Virtual Laboratory - Information In Education A Specific Factor Of The Communication System In The Form

Z.R. Mamadaliyeva Assistant of the Samarkand State Medical Institute

ABSTRACT

The graduation qualification work is devoted to the introduction, organization and solution of virtual laboratory work in the educational process through special pedagogical software using information and communication technologies and the problems arising in this process and ways of their solution.

Keywords: Laboratory, virtual laboratory, sanitary laboratory, Department of Biological Chemistry, teaching and laboratory equipment in biochemistry, reagents.

Introduction. Different areas of knowledge require different experiments, so the types of laboratories are very different from each other. For example, a physics lab might have a particle accelerator or a vacuum chamber, while a metallurgical lab might have facilities for preparing or refining metals. A psychology lab, for example, may consist of one-way mirrors or cameras to observe subjects. In any case, laboratories are places where professionals have the opportunity to experiment.

Laboratory (lat. Laboratorium, Laboro from "ISHLAYMAN") - chemical, physical, technical, mechanical, physiological, psychological, etc. is a specially adapted and equipped room depending on the field of scientific experiments and research. Laboratories often work in universities, factories, pharmacies and other organizations.

Types of laboratories

a) Sanitary laboratory (analytical or sanitary station) - an institution engaged in the study of food, flavorings and other consumer goods, determining their sanitary quality.

b) Testing laboratory (testing center) - a laboratory accredited for testing products in one of the existing certification systems in accordance with the scope of accreditation.

c) research laboratory - a laboratory in which scientists and researchers conduct experiments and research;

Each laboratory is a place that requires special precautions, and the following most common safety precautions must be observed before working in this laboratory:

- Availability of eye wash facilities in the laboratory;
- some types of laboratory experiments can be potentially dangerous;
- chemical and biological laboratories sometimes work with toxic substances or dangerous bacteria;
- may contain flammable, explosive or radioactive substances;
- can sometimes be affected by high temperature, strong magnetic field or electric current;

In order to reduce the risk of injury and other life-threatening conditions in the laboratory, safety measures are provided when working in the laboratory, and in some cases personal protective equipment is used. An example here is the PCR analysis laboratory, a laboratory for the detection of the Covid-19 virus, which is

becoming increasingly relevant today in a pandemic.

Research laboratory in higher education - a laboratory for experiments and research by scientists and researchers will be attached to a university or research institute. Laboratory rooms are organized by the institute at the level of departments for the full implementation of part of the practical classes (laboratory work) included in the curricula of the students of the institute (university). For example, at the Department of Medicine and Biological Chemistry of the Samarkand State Medical Institute, which I head, all students of 1,2,3 courses of 8 faculties of the institute study 9 subjects. In addition to its theoretical part, each science is reflected in the scientific program of laboratory work from 12 to 36 (for example, in the field of pharmaceutical chemistry) and the work program developed according to it. The department has an educational laboratory "biochemistry", which has a laboratory passport on a standard basis. An educational laboratory "Pharmaceutical Chemistry" is currently being created for students of the Pharmaceutical Institute.

Therefore, the brief information mentioned above is information that describes the actual laboratory.

Analyzing the origins of the theory and practice of informatization of education in Uzbekistan, we can say that the strategy for the development of teacher education should be based on the widespread use of innovative technologies in the educational process and the integrity of the entire system. The formation of such systems is the subject of innovative computer didactics, an example of which is a virtual laboratory that combines a variety of modern educational materials based on innovative approaches and technologies.

So, the virtual laboratory is...?

Virtual - (lat. Virtualis - possible) - an imaginary object or situation that does not exist in reality, but can arise under certain conditions. Under the influence of information technology, the term "virtuality" has acquired a new meaning associated with virtual reality. "Virtuality" in this case is understood as a specific state that loses the distinction between the real and the imaginary (virtual) world. In this sense, "virtuality" is a characteristic of the consciousness and perception of an object. The concept of virtuality is also used in psychology, aesthetics and culture in general.

A. V. According to Truksin, a virtual laboratory is a set of software and hardware tools that allows you to conduct experiments without real equipment used in the laboratory. This means, firstly, a remote laboratory, which includes a real laboratory, hardware and software, as well as communication facilities, and secondly, all processes are simulated using a computer.

Thus, virtual laboratories mean two types of software and hardware:

1) laboratory equipment that allows remote use - such complexes are called remote laboratories.

