Methodology for Teaching the Science "Human and his Health" Based on Computer Simulation Models

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Abstract: *This article is devoted to the issues of improving the educational process in biology in secondary schools based on computer simulation models.*

Key words: Media technologies, visualization, knee reflex, nerve impulses, neuron, axon, analyzer, peripheral structure, simulation model, competence, inductive approach.

The increasing influence of mass media on various spheres of life puts new tasks before the educational system. It requires society not only to know and work with modern technical tools, but also to have a certain level of critical thinking. Thinking includes independent creative work skills related to the search, processing and presentation of information material. [1].

Mass media provide an opportunity to perform educational functions. This includes television programs, most of the information on Internet sites is related to the subjects studied at school.

The objective development of the role of mass media has a real conflict with the practice of using them in the educational process of a general education school. In the science and practice of pedagogy, the educational opportunities of modern mass media, their didactic and educational potential are not sufficiently evaluated, it is connected with the complexity and insufficient development of many concepts, the low qualification of teachers in this field, and insufficient technical equipment of schools. On the other hand, the mass media are active propagandists of the news media, thereby trying to expand their audience, differentiate the presented material, direct it to different groups, and satisfy individual tastes and interests. But such influence on the children's audience does not always achieve the desired effect, because the students do not have enough social experience[2].

Literature analysis and methodology.

Despite the fact that many studies have been conducted on various aspects of the use of mass media in the pedagogical process, the problems are not being solved. The results of foreign and domestic studies do not always consider the use of information technologies for educational purposes useful. Today, there are a number of contradictions in the current stage of education development in the Republic of Uzbekistan, including:

social demand for graduates of educational institutions focused on the world of information and the fact that the pedagogical process is not equipped with enough media tools;

the need to change the content and methods of teaching in accordance with the conditions of the modern information space and the lack of readiness of teachers for these changes;

conflicts between the expected effectiveness of the educational process as a result of the use of media

technology tools and the lack of scientifically based tools and methods of their use in education[7].

According to A. V. Sharikov [Sharikov, 1990; 1991], school children should study media texts based on their social, political, informational and other characteristics, regardless of their artistic qualities. To some extent, these views corresponded to the concept of L. Masterman, an English scientist and media pedagogue [Masterman, 1985; 1988; 1997], he explains in his works that media education has a major impact on the development of critical thinking and personal critical thinking. [4-7].

The above-mentioned contradictions determine the relevance of the research problem. From a theoretical point of view, this is the problem of substantiating the educational features of modern information technology tools and the possibilities of using them in the educational process, from a practical point of view, the problem of identifying and developing these tools, effective media technology tools in the educational process of a general education school is closely related to considerations such as use [8].

Now there are multimedia textbooks for various subjects. Therefore, the use of visual aids in lessons (slides, atlases, drawings in textbooks, pictures, animations, videos) helps children to form visual images and concepts based on them. But it is not always possible to find information from such textbooks that is really necessary in a certain situation and suitable for a certain subject and teacher. This, in turn, causes pedagogical staff to increase their interest in creating and using electronic courses in their respective subjects with the help of ICT software tools [5].

The following types of computer programs can be distinguished according to didactic goals and specific features of the subject course:

educational, simulators, control, demonstration, simulation, reference-information, multimedia textbooks and multimedia electronic resources and virtual laboratories based on computer simulation models can be cited. Often, teachers use visual programs in their work, including pictures, video clips, photos, interactive atlases, computer lectures, and presentation lessons developed using Power Roint. Using media tools to create an opportunity to reveal the educational process of general education schools, especially the content of biological sciences, on the one hand, and on the other hand, the possibility of remote use in conducting lectures, practical and laboratory classes through the visualization of lessons creates [5-6].

At the same time, biology teachers have an important task, because the uniqueness of the science allows to attract various information resources and make maximum use of various tools of modern information technologies for teaching. Biology is a science that can explain the effects of events that occur in society. The use of information technologies in teaching biology creates conditions for solving important educational tasks:

➢ improving the teaching methodology using computer simulation models to reveal the content of biological sciences;

➢ educational activities can improve the educational process based on the creation of modern tools and methods of working with information of biological content from various Internet, Intranet, virtual library, virtual laboratory and multimedia electronic textbooks [3-4].

Bangladesh scientists Zeba Farhana, Sabbir Ahmad Choudhury, the perspectives of using ICT by biology teachers in general schools, Indonesian scientists Sukenda, Maharani Anjani, Benny Yustimlar, Indonesian scientists Sukenda, Maharani Anjani, Benny Yustimlar, the fundamentals of multimedia-based biology learning tools at the secondary school level Nigerian scientists A Adedamola, Kareyem have justified the use of multimedia in teaching and the effects and achievements of students in their research [7].

