in the cells of the body, including the brain. The brain works like a muscle. The more active he is, the bigger and better he will be. Therefore, increasing physical activity can improve the quality of education. So, physical activity is needed to increase mental ability.



Visualization of data and the role of ICT in it

Sight is more important than other senses, it occupies half the capacity of the brain. The retina collects the energy of visible light in the information pathways and sends it to the brain. The cerebral cortex analyzes this information (one movement, another color, etc.) and summarizes it to form a whole picture.

As you know, there are different rules for remembering images and remembering text. Visual information is recognized faster and recovered faster. Even when people were shown more than two and a half thousand images in 10 seconds, their recognition rate was 90 percent. One year later, the figure was 63 percent. If the information is given orally, after 72 hours people will remember 10% of it. If the text is presented in the form of an image, this figure increases to 65%. The color, position, size, and movement of the image are striking. That's why it's a good idea to use animation in your lessons.

Advantages of using ICT in the educational process:

- Increases the desire of children to use computers;
- Increases the productivity of the learning process;
- Increases interest in studying this subject;
- Increases the level of individuality of students in education;
- Develops students' creative abilities;
- Increases visualization in education;

Conclusion

- The article discusses the process of learning, knowledge, direct knowledge. The importance of thinking for the learning process has been noted.
- The importance of information from sensor channels and information about these channels in the process of learning.
- There are comments on the factors that increase the effectiveness of the learning process. Emphasis is placed on what is important to focus on to develop students' creative abilities.
- The importance of attention to the learning process and what to look for in it. It has been noted that one of the best factors in improving the cognitive process is physical activity.
- The most effective way to increase the efficiency of the learning process is based on the importance of data visualization and the use of information and communication technologies for this purpose.

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