



Extended Abstract

Possibilities of using virtual laboratories in teaching computer science subjects

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Introduction

According Caglar (see [2]) the new media oriented technology usage in education converts an information sharing classroom to a global information sharing classroom. In our contribution we would like to analyse some electronic supporting materials in selected learning management systems. We want to apply modern trends and means of using virtual laboratories in Informatics Education according the New Slovak State Educational Program ISCED 3 for secondary schools (see [4]).

Experiments play a key role in teaching technical subjects at the elementary, secondary schools and universities and have the potential to increase student's interest in the study of technical subjects and motivate them in exploring and discovering the natural phenomena and laws around us. The importance of real experiments for informatics as a science as well as for teaching a subject is significant - not only allows for a perfect understanding of measuring characteristics, but also contributes significantly to the development of the personality of civilized man (see [6]).

Teachers of technical subjects should be open to modern technologies and should incorporate them into their teaching subjects. Otherwise there is a risk that the current preparation of students for the challenges of the future will be using the equipment and tools from the past (see [3]).

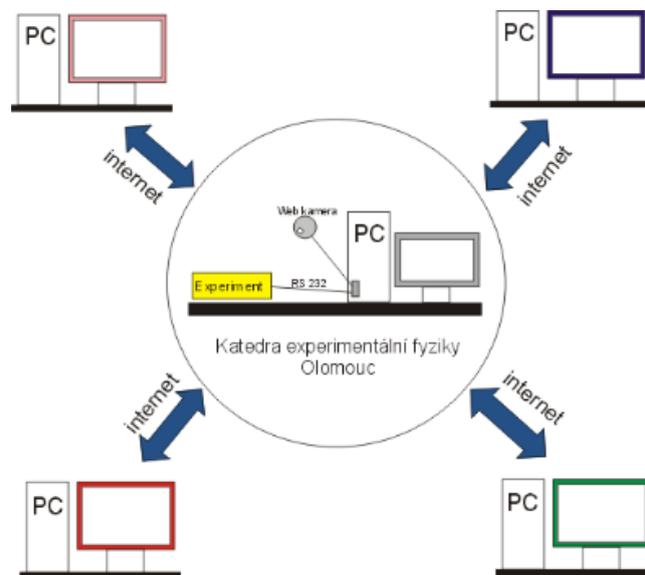
How can we generally define experiment? By what criteria can be physical experiments divided? In the book of Physics Education (see [5]) is regarded as a physical experiment storyline artificially induced, so as to ensure conditions that are important for its progress. In doing so, the point is that these conditions could be at retries maintained the same, or that they can be appropriately varied.

Methods and Results

Systematic education in computer science and use of its tools provide an equal opportunity for a productive and fulfilling life of the Slovak population in the information and knowledge society that we are building. It is necessary to focus on the study of basic universal tools that go beyond current technology. One of the new tools for informatics education are virtual laboratories. We think that virtual labs can increase the clarity of teaching informatics subjects, as reflected by the increased knowledge level of students in quantitatively and also qualitatively point of view. Possible research in this field will be discussed.

There are few experiments created at the Department of Experimental Physics Faculty of Science, Palacky University in Olomouc that were accessible on the website <http://ictphysics.upol.cz/remotelab/>. From this Web site, users can experiment remotely control and acquire (measured) data download to their computers.

Figure 1. Virtual lab (<http://ictphysics.upol.cz/remotelab/>)



This is the scientific method, in which the artificial induces a storyline with predetermined conditions so that it can be under the same conditions repeated. During an ongoing experiment objectively monitor measurements using instruments interdependence of physical quantities under the influence of the smallest number of distractions. Experiment is the means of knowledge and also a specific form of practice. The results generalize to form physical law (usually described mathematical model), while the other attempts to verify accuracy. (see [6])

Virtual laboratory as an educational technology provides an advanced individualized learning perfectly meets the educational needs and provides a high level of flexibility and freedom from constraints of time and place. One of the most important features of virtual reality is the easily and continuous material update aiming to attain learning objectivity and interest (see [1]).

Conclusions

The mission of teaching informatics is to help students to understand the basic concepts, methods and techniques used for data handling and flow of information in computer systems. Builds the informatics culture the students are educated how to effectively use information resources with respect of the legal

and ethical use of information technology and products. We can classify virtual labs in these categories:

1. Classical simulations which contain certain elements of laboratory experiments and are available locally (Simulations).
2. Classical simulations which contain certain elements of laboratory experiments are accessible on the Web (on-line) and are available as JAVA-Applets (or accessible with plug-ins) (Cyber Labs).
3. Simulations which attempt to represent laboratory experiments as closely as possible (Virtual Labs).
4. Simulations of lab experiments using virtual reality techniques (VR Labs).
5. Real experiments which are controlled via network / Internet (Remote Labs).

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References and Notes

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