

**IXTISOSLASHGAN MAKTABLARDA FIZIKAVIY JARAYONLARNI
MODELLASHTIRISH IMKONYATINI BERUVCHI DASTURIY TA'MINOTLAR
TAHLILI**

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Annotatsiya: *ixtisoslashgan maktab o'quvchilari "Interactive physics" simulyatorida ishlash ko'nikmasini shakllatirilgandan keyin o'quvchigaga biror bir fizikaviy jarayonni modellashtirish yoki fizikaviy masalaning modelini yaratishni va tadqiqotni mustaqil ravishda bajarishni tavsiya etish maqsadga muvoffiqdir.*

Kalit so'z: *simulyator, virtual konstruktor, modellashtirish, "Interactive physics".*

**АНАЛИЗ ПРОГРАММ С ВОЗМОЖНОСТЬЮ МОДЕЛИРОВАНИЯ
ФИЗИЧЕСКИХ ПРОЦЕССОВ В СПЕЦИАЛИЗИРОВАННЫХ ШКОЛАХ**

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Аннотация: *В данной статье рассмотрена анализ программ с возможностью моделирования физических процессов в специализированных школах. Основная задача лабораторной работы с игровыми элементами состоит в измерении или наблюдении значений физических величин с использованием законов физики. Элементы игры повышают интерес учащихся к чтению, одновременно помогая им лучше понять и усвоить материал.*

Ключевые слова: *Симулятор, виртуальный конструктор, моделирование, «Интерактивная физика».*

**USE OF COMPUTER MODELS IN THE ORGANIZATION OF INDEPENDENT
WORK ON PHYSICS IN SPECIALIZED SCHOOLS**

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Abstract: *Once students in a specialized school have developed the ability to work in an Interactive physics simulator, it is a good idea to encourage the student to model a physical process or create a model of a physical problem and do the research independently.*

Keywords: *Simulator, virtual constructor, modeling, "Interactive physics".*

Introduction. The role of simulators in the educational process is unique, in particular, the effectiveness of the educational process is determined by the desire of teachers, students to activate their independent activities. Using the Interactive physics simulator, which we offer, cultivates and develops students' aspirations, curiosity, ingenuity, and uses them in the process of teaching physics in the organization of independent learning activities. Some experiments can only be performed by a student in a laboratory or demonstration room. When using simulators, the student will be able to model physical experiments on their personal computer, perform virtual laboratory work. Through the site <http://my.estudy.uz>, which we have created, students will be able to access the Internet, receive the assignment and send the completed assignment to the students' e-mail. This, in turn, leads to the development of communicative skills among students. Here's how to put one together for use with your interactive physics simulator.

Once students in a specialized school have developed the ability to work in an Interactive

physics simulator, it is advisable to encourage the student to model a physical process or to model a physical problem and conduct research independently. Depending on the nature of the students, the Interactive Physics simulator may be offered in advance or with no equipment at all.

Literature review and methodology. When a student is given this type of task, he or she will need to independently model a physical process, enter the physical quantities involved in the physical process, and select objects and objects. The student is completely independent in obtaining the objects and tools he / she needs or is given a pre-prepared semi-finished object. The student will be able to visualize a physical process and visualize an object needed for modeling, imagining it and creating its appearance on a computer.

This process is an important step in shaping the student's imagination. In particular, the ability to transition from a particular physical phenomenon to its model can be the basis for developing a student's sense of exploration.

It will also be possible to assign the student the task of researching a ready-made model based on his / her cognitive potential. The student independently studies the physical process in the model, draws appropriate conclusions and presents the results to the teacher in the form of a report.

Nowadays, design assignments are very popular in many universities. The project method is a new calculation in world pedagogy. It originated in the United States over the last century. It is also called the problem method [3]. In our opinion, the organization of independent work of students using the method of projects and the simulator «Interactive physics» leads to the effectiveness of the learning process.

Discussion. The design method always allows students to model and conduct research on a physical process over a period of time, or to provide a pre-designed computer model based on individual, pair, or group activities. When using the project method, special attention should be paid to the structure of the project, whether it is a complex or a simple task:

1. Attention should be paid to the distribution of the project topic by the level of knowledge of the students participating in the project.

