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Methods Of Teaching The Subject "Information Technologies" Based On Computer Simulation Models

(On The Example Of Higher Educational Institutions Of Technical Orientation)

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***Abstract*—This article examines the creation of computer simulation models on the topics of the subject of information technology in technical higher educational institutions and the organization of the educational process based on simulation models, which will lead to an increase in their effectiveness, on the one hand, and allows the organization of independent work of students on the other hand.**

Keywords—computer simulation models, educational process, information technology, technical universities.

Teaching the subject "Information technology" in higher educational institutions of technical orientation is currently carried out on the basis of a variety of visual aids. Examples include using the power of a whiteboard and organizing lecture and practice sessions based on different presentations.

In the course of the analysis of scientific research of foreign and republican scientists in this direction, one can see the implementation of the following works:

In the research work of E.N. Guseva, I.Yu. Efimova, T.N. Varfolomeeva on the topic "Methodology for the formation of skills in simulation modeling among IT specialists", the results of the application of simulation models in the direction of economics have been analyzed.

In the research work of T. V. Mikheeva on the topic "Information technologies of simulation in the organization of a corporate production system", the management of production systems using simulation models is analyzed, control mechanisms are studied and recommendations are given.

In the scientific research of E.N. Guseva on the topic "Methods of teaching the discipline" Simulation modeling "for bachelors of applied computer science", the processes of creating simulation models in order to assimilate students of mathematical modeling and methods of system analysis within the framework of the Rockwell Software "Arena" program are described. With the help of the "Arena" program, simulation models for optimizing economic systems have been introduced.

In the scientific work of E.V. Guseva on the topic "A simulation model of a construction company", the activity of modeling a construction company is described, negative economic factors affecting construction projects, as well as the reasons for a decrease in the productivity of a construction company, are revealed. The examples of creating a simulation model of a construction company in the "Arena" environment using the "Rockwell" program are considered.

In the scientific works of MV Yadrovskaya on the topic "New technologies of modeling in pedagogy", the means of computer modeling are analyzed, both in solving theoretical and practical problems of pedagogy.

In the scientific works of D.V. Mitrofanov on the topic "Pedagogical capabilities of information technologies in the formation of intellectual culture of students" the significance of multimedia, hypermedia, 3D-technologies in the development of intellectual culture and pedagogical potential of students is analyzed. In the studies of Mojca Indihar-Stemberger, Ales Popovic on the topic "Simulation and information systems modeling: A framework for business process change", simulation models are introduced in order to combine methods and means, and develop e-business.

In the scientific works of EV Konstantinov, VS Timchenko on the topic "Application of simulation in the educational process of a transport university", simulation models are used to study complex technical systems, their actions and control. In scientific researches of N.A. Garyaev, A. V. Rybina on the topic "Simulation model of material and technical support of construction objects", an algorithm of material and technical modeling in the JAVA programming language was developed, and the results were obtained. The analysis found that the choice of these technologies optimizes time and cost issues.

V.S. Smorodin and A.V. Klimenko in his scientific work "Simulation modeling and means of optimizing complex technical systems" considered the creation of simulation models when solving problems of optimization of multicriteria issues of complex technical systems. NNLychkina in her research on "Modern technologies and solutions of simulation modeling and their application in information business systems and decision support systems" and "Concepts and experience in teaching disciplines simulation of economic processes" created simulation models of economic processes.

TV Mikheeva in her scientific work on the topic "Review of existing software for simulation in the study of the mechanisms of functioning and management of production

systems" analyzed the importance of simulation models in the study of the production system and control mechanism.
Chernenko Vitaly Evgenievich in his research on "Low-level simulation of transport systems" studied the simulation model in the transport system.
Malykhanov Andrey Anatolyevich in his scientific work "Simulation model of an agent for low-level research of transport systems" created a simulation model of low-level research of transport systems.
Gribanova Ekaterina Borisovna in her scientific work on the topic "Algorithms and a set of programs for solving problems of simulation modeling of objects of applied economy" analyzed a set of simulation models, algorithms and programs for solving problems of objects of applied economy.
In the scientific works analyzed above, the development of methods for teaching the subject "Information Technologies" in higher educational institutions of a technical orientation are individually and partially analyzed.
n this research work, the question of creating a methodology for teaching the subject "Information Technology" in higher educational institutions of a technical orientation on the basis of computer simulation models, and its introduction into the educational process is raised.
For this reason, the article discusses the creation and implementation of computer simulation models (CMM) into the educational process in teaching the subject "Information Technology" in higher educational institutions of a technical orientation.
The content of the subject "Information technology" in higher educational institutions of a technical orientation covers the following topics:
Methods for creating images. Color models (RGB, SMUK).
2. The interface of the CorelDRAW program. Toolbar.
3. Working with objects in the CorelDRAW program.
4. Working with colors in the CorelDRAW program.
5. The interface of the AutoCAD program. Toolbar.
6. Working with the coordinate system in AutoCAD.
7. Working with objects in AutoCAD.
8. Editing circuits in AutoCAD.