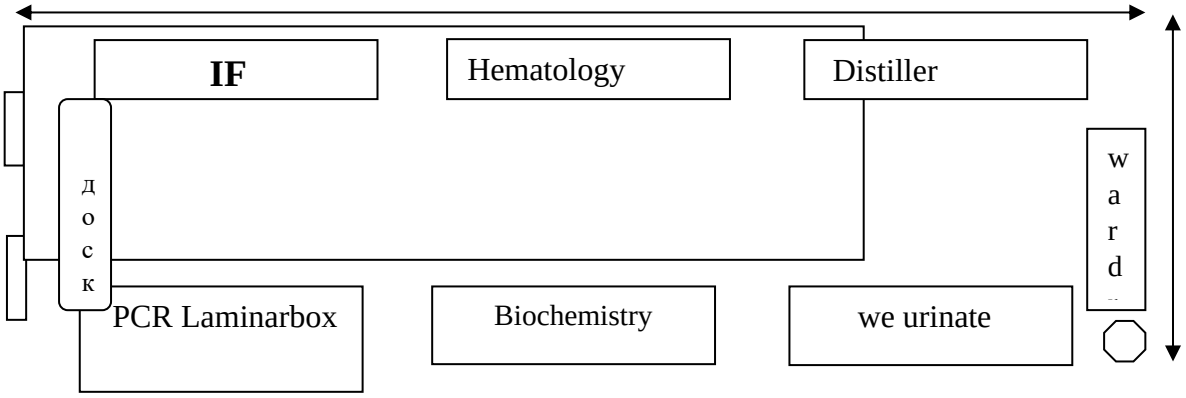
2) software that allows you to simulate (simulate) laboratory experiments - a virtual laboratory (in the narrow sense)

What are the advantages of virtual laboratories over traditional - real laboratories?

The main advantages of virtual laboratories:

a) There is no need to purchase expensive equipment and reagents for a virtual laboratory. Many labs have old equipment that, due to lack of funding, distorts the results of experiments and is a potential source of risk for students. In addition, in areas such as chemistry, for example, in addition to equipment, consumables (reagents) are also required, which are much more expensive. Using the example of our Department of Medicine and Biological Chemistry, we will analyze the following situation:

In the process of compiling the passport of the educational laboratory "Biochemistry", it is planned to provide this laboratory with modern equipment and consumables (reagents)



SamMI Department of Medical Biological Chemistry List of equipment of the educational laboratory "Biochemistry"

№	title	Consumables (reagents)	Function	Photo	approx. price in USD
1	**PCR AMPLIFIER**	One set of reagents for detecting infections costs 200-300 US dollars.	DNA analysis		**35 000**
2	**Urine Analyzer**	**jet set $30-35**	Analysis of urine		**1500**
3	**Hematology analyzer**	Jet set 100-120$	Blood test		**11 000**
4	Biochemistry analyzers	**One inkjet indicator detection kit costs $30-40**	Biochemical analysis		**20 000**
5	ELISA analyzer	**One set of reagents for detecting infection costs 150-200 US dollars.**	Analysis of infectious diseases		**16 000**
TOTAL:		**$ 460-560**			**83 500**

This means that the department needs to purchase equipment in the amount of 83,500 US dollars for the organization of a teaching laboratory, and the operation of this laboratory equipment requires consumables (reagents and reagents) in the amount of 460-560 US dollars per semester.

Obviously, the cost of computers and various computer software is also very high, but the versatility of computing technology and its

wide distribution compensate for this disadvantage.

b) can be implemented in a virtual laboratory by simulating processes that cannot be implemented in a real laboratory. This allows you to visualize the computer screen. Modern computer technologies make it possible to observe processes that are difficult to distinguish in real conditions without the use of additional equipment, for example, due to the small size of the observed particles.

c) it is possible to enter the sensitive area of laboratory processes (observation) in a virtual laboratory and observe events occurring on different time scales (this is relevant for processes lasting several seconds or, conversely, several years).

g) Security. Safety is an important benefit of using virtual labs, for example when working with high currents or chemicals.

d) Since the virtual process is controlled by a computer, a series of experiments can be quickly carried out with different values of input parameters, which is often necessary to determine the dependence of output parameters on input parameters.

e) Save time and resources by entering results electronically. Some works require subsequent processing of sufficiently large arrays of obtained digital data to be performed on a computer after a series of experiments. The disadvantage of a real laboratory is that there is a time-consuming step of entering the results into a computer. In virtual laboratories, this stage is absent, since the results of experiments can be entered automatically during the experimental experiments or automatically. This saves time and significantly reduces the percentage of possible errors.

j) The main and most important advantage is the possibility of using a virtual laboratory for distance learning, in cases where it is not possible to work in university laboratories. This advantage is relevant today in the era of the coronavirus pandemic in online learning for all schoolchildren, high school students, college students and students studying in higher education institutions.

References:

1. Z.R.Mamadalieva, M.E.Nazarova, Sh.Kh.Keldiyorova, S.A.Abdusamiyeva “Biochemical processes in saliva” ISSUE 8/2021 ISSN: 2181-1601 Uzbekistan Pages 21-26.
2. www.scientificprogress.uz
3. M.D. Dzhuraev, Z.R. Mamadalieva, D.Yu. Mamarizaev “Management of patients with pheochromocytoma in the perioperative period” ISSUE 9/2021, ISSN: 2181-1385. Academic Research, Uzbekistan, pp. 838-845.
4. www.ares.uz