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Multimedia in Teaching Science

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The important role of multimedia in teaching Science we have proposed already in the 90s of the twentieth century. Regular multimedia textbooks at high school level were already present on the Italian market and publishing house Dorling Kindersley published a thematic encyclopedias to teach Science subjects such as: Earth, Birds, Human Body, Animal Encyclopedia and others. At the time, we use educational software in the classroom with students and pupils come mainly from abroad. In the late 90's of the twentieth century, the first multimedia encyclopedia has been published by Polish publishers and were available on the market. The first interactive exhibition of multimedia educational software was organized by us at Pomeranian Academy in Słupsk as early as in 1997. Later, with the advent of internet, the development of new multimedia declined. Nowadays, most children and students use the Internet every day and has to deal with hyperinflation occurring here information (Karwasz, 2012). There is the problem of how to find the best information among the thousands of pages found by the search engine.

Dr. A. Kamińska has prepared a questionnaire and conducted a study in 2010 on a group of about 150 high school students. The results obtained show that they have worked with the computer an average of four hours per day (outside the classroom), of which in the Internet 3.5 hours. Again, studies were carried out in 2016 on a group of students from the same schools. It turns out that the less time students spend in front of the computer, just 1.7 hours. However, much more time they spend on the Internet - about 7 hours daily. No longer use computers, but smartphones and tablets. To study the use of multimedia, students spend only about 45 minutes. To the question: for what purpose you use your computer, we have got the following answer: games, entertainment (76 %), social media (60 %), learning (32 %), listening to (or download) music (15 %) (Fig. 1). To use the Internet met mainly positive educational function, you should try to properly direct the use of the media. Teachers should on the one hand lead properly thought-out media education, on the other hand indicate a risk of reaching there. New technologies will not be afraid, but use them as a means to achieve the desired goals.

Despite threats to modern technologies give us unlimited possibilities of science education more attractive. Speaking about the usefulness of new technologies in the educational process should be aware that they should meet

certain requirements: be innovative, interactive, intuitive and have the ability to fit the individual needs of the user (Okoniewska & Meger, 2002).

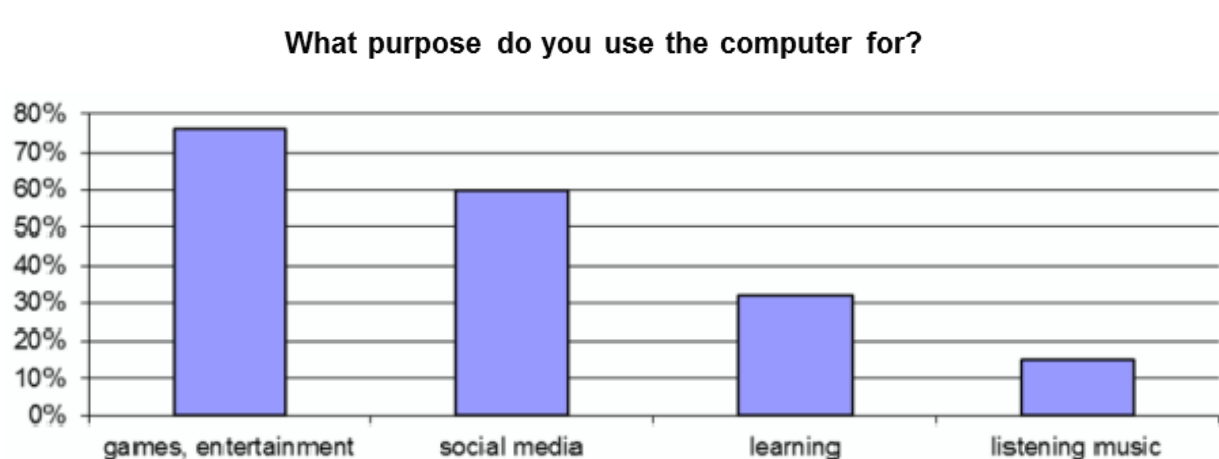


Figure 1. The results of a questionnaire conducted in the school year 2015/16 among middle school students.