9. Working with color images in AutoCAD. 10. Working with objects in the program 3 D Studio Max. 11. Simple operations with objects in the program 3 D Studio Max. 12. Transfer of objects to the XYZ plane. 13. Modeling using standard primitives and modifiers in the program 3D StudioMax. 14. Basics of animation. Rendering. 15. Design and automation of building structures in the Lear program.

In order to reveal the essence of the topic, you should design a process for creating a CMM for training materials for each topic. For example, "Methods for creating images". On the topic "Color Models" (RGB, SMK), it is advisable to develop a technology for revealing the essence of the following issues.
The RGB color model is based on three colors: red, green and blue (RGB: Red, Grean, Blue) (Figure 1). Using the parameters of these colors, you can create more than 16 million color shades, and based on a computer simulation model, you can get any color.

Figure 1: RGB color model

Each of the parameters of red, green and blue takes on a value from 0 to 255, from combinations based on them all colors can be created. Taking into account the higher and lower boundaries of the parameters of the three colors, it is possible to form the basic colors that are often found in nature. By giving different values to the RGB color parameters, it is possible to achieve white, black, red, blue, green, yellow, pink, and cyan. For instance:

1. R = 255, G = 255, B = 255 based on these values, white is formed.
This figure dynamically shows and explains how white is formed using simulation models.

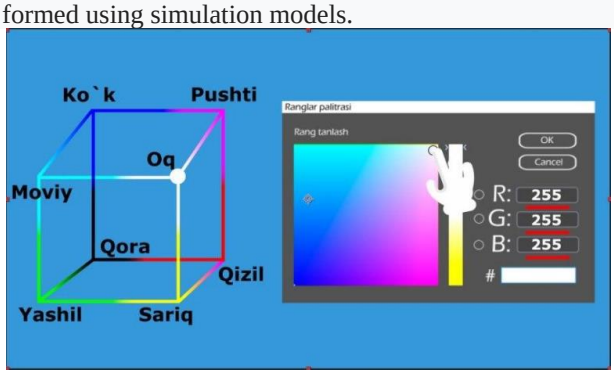


Figure 2. The process of formation of white.

2. Black is formed based on the values R = 0, G = 0, B = 0. The figure shows the formation of black color using a simulation model.

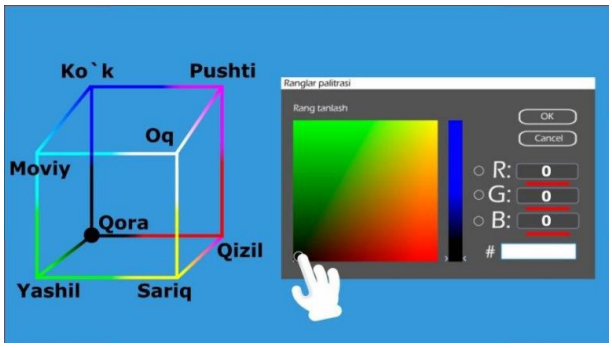


Figure 3. The process of black formation.

3. Red is formed based on the values R = 255, G = 0, B = 0.

In this figure, to get red, the R parameter gets the maximum value, and the other G and B parameters get the minimum value, that is, R = 255, G = 0, B = 0.

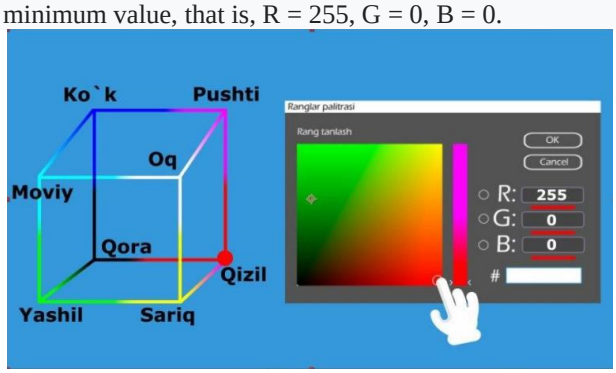


Figure 4. The process of formation of red.

4. The blue color is formed based on the values R = 0, G = 0, B = 255. From this it can be seen that parameter B has the greatest value for the formation of blue, while parameters G and R are given the minimum values.

