

# **COMPUTERISED LABORATORY IN SCIENCE AND TECHNOLOGY TEACHING: TEACHER TRAINING**

**Libor Konicek, Erika Mechlova, Antonin Balnar, *University of Ostrava, Ostrava, Czech Republic***

**Abstract:** The physics teacher students are acquainted with computer aided education in gradual courses at university. They work with the educational programmes in physics and they make computer aided experiments in specific two obligatory subjects. There are a few systems for computer aided experiments for secondary schools in the Czech Republic. These are IP-Coach, the Czech system ISES and system CMC-S3 that is developed in programme Leonardo da Vinci in Slovenia. These systems are implemented at secondary schools in teaching learning process of physics in normal classes. Contribution includes possibilities of the using measurement systems in normal classes and demands on skills of teachers and the way of developing of these skills.

## **1. Introduction**

The aims of physics teacher students preparation are determined by aims of pupils in physics. The computer literacy presumption of using computerised laboratory in science and technology teaching is on both sides, teacher and pupils. Pupils of higher secondary classes have computer literacy and teacher of pupils, too.

## **2. Using of computers in secondary schools in physics teaching/learning process**

There are three main using of computer in secondary higher classes:

- the computer laboratory for computer science – not for physics education
- the laboratory of science with computers for the laboratory work in physics
- the computer laboratory for laboratory work in current lessons in current lesson for all pupils working in groups.

### **2.1 Training of physics teacher students in the University of Ostrava**

The special seminar and workshop are especially for this training.

The aims of these seminar and workshop are for physics teacher students: Mastering in

- processing of graphics – raster graphics and vector graphics
- record, cutting and processing of video
- record and processing of sound
- programs for data processing such as Excel
- presentation programme such as Power Point

### **2.2 Physics educational programmes**

Physics teacher students are introduced with very spread educational programmes of physics. There are many programmes in the Czech and the other languages. The programmes in Czech language are better for students and educational process in schools. The useful programmes in the other languages are more oriented on graphical presentations with pictures schemas and videos.

Students work with these programmes and evaluate these programmes. Physics teacher students investigate possibility to use programs at secondary school physics lessons.

### **2.3 Computer aided experiments**

Physics teacher students investigate in workshops

- physical principle of experiments
- optimization of experiments from the point of view educational aids and limiting of measurement system

Physics teacher students investigate and verify conditions for using computer based measurement in

- data acquisition
- data processing
- evaluation of results

The aim of all above mentioned activities is preparation of physics teacher students for physics lessons at secondary schools.

Physics teacher students prepare lessons for secondary school classes in workshop. Lesson planning consists of

- formulation of objectives from the point of view pupils
- motivation of pupils
- planning of pupils activities from the point of view objectives
- organisation of pupils activities
- checking received results as concern objectives

Physics teacher students prepare real physics lecture and this preparation consists of

- description of set up for the work pupils in groups
- list of educational aids for groups
- short theory
- typical results of measurements
- recommendation for optimisation
- setting for different types of measurement systems that conclude
  - timing (time delay)
  - set up of experiment and sensors
  - setting of output channels

### **Conclusions**

Every physics teacher students prepares one physics lesson for secondary school practice at the University of Ostrava. He or she presents this lesson to follow students at the end of semester. Author of lesson have to vindicate the conception of lesson and real results of measurements. The stress is given on different types of using computer in preparation of lesson and how to use computer in physics lessons from the point of view pedagogy. Computer is only one from many didactical aids but very powerful for good understanding of physics subject matter.

Department of Physics of the University of Ostrava investigates using of computer aided education of physics at secondary higher classes. The effectiveness of teaching/learning process is search as concern pupils physics knowledge and competences. The research is supported by Leonardo Da vinci project: Computerised laboratory in science and technology teaching, "ComLab-SciTech" N° SI 143008.

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