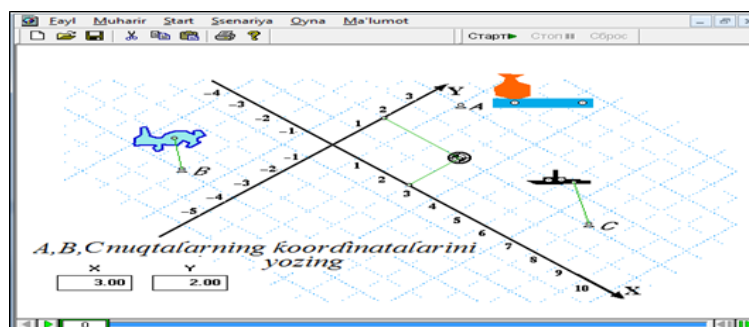
2. The teacher should provide questions, comments, recommendations, video tutorials and other methodological assistance to the students participating in the project.

3. It is advisable for the teacher to report the results on the scheduled days and to encourage the group to discuss them with the participants.

4. It is advisable to keep in touch with project participants through forums, chats or various types of messaging (mailAgentb Skype, QIP), which are elements of communication on the Internet.

Students' independent work can also be organized through laboratory work with game elements. Below is a game model based on the Slanted Coordinate Axis created in Interactive physics (Figure 1).

Keywords: Coordinates, inclined x and y arrows, point coordinates



Objective: To develop students' ability to identify coordinate points.

Student: Determines the coordinates of the target, tries to damage them.

Instructor: Informs students that choosing the right coordinate axis direction and coordinate head will help them solve a specific problem.

Result. The main task of laboratory work with game elements is to measure or observe the values of physical quantities using the laws of physics. However, the computer allows you to turn such measurements into the necessary steps to win the game. Elements of the game increase students' interest in reading, while at the same time helping them to better understand and master the material. The student is given the following tasks: to hit a target, to catch something, to cross a given path in a very short time, and so on. Apparently, this activity has a number of advantages over traditional laboratory work. On the other hand, such work requires extra time and good preparation of students.

The following models are based on the Interactive Physics application environment and cover the mechanics of physics. These models can be used in general physics, secondary special education, as well as in the teaching of physics and mechanics in higher education.

These models begin with keywords for each physical phenomenon under consideration. Then there is the general interface of the model, the general purpose of the work. The role of the student and the teacher in working with the model is also given.

The models listed in the appendix can be selected based on the lesson plan. These models can be used as homework for students to study independently, in clubs, or when working with students who are unsatisfactory.

Conclusion. It can also be used in distance learning virtual labs and design classes. Tables 1 and 2 in the appendix show the models created in the Interactive Physics environment for each subject, based on the calendar-subject plans in physics for schools specializing in physics, respectively. Demonstrations from such models can be given as independent work in lectures, physics problem-solving and laboratory classes, seminars, and design classes.

An experimental analysis of the "interactive physics" simulator for different types of activities to determine the effectiveness of the physics teaching process.

		Save time	Course content delivery	Easy to accept theme	Opportunity to activate the learning process				Improving the level of independent learning		Use in distance learning
					Increase	Increase the	Scientific		Heuristic	Reconstruction	
Lecture training	Using demonstration experiments through models created in IP	+									
	Modeling a physical process										
	Conduct blitz queries using an IP model										
Practical training	Investigate the issue using a pre-created model in IP										
	Investigate the issue using a pre-created model in IP										
	Tracking the case condition in IP										
Laboratory	Problem solving through an simulator on IP										
	Creating virtual lab work on IP										
	Working with simulators										
	Prohibition work										
Computer modeling class	Perform pre-created virtual lab work on IP										
	Microprojects in the IP environment										
	Modeling of physical processes in IP										
	Creating simulators										

- + The use of this method forms the specified quality
- The use of this method does not affect the quality
- ± This method has both positive and negative effects on the process under consideration
- ± + pluses are more than minuses
- ± - minuses outweigh pluses

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