Whereas the effective teaching of science with the use of multimedia resources we organized in 2015 new laboratory of Multimedia in Education and Culture at Nicolaus Copernicus University. During the classes we observed a huge interest of students in this form of acquiring knowledge. First of all, students can compare not only different contents, but also various attitudes towards presenting it – in a manner more or less effective, respecting the cognitive teaching methods. The ability to assess the suitability of available multimedia resources and their use in science education is an important competence of future teachers. The main advantage of the multimedia encyclopedia installed on computers in our new laboratory is that they are *closed resource* (CD-Roms on Science, Education and Culture), thus enabling students to concentrate on learning focused on a specific subject and activity allows to go back to try and check again.

In present paper we discuss the variety of available multimedia resources in teaching Science, respecting the division proposed some time ago (Karwasz, 2010): collection of loose files, educational pathways, encyclopedia, multimedia textbooks. collection of loose files, educational pathways, encyclopedia, multimedia textbooks. Among the multimedia, there are resources of communication with users: photos, pictures, diagrams, movies, animation, 3D animation, narratives, music, sounds. An example of a well-prepared and developed multimedia textbooks in teaching of Science is “Mobile chemistry”. Of particular note is available on mobile devices (Bartoszewicz & Gulińska, 2015). To the active and creative teaching physics developed educational pathways “Physics and Toys”, where playing objects become a pretext the interest in Science (Karwasz et al., 2005). The multimedia resource created at Pomeranian Academy in Słupsk in 2003-2005 had on Nicolaus Copernicus University in Toruń site more than 200000 views in six years, and exercised a strong influence on development of interactive Physics in Poland (Fig. 2).

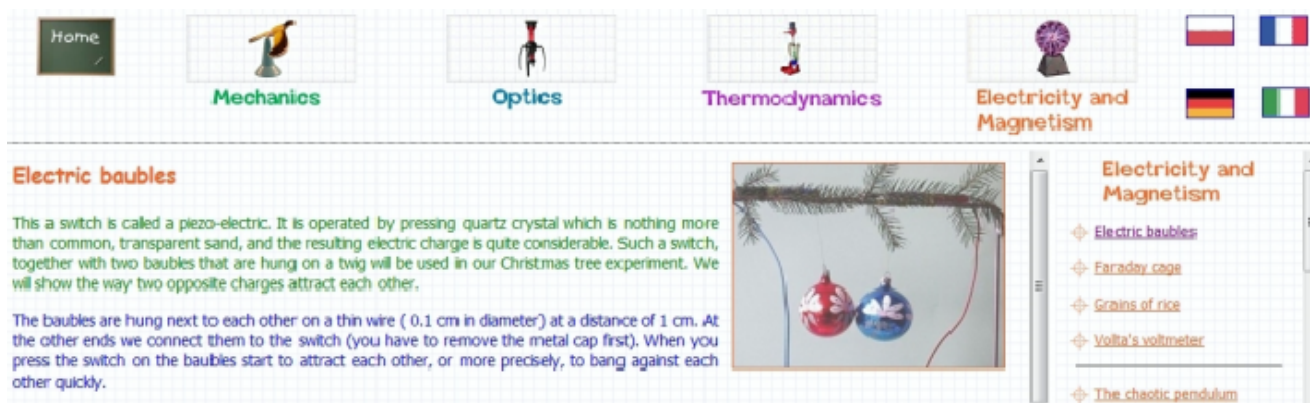


Figure 2. "Physics and Toys" educational pathways. On the screen you can find photos, videos, a brief description of the experiment and the 1.5 bit of new information to the user.

In order to effectively, interdisciplinary and modern science teaching we prepared a website "Physics for Everyone" (<http://dydaktyka.fizyka.umk.pl>) in the Didactics of Physics Division at Nicolaus Copernicus University in Toruń. On our website you can find, for example: video recordings of lectures and lessons, short movies with experiments, animations and simulations of phenomena, interesting photos and diagrams, descriptions of experiments, press review, twitter, educational materials for pupils, students and teachers. Every day we observe from 500 to 1000 hits different users. In summary, we find that the multimedia in teaching Science allow students to: make more attractive learning process, consolidate the knowledge, focus students on knowledge transfer, illustrate the phenomenon hard to imagine and impossible to carry out, increase the effectiveness of teaching Science, stimulate the activity of cognitive and creative.

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