

# **Chemistry is All Around Network**

## **Workshop on "Students' Motivation"**

### **Bratislava, (Slovakia), 7.9.2012**

## **Minutes**

### **Participants**

Mária Fabiánová - Secondary Vocational School, Janko Jesenský, Krupina

Beáta Brestenská - Faculty of Natural Sciences, Department of Didactic in Science, Comenius University in Bratislava

Viera Lisá – High School of Ladislava Sáru, Bratislava

Eva Smreková - 1. Private High School in Bratislava

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Miroslav Prokša - Faculty of Natural Sciences, Department of Didactic in Science, Comenius University in Bratislava

Jana Škreková - Elementary school, J. C. Hronského, Krupina

Anna Fedešová – High School of A. Sládkovič, Krupina

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### **Minutes**

The workshop was attended by seven teachers and three experts. Participation of the teachers from outside of Bratislava was also managed. They took the time to come and discuss the problems of teaching chemistry in secondary and primary schools in terms of student motivation.

The talk about motivating students to learn chemistry was essentially based on a single basic fundamental starting point: how is the chemistry actually being taught in all types of schools (including universities) and for that matter what, in what way and why should be attractive and interesting about it for the students.

The first topic discussed mostly by the teachers of primary and secondary schools is the system of teaching chemistry at Slovak schools, number of teaching hours, number of students in classes with laboratory practice, equipment of individual schools with the chemical laboratories and ITC technology as well as the latest educational technology. Teachers of secondary schools emphasized that the fundamental problems of secondary school chemistry teaching is the attractiveness of the facilities and especially, as with other subjects, the key factor is the teacher figure. This was evident not only in the teaching but mainly in the number of students who continue to study chemistry at university level taking it as a major or as one of the main subjects. For these students the main motivation is not to get a good grade (which is the motivation of

most natural science students), but to learn more. Chemistry is essentially a very attractive subject even though most teachers are not able to motivate students for its study. Where there are such teachers e.g. Prof. Lisá of the High School of L. Sáru or Prof. Smreková from the 1. Private High School in Bratislava, the number of students who go on to study chemistry is high. The motivating factor is not so much linked to a graduate's good position in the labor market of applied chemistry or related fields but more to the personality of the teacher. Prof. Lisá of the High School of L. Sáru had 37 students graduating from chemistry in 2012. They all continued studying chemistry on different types of colleges. Similar figures were presented also by Prof. Smreková.

Since the main theme of the workshop was the use of the ITC technology for teaching chemistry, teachers better understood that in the present times when computers are ordinarily used by the students, teaching chemistry this way is a necessity. Specific examples in the discussion were reported by the teachers from high schools, especially Prof. Lisá who is one of the authors of model textbooks for chemistry teachers. Along with other workshop participants from different high schools including Prof. Smreková, Fedešová and Fabiánová, they clearly agreed that chemistry must be definitely be taught principally on examples from life, and then practical examples (within the limits of each school). ITC technology is a tool that can make the teaching more attractive and better motivate students but should not be a mean standing by itself. In addition, practical activities and experiments are crucial for chemistry, therefore laboratories and school facilities are the key. ITC can help a lot and can simulate a lot of but direct practical experiments cannot be replaced by anything. Participants noted there are several problems with the laboratory experiments. The list starts with a ban of the European Union to use direct gas which has not been a problem previously. The second issue is the facilities. Paradoxically older schools built under socialism are now better equipped than the new schools (if some were built in the last 20 years). In the last 10 years the experiment costs rose dramatically. Schools often do not have money to cover these costs so they improvise. All participants stated that the key issue is the large number of students in the laboratory classes without the option to better motivate and work individually with those students who have an interest in chemistry. This is thereafter replaced by individual consultations.

Another topic of the workshop was the differences of the school facilities in different Slovak regions. Schools in Bratislava as the capital city are doing the best. The workshop was also attended by the teachers from Krupina, a typical medium-small Slovak town in a provincial region of central Slovakia with three types of schools (High School, Vocational School and Elementary School). It provided great confrontation in terms of facilities, approaches to teaching, student levels and their motivation for natural science disciplines. Teachers of Krupina stated that the first difference is the level of students who do not have foundation and systematic learning habits from home. This results in much greater demand on the teacher, a different approach and different ways of motivating students to learn. More emphasis is placed on practical illustration and practical mastering of the topic. Schools are not so well equipped and have to look for other solutions. Even though the situation has greatly improved by the teachers' involvement in the National Project of the Ministry of Education EFTA, in which were created entirely new textbooks and teaching aids for teachers of chemistry with an ongoing training and exchange of experience through the project web site. The project includes more than 3000 teachers.

Another topic was the current training of the future chemistry teachers at the Faculty of Natural Science. A relatively big part of this faculty is the Department of Didactic Science. Our workshop was attended by two people from this department, Prof. Prokša and Associate Prof. Brestenská who lecture didactics of chemistry at the faculty. Both of them deal in a long-term with the problem of didactics of science and motivating of the students through the use of ITC. Associate Prof. Brestenská is involved in several European projects, as well as the above-mentioned national teacher training project. According to her, the biggest problem in motivating

the students includes a complex of several factors:

- School laboratory facilities
- Experience and didactic training of the teacher
- New textbooks
- Private motivation of the student

Prof. Prokša said that the generation of teachers studying didactics at the universities has learned the traditional didactic approach to the students (tasks, assignments, grades and penalties, explanation of the topic) and until the end of the 90s did not have classes such as communication and social skills. These are nowadays considered essential for new approaches of managing group dynamics in the classroom as well as individual approach to each student. Today, these approaches allow motivating students in a more effective way as well as resolving conflicts and problems in the classroom.

At the end of the workshop project manager Juraj Dúbrava thanked to all involved for a very stimulating discussion and mentioned looking forward to further cooperation within the project.