That is, to show the processes in the subjects of biological sciences through simulation models based on the software tools of information technologies.

Examples of these are the formation process of the knee reflex, the activity of the higher nervous system, conditioned and unconditioned reflexes, and the importance of sensory organs in the 8th grade "Biology" (Man and his health) textbook. It is possible to show an imitation model developed from the

topics of the process of transformation of external influences into nerve impulses:

1. Topic: The process of formation of the knee reflex. This simulation model shows the formation of the knee reflex and the reflex parts involved in its formation. When explaining to students the formation of the reflex arc, it is related to hitting the knee cap with a rubber hammer, after the impact of the rubber hammer, the receptors in the knee joint are stimulated, and the back is sent through the impulse-sensing neuron.
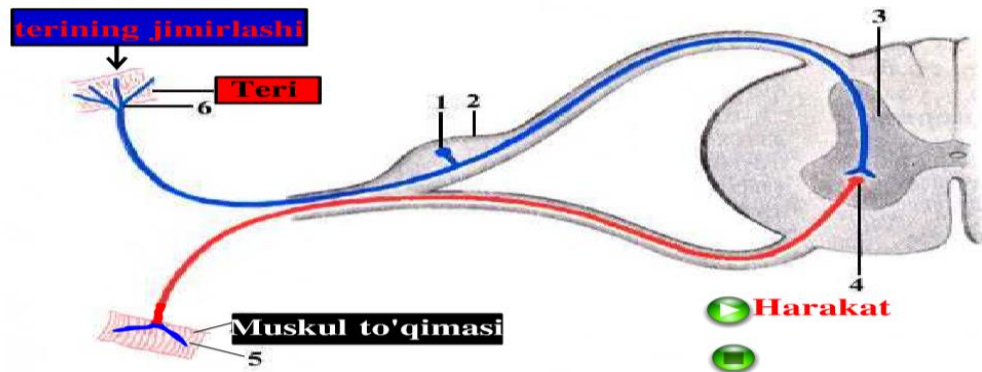
Figure 1. A simulation model of processes in the reflex arc and its parts.

Going to the brain (if it is analyzed and synthesized through the gray matter in the spinal cord, the white matter acts as a response reaction), the motor neuron from the spinal cord is transmitted to the anterior thigh muscles through the axon of the motor neuron, and as a result, the leg is raised from the knee, or The knee reflex formation process is shown and explained.

2. Topic: Higher nervous activity, conditioned and unconditioned reflexes.
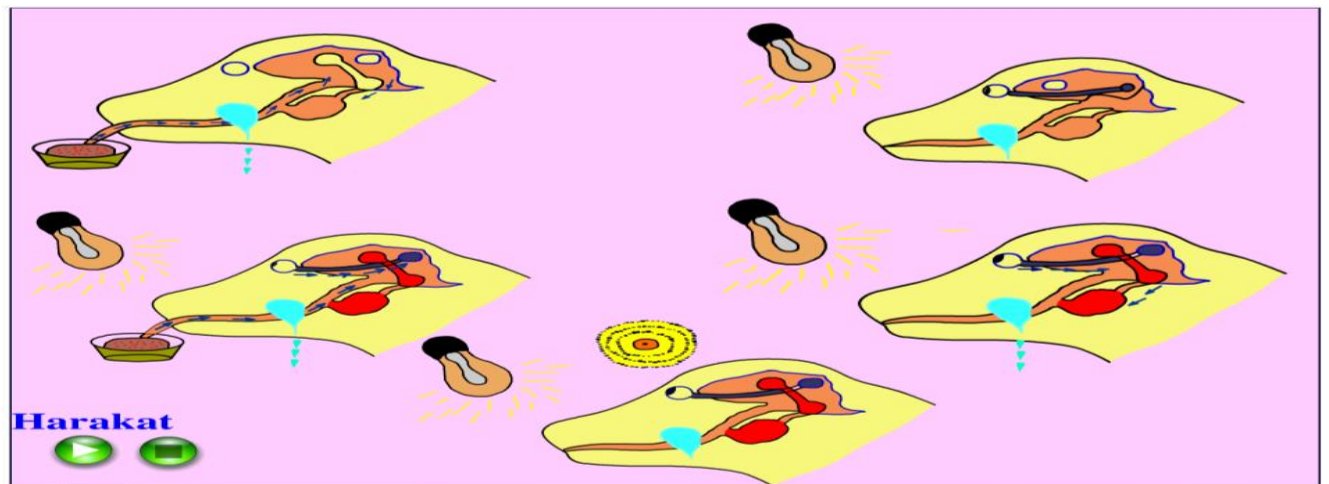
Figure 2. An imitation model for the formation of a conditioned reflex in dogs.