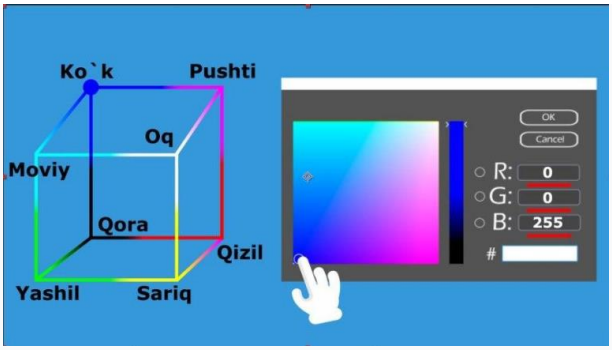


Figure 5. The process of blue color formation.

5. Green color forms based on the values R = 0, G = 255, B = 0.

In the process of forming a green color, parameter G is given a value of 255, and the rest of parameters B and R are given a value of 0.

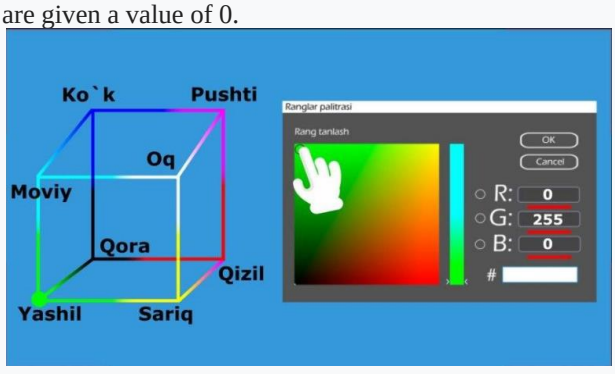


Figure 6. The process of green color formation. 6. The yellow color is formed based on the values R = 255, G = 255, B = 0. You can see the process of formation of yellow color on the basis of CMM without admixture of red and green colors.

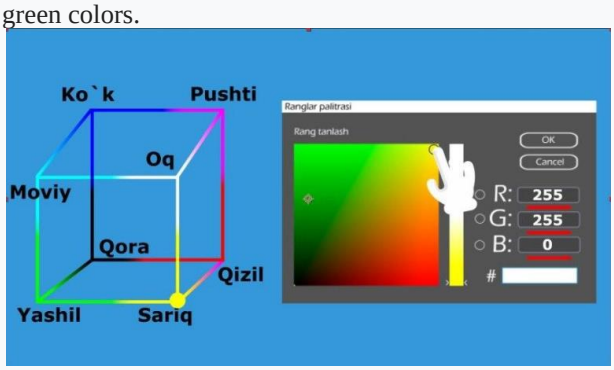


Figure 7. The process of yellow color formation.

7.Pink is formed based on the values R = 255, G = 0, B = 255.

The pink formation process is shown and explained dynamically below.

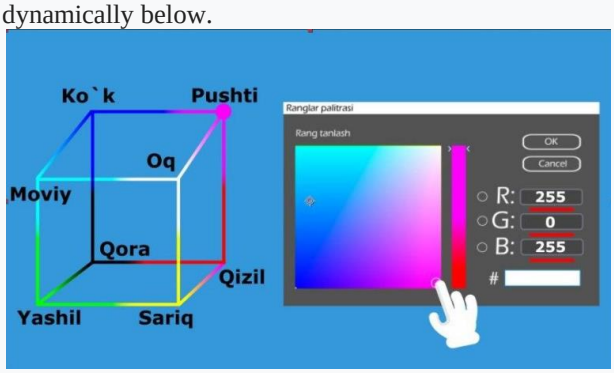
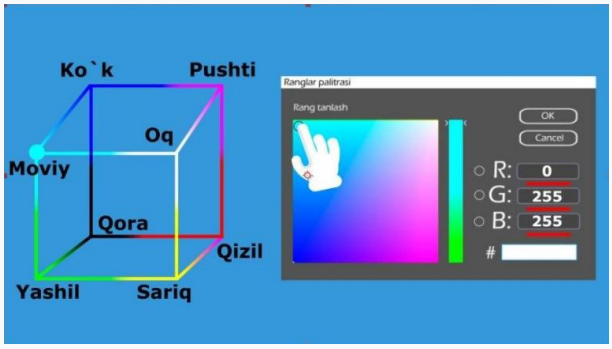


Figure 8. The process of formation of pink color. 8. Blue is formed based on the values R = 0, G = 255, B = 255. The formation of blue is shown and explained from the combination of these colors using a computer simulation model.



Ultimately, on the basis of red, blue and green colors, which are the basis of RGB models, in the maximum and minimum values of the color parameters, computer simulation models of the formation of white, black, red, blue, green, yellow, pink and blue colors, eight combinations most often found in nature. The processes of their formation are dynamically shown and explained.

The creation of computer simulation models on the topics of the subject of information technology in higher educational institutions of a technical orientation and the organization of the educational process on their basis will lead to an increase in their effectiveness.

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