

## Swedish annual report for Committee on Chemistry Education 2012

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Abstract: 300 words maximum

There are many activities done from the Swedish Chemical Society, schools, universities and industry to promote the interest in and knowledge of chemistry. They attract many young persons. The International Year of Chemistry was a success, and efforts are made to make every year a Chemistry Year.

Some of the challenges are the lack of enough educated chemistry teachers in secondary school, outsourcing of less advanced chemistry jobs and the closure of one of the important industrial research facilities. These challenges call for rethinking of the university education.

### 1. National educational policy

Describe any changes/ developments in national educational policies concerning chemistry that have taken place in primary, secondary and tertiary education.

New curricula are formulated for primary and secondary education, including new diploma goals. New grades are introduced. In secondary education the programme structures are modified. In chemistry there are no dramatic changes concerning learning outcomes or content.

A teacher certification will be introduced in Sweden, needed for a permanent employment as a teacher in primary or secondary school. Among the prerequisites for chemistry teachers is of course adequate chemistry qualification.

There is a lack of enough educated chemistry teachers, and too few new chemistry teachers graduate to fill the vacancies. Therefore specially designed university courses in chemistry are offered to teachers with a teacher degree, but without enough chemistry competence.

The Swedish National Agency for Higher Education has begun evaluating subject areas (main fields of study) and study programmes in a new and uncommon way, in accordance with the change proposed by the Government. Focus is shifted from process to results. It means that programmes are evaluated in terms of how well they achieve the requirements laid down in the Higher Education Act and the ordinances linked to the act. In other words, the National Agency determines to what extent students' achieved learning outcomes correspond to intended learning outcomes. The evaluation system attaches great weight to the appraisal of the students' independent projects (degree projects). The higher education institutions' self-evaluations, alumni questionnaires and the students' own experiences of their programmes are also taken into account. The National Agency's evaluations are undertaken by external assessment panels in which subject experts, students and practitioners are represented. Universities and higher education institutions that have study programmes of high quality will be rewarded through increased appropriations. (For more information see

<http://www.hsv.se/qualityassurance/subjectareasandstudyprogrammes.4.28afa2dc11bdcdc557480001508.html> ) There is a debate considering the evaluation system going on, and it has been criticised by ENQA, e. g. not to be enough focussed on development.

Chemistry bachelor and master as well as Chemical engineering will be evaluated during autumn 2012 and results presented 2013.

## 2. Events in chemical education

Describe major events conferences that took place concerning chemistry education in your country

Since 1956, the Swedish Chemical Society organise Berzeliusdagarna (Berzelius Days) a yearly event for students in upper secondary schools. This year over 350 students were selected for their interest in chemistry. They were enabled by grants to participate in two days, February 3-4, filled with lectures from chemistry researchers. The intention is to stimulate interest in chemistry by letting interested young people meet chemists and each other, and through current knowledge of research in chemistry. An aim of Berzelius days is to inspire students to study chemistry or other natural sciences, why Universities are participating to inform potential new students.

<http://www.berzeliusdagarna.se/>

Sweden participates in the European Union Science Olympiad and in the Chemistry Olympiad. Competitions are organised to select the participants – and to stimulate interest in natural science. Training camps are organised to help the participants.

<http://www.euso.se/> and <http://www.chemsoc.se/kemiolympiaden.aspx>

To stimulate school teachers, a teacher training conference is organised. This year the themes are Inspiration and Hope for the future.

<http://www.chemsoc.se/fortbildningsdagar.aspx>

A science school for students in upper secondary school interested in chemistry is organised in the hometown of Alfred Nobel. <http://www.forskarskolan.nu/>

SPUCK is a conference for university teachers in chemistry. Swedish researchers in chemistry education and university teachers share their knowledge. An international keynote speaker is Professor Ilka Parchmann talking about "Competencies in Chemistry – A Critical Reflection".

[http://www.trippus.se/eventus/eventus\\_cat.asp?EventusCat\\_ID=25455&Lang=swe&c=515857543444656350764D724735636E422F6B354D57366D596430357466316D](http://www.trippus.se/eventus/eventus_cat.asp?EventusCat_ID=25455&Lang=swe&c=515857543444656350764D724735636E422F6B354D57366D596430357466316D)

## 3. Activities of the national adhering organizations of IUPAC, usually the chemical society.

The Swedish Chemical Society arrange many events each year, many of them linked to chemical education, but also to different branches of chemistry and their sections.

<http://www.chemsoc.se/kalendarium.aspx>

During the International Year of Chemistry twelve monthly themes were selected to display chemistry in our daily life, from art and clothing to food and medicine.

Throughout Sweden, from north to south, universities, colleges, businesses, organizations and science centres organized activities that demonstrated the importance of chemistry.

Teachers and students have received new teaching materials, videos and training. The public has been invited to chemistry activities, lectures and open houses.

Some of activities and the focus areas are described in the brochure found at:  
[http://www.chemsoc.se/admin/UploadFile.aspx?path=/UserUploadFiles/KEMINS\\_AR/KeminsAr\\_Broschyr\\_Overview\\_eng.pdf](http://www.chemsoc.se/admin/UploadFile.aspx?path=/UserUploadFiles/KEMINS_AR/KeminsAr_Broschyr_Overview_eng.pdf)

4. publications about chemical education in your country, including websites/ books magazines

Important websites are:

<http://www.krc.su.se/> and <http://school.chem.umu.se/Compiled/> both with information on chemistry, ideas for laboratory practice, possibility to discuss and ask questions, materials to be downloaded, films to show and discuss in primary and secondary school, teacher training courses etc.

5. activities relating chemical industry and education

Many of the activities organised for educational purposes are done in cooperation with chemical industry. Many projects on universities are made to link industry and education.

A challenge is the closure of one of AstraZenecas large research facilities in Sweden. Outsourcing of less advanced jobs is also problematic. That calls for a more elaborated cooperation between industry and higher education, since some of the learning that earlier was done during the first jobs, now has to done during the studies.

6. international activites that were visited

7. other events or activities

8. Brief resume or CV of the national representative.