

**Chemistry is All Around Network**  
**Workshop on "Successful Experience and Good Practice in Teaching Chemistry at School"**  
**Bratislava, Slovakia, 26.3.2014**

**Minutes**

Slovak National Workshop took place on 26.3. in Bratislava in headquarter of TRANSFER Slovensko. 12 teachers of chemistry from elementary schools and from high schools participated at this workshop. In comparison with the original group there were three more teachers of chemistry from secondary vocational schools in Nitra and Prešov. The workshop started at 8.30 in the morning and ended at 16.00. Thematically it was divided into two parts:

**1. Discussion dedicated to lectures and publications published on the project's web page.**

All the participants discussed to the first topic, during this discussion they appreciated all the lectures and very good outline of publications dedicated to successful experiences in teaching chemistry. The first interesting lecture was from the Czech Republic which provided review of all successful experiences focused on various competitions, activities, portals, Olympiad etc. All teachers appreciated these information mainly because of the fact that many of these activities is done also at Slovakia. Polish lecture was very innovative in the means of tools for better motivation of students towards chemistry. Spanish contribution about cooperative learning was also interesting. Teachers discussed also about interesting Belgian report about use of ICT technologies during teaching chemistry and about digital school. Slovak publications in which were teachers interested were the ones which explained chemistry in unusual way. They discussed mainly about publications as Chemistry and Cooking, Olives in salmonia and fruit in syrup, 3D visualisation types in multimedia applications in science education and New games in chemistry for attractive chemistry education.

**2. Current problems in teaching chemistry and natural sciences at Slovak primary and secondary schools**

Katarina Javorova from Department of Didactic and in Science presented short output which OECD published few weeks ago results of project PISA – the biggest and the most important international research in the area of measurements of education results, which takes place all over the world. In solving problems Slovak students achieved average result which was 483 points. These results are significantly lower than average results in other OECD countries. Result of Slovak students in mathematical literacy of international study PISA 2012 is under the average of countries which participated in this project. Results similar to Slovak ones reached countries as Norway, Portugal, Italy, Spain, Russian Federation, the United States of America, Lithuania, Sweden and Hungary. From OECD countries only 5 of them reached lower results than Slovak republic – Israel, Greece, Turkey, Chile and Mexico.

Results of Slovak students in natural sciences literacy is under the average of countries of OECD. Results similar to Slovak Republic were reached in Iceland, Dubai (SAE), Israel, Greece and Turkey. Significantly lower results than Slovak republic from OECD countries reached Chile and Mexico.

Results of Slovak students in the fifth cycle of international study PISA are not satisfying. In every studied area, whether it was mathematical, scientific or reading there was a significant decrease in results of Slovak students. It is the first time when results of Slovak students in all three areas are significantly lower than average results of OECD countries. Teachers agreed that the results are alarming and that it is needed to add scientific lessons as well as lessons of mathematics which were lowered in past.

Ministry of Education of Slovak Republic wants to empower teaching of mathematics and scientific subjects, this information appeared in medias on 25.8.2013: According to the proposal of Ministry of Education there should be added lessons of mathematics, biology, physics and chemistry in timetables of students. On the one hand students should spend more time with calculations on the other hand there will be lowered lesson dotation of other subjects. Teachers think that it will be at the expense of foreign languages.

**Increase in science lessons at primary and secondary schools.** Proposal for chemistry: Elementary schools – from 4 lessons to 5, Secondary schools – from 5 lessons to 6. All teachers discuss about this number of lessons and about new curriculum.

Published proposal lacks samples of curriculum for 8-year grammar schools and it is not clear what will be and what won't be in the curriculum for elementary schools.

Nowadays the teaching conditions for teaching of scientific subjects got better, thanks to EU projects the school chemical laboratories were newly furnished, classes have new modern technologies (mainly interactive boards). New teaching principles and methods started to be practised – exploratory method, IBSE research conception, project teaching and digital pH – metres became very popular in teaching chemistry (Vernier, IP COACH etc.).

Big discussion was about decision that teachers could share their experiences with students of teaching in combination with chemistry during three semesters (in years 2012 – 2014) within the project *Incubator of innovative teachers of scientific subjects at elementary and secondary schools* (KEGA Project n. 035UK-4/2012). We realised more than 20 professional lectures connected with seminars and workshops for students of Faculty of Science UK. Students were presented experiences from years of pedagogical practice of innovative teachers of elementary and secondary schools.

Initiators of project plan to continue in realisation of professional psycho-pedagogical lectures, seminars, workshops and prepare new activities. They want to make available new trends in chemistry teaching for students of teaching subjects in combination with chemistry and by this way they want to connect theory with practice.

Teachers could share their experiences with teaching of chemistry at elementary and secondary schools at 1. and 2.national conference organised by civic association - Association of chemistry teachers (ZUCH) in February 2013 and 2014. In this programme were presented previews of innovative approaches and particular chemistry lessons, new textbooks for grammar schools were presented and some serious problems which bother teachers were discussed (insufficient dotation for chemistry lessons, school reform and its impact on education, preparation on chemistry Olympiad and work with talented students, chemistry laboratories and their equipment, support of scientific education and how to make teaching of scientific subjects more attractive and etc.).

Teachers at Slovak schools try to make some changes and know how to teach „good“ but they need also support from school leadership, municipal offices, National Education Office and mainly from Ministry of Education. It is needed to end the reform, make new curriculum and textbooks, to state what has to be taught (in which year) and let teachers (school) to teach in their way.