In this imitation model, all the actions of humans and higher animals are aimed at a specific goal, and the activity of the central nervous system is related to its reflexive (analysis and synthesis) feature.

One example is that I.M. Sechenov, published in 1863 in his book "Cerebral Reflexes", states that the reflexes of the brain are made up of three closely related parts:

1. Stimulation of the sensory organs under the influence of the external environment, for example, when a light bulb is lit in a dog, the vision analyzer is stimulated;

2. Mental states that arise based on the processes of excitation and inhibition generated in the brain - the dog begins to salivate after seeing a lit light bulb:

3. Human or animal behavior - Before the light bulb is turned on and the dog is fed, the dog starts salivating for food by moving around. A second process can be seen by turning on the light bulb and not feeding the dog, and after a certain period of time, the dog does not make any movement

because this process is extinguished.

There are two types of reflexes. Conditioned and unconditioned reflexes. Unconditioned reflexes are innate. Conditioned reflexes are reflexes that are formed after birth. Conditioned reflexes are formed on the basis of unconditioned reflexes under the influence of certain conditioned influencers. For example, when the lamp shown in the simulation is turned on, the dog begins to salivate without food. Giving food is an unconditional trigger for salivation, but turning on the light is a conditioned trigger for salivation in dogs. Complex life processes in the body, such as the fact that conditioned reflexes can fade over time, are shown and explained in the simulation model.

3. Topic: Importance of sensory organs. Transformation of external influences into nerve impulses
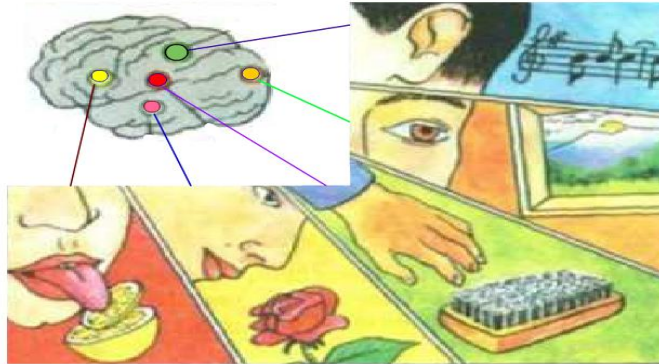
Figure 3. Simulation model of transformation of external influences into nerve impulses

In this simulation model, it is described that the external influences are received through the sensory organs and, in connection with the central nervous system, they show reactions to it.

It is known that information from the external environment is received by the human body through sensory organs. Sense organs include sight, hearing, taste, smell, and touch.

Each sense organ provides perception of a certain type of impact. For example, the eye is affected by light, and the ear is affected by sound. Receptors located in each sense organ receive a specific effect and convert it into nerve impulses.

Nerve impulses are transmitted from receptors in sensory organs to the central nervous system through sensory neurons. Depending on the type of excitation and the location of the neurons in the cortex of the hemispheres, it creates a certain sense of sensation. The olfactory center is located in the anterior superior region of the cerebral cortex, the visual center is located in the occipital region, the auditory center is located in the lower regions of the cerebral cortex, and the taste center is located in the peripheral region of the cerebral cortex. in the upper and middle area of the part, the palpation centers on the skin of the fingers are located in the middle area of the top of the cerebral cortex.

In summary, sensory organs are specialized peripheral structures that provide reception and perception of external influences affecting the organism. They show and explain processes such as the body receiving various stimuli from the external and internal environment and transmitting information about it to the central nervous system in an imitation model.

Results.

Biological objects and processes that cannot be directly seen and perceived by schoolchildren are modeled;

on the basis of virtual cameras, it is possible to visualize processes and carry out virtual laboratory work and practical experiments;

it was achieved to reduce the time of monitoring the learning material directly in the classroom;

invisible life processes were visualized and explained to students on the basis of simulation models, and opportunities were created for their independent work outside of class.

Conclusion: organization of educational activities with the help of computer simulation models (CIMs) created on the topics of the textbook "Man and his health" was justified from a theoretical and practical point of view to increase its efficiency and develop students' competence. This will facilitate students' independent work, inductive approach to the material compared to traditional paper printed educational literature, hearing, and emotional memories.

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