

Abstract

The use of information and communication technologies, including computer graphics, in teaching chemistry is one of the frequent issues of contemporary chemistry didactics. Current publications are mainly focused on displaying structure of chemical compounds and symbolic form of chemical reactions. This thesis offers a more complex view on the computer graphics and other means of information and communication technologies – their possibilities and limits of use in teaching. The goal of the thesis is to provide an overview of selected computer-graphics technologies and to discuss their role during current curricular reform, based on current problems identified by students attending chemistry-teacher training courses and chemistry teachers. Usability of selected elements in pre-teaching and teaching phases was checked. Innovations of contemporary teaching methods were proposed using computer graphics. The thesis is focused on the area of visualization of educational content with use of computer graphics, computer-assisted innovation of methods and educational content, computer games and the role of computer graphics in didactic transformation.

Two textbooks for lower-secondary and upper-secondary schools were created. These textbooks contain newly developed parts using computer graphics. According to everlasting expansion of gained information in chemistry, a model of pupil-friendly presentation of these was developed using carbonic acid as a subject of concern. For keeping chemical experiment's role in science at least at current level, a method for optimizing renewed school chemical experiments was developed.

Keywords:

chemistry teaching, computer graphics, animation, textbook, optimization, school chemical experiment, information and communication technology