

## Challenges of the Modern Educational System - Technologies of Modeling and Virtualization

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**Abstract:** Virtualization in computer technology means a modeling technique that uses software methods. Partially, we can think of it this way: modeling as the creation of a certain software product, and virtualization as running these programs on execution. Where does modeling end and virtualization begin? Today's educational reality is unbelievable without these two closely related terms. Any innovative approach is difficult to implement without advances in computer technology and their widespread use in the educational process. In the teaching of natural sciences or humanities, various package programs are widely introduced, which successfully use modern advances in computer technology in the fields of virtualization and modeling.

**Key words:** *educational, virtualization, modeling, computer technologies, Blender.*

### Introduction

In today's educational reality, any innovative approach is unthinkable without the development of computer technologies and their wide participation in the educational process. In the process of studying the technical, humanitarian, medical, etc. disciplines, various software packages are actively introduced, which widely use the achievements of modern computer technologies in the field of virtualization or modeling. Virtualization in computer technology is a modeling technique using software methods. By means of virtualization technology, we can create several virtual computers, that is, one that is simulated by the program. In this case, it is enough to use one computer with strong physical characteristics (with high power). Virtual technology implies the possibility of running several operating systems in one computer, where each running operating system works independently (its own) with logical virtual resources (processor, RAM, storage devices),

which are controlled by the physical host operating system server. In order for a physical guest (hosting) to be able to run at least two "virtual machines", a sufficient amount of operational resources is required. If we want to conduct certain types of experiments on any program or test new technologies, it is better to conduct them not directly on our computer, but in a virtual machine, but if we are interested in the complete information obtained from this experiment, then it is better to use a special program to "clone" our system to run in a virtual machine. The choice of software to perform this operation depends on which virtualization program we use. For example, for VMware products, it is better to use VMware vCenter Converter Standalone, but for others (especially Microsoft virtualization products), disk2vhd is quite a good tool. Its positive side is that it is easy to use and can be run from a flash memory card.

Virtual environment in today's reality is a technology of transformation of Internet technologies, consolidation of resources and many opportunities. By using virtual servers, we can not only reduce costs and increase efficiency, but also simplify complex infrastructure and eliminate physical or geographical limitations. Virtual infrastructure provides high-quality access to resources, efficient system and computer management, high level of security and optimal system operation. It should be noted that at this time the server can be changed without shutting down the system. The virtualization method includes the possibility of using cloud systems and data storage and integrated networks, which use VCOMPUTING; VSTORAGE; VNETWORK; VCENTERSEVER; VSHIELD zones.

We can mention many examples of the use of virtual systems, among which it is impossible not to mention the work carried out by Professor Peter Der Manuelian at the Museum of Fine Arts in Boston, which transforms an impressive collection of photographs, diaries, images and documents of the Egyptian pyramids of Giza into 3D. Models will allow students to enter the tombs of the pyramids and view the remains of the fourth dynasty of pharaohs from the inside. With this rich data and a 3D printer, the professor is also analyzing long-unseen ancient Egyptian artifacts. Today, there are many software products that make extensive use of the capabilities of virtualization technologies. An example of this is Blender. This is a program that works using 3D graphics. The program contains a large set of tools, modeling, animation, visualization, video processing, etc. Blender includes a base with which the user can create realistic and detailed 3D effects. The program uses the Python programming language. Blender – has the ability to implement plug-ins created by authors for specific users or software.

As for modeling itself, the use of modeling is one of the features of management science. The existence of the modeling concept is due to the complexity of the control problem and the difficulty of conducting experiments in real life. With the help of the model, it becomes possible to simplify the real life situation, which increases the possibility for a person to understand the essence of the problem before him and solve it optimally. Up today, modeling is one systematic way to envision future options and determine the potential outcomes of alternative solutions.

There are three main types of modeling: physical, analog, and mathematical.

A physical model is one that is clearly expressed by describing an object or system in enlarged or reduced geometric dimensions. A physical model is also called a portrait model. A physical model facilitates the perception process and helps in making the right decision.

An analogue model is an analogue of the object to be studied, which acts like a real object, but does not resemble it.

As for the mathematical model, it means describing the properties of the phenomenon or object using symbols, which is why it is also called a symbolic model. When using a mathematical model, it is possible to understand particularly complex phenomena. It is important to take into account that the use of a mathematical model is most often recommended when making organizational decisions.

When considering the modeling process, the following main stages can be distinguished: setting the problem, building the model, checking the reliability of the model, using the model, etc. One of the best examples of the use of modeling technologies can be advances in the medical field. "If you imagine, you can model it," said Simulia, Dassault Systèmes' chief strategy officer, who led the Living Heart project. We need to have good data quality to simulate accurately. In case of the Living Heart project, Dassault Systèmes obtained electrical and mechanical data from the living heart, from about ten sources from cardiologists, scientists, medical device companies, etc. Then the data was combined into one massive database: "People were working on different parts of this important organ, but no one was trying to work together," said Levin, one of the participants. Reconciling the data from the heart's electrical impulses with the mechanical data was a difficult task. Using a standard 48-processor workstation, Dassault Systèmes scientists took about four hours to accurately calculate the biomechanical force of a single heartbeat. To do this, they observed how electricity passed through each muscle tissue to mimic the movements of a real heart. After an accurate description of the physical pattern was completed, the model began to act on its own: "What we did is the model naturally began to pulsate," says Levin. The next step is to create personal 3D models of the heart. The doctors started with the Dassault Systèmes model of a normal heartbeat. At the next stage, on the basis of tomography and echocardiogram, it was reconstructed according to the patient's heart activity. For example, if a part was damaged by a heart attack, they began to observe how the physical image would change and treated the model with different versions of the treatment to ensure proper circulation.

The main guarantee of the development and progress of the modern world civilization is the need to receive quality education. Today's education system widely uses virtualization tools and capabilities in almost every school or university discipline. Many software products are created, through which real life processes are actively virtualized. On the one hand, it is a safe educational process. It should be noted that such toxic and explosive substances have been removed from school laboratories, the tests conducted with them are dangerous for health, however, the charm and interest that accompanies the tests conducted in reality is immeasurable. For example, the interaction of a small piece of potassium with water, which we will replace with virtual elements, but the effect, astonishment, which we have during a real test, cannot be compared. As a counterbalance to the mentioned, there are special "techno laboratories", the so-called Forums, festivals for children, where impressive trials are conducted with their own participation, taking into account the observance of special safety measures.

Finally, it can be emphasized that today's reality is unimaginable without the coexistence of virtual environment creation and modeling elements.

## Literature

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