



DIVISION OF CHEMICAL EDUCATION
CZECH CHEMICAL SOCIETY



Chemical Society Annual Report to the EuChemS Division of Chemical Education for 2018-2019¹

1. Abstract

In 2018/19, Division of Chemical Education of the Czech Chemical Society participated in chemical education activities in the Czech Republic and abroad.

The main activities were the organization of three conferences and one seminary; participation of our members in several conferences abroad; cooperation with universities, secondary schools and primary schools; participation in the realization of chemistry teachers' courses and Chemistry Olympiad in the Czech Republic.

2. National educational policy

Primary and secondary education

The framework of educational programme of science education on primary and secondary schools (Biology, Chemistry, Physics, Geography) came to schools in 2007 as a national curriculum called Framework Educational Programme (FEP, for different types of level of education). Each school prepared its own School educational programme according to national curriculum (FEP) in the academic years 2007/08-2011/12. Today, all primary and secondary schools in Czech Republic prepare students using the school programme based on the framework educational programmes. The problem is that these curricular documents are very general and don't bring necessary change in the majority of schools. Although the programmes continued to be gradually adjusted, in 2018 was decided that FEP need general revision to fulfil more than minority needs. From 2018 theoretical studies are being worked out to support research-based revisions on national curriculum. Regarding the chemistry education, based on the results of national and European projects, there was some effort to include and use active educational methods in chemistry education – problem education, project education, and especially ISBE. As chemistry is within FEP a part of educational area “Man and Nature” there is a possibility to include the subject in all 4 years of lower secondary education beside physics, biology and geography (grades 6th-9th). Traditionally, chemistry is taught as a separate subject mostly last two years of nine-year elementary school (grades 8th and 9th).

Tertiary education

Two-degree study programmes, i.e. split into bachelor (3 years) and master (2 years) degrees, for education of chemistry pre-service teachers in the Czech Republic is now in its 15th year. A PhD study

¹ July 2018-June 2019, all levels of chemistry education: primary, secondary schools, universities, LLL, general and vocational education.

programme (4 years) is designed to develop concept issues related to education in respective subjects in accordance with current European trends. In the school year 2018/19, 42 students continued their studies: 34 students at Charles University in Prague – Faculty of Science and 8 students at University of Hradec Králové – Faculty of Science.

All the study programmes are currently accredited by an independent Accreditation Committee. The Committee ended its activities on 30th June 2016; its place was taken by a newly created Accreditation Bureau. This bureau has already published recommendations for new ways to acquire accreditation on B.A., M.A. and PhD studies; it's already clear that this process is going to be many times more administratively complicated than before, without any increase in study quality.

At Charles University is now in internal accreditation process Ph.D. study programme “Didactics of Chemistry” in cooperation of Faculty of Science and Faculty of Education.

3. Events in chemical education

14th International Seminary for PhD students

Organized by the Faculty of Education, Charles University from 9th to 10th November 2018 (26 participants from Czech Republic, Slovakia and Poland).

70th Conference of Chemical Societies - Chemical Education and History Section

Organized by Association of Chemical Societies in Zlín (Czech Republic) from the 9th to 12th September 2018 (14 participants from chemistry education division from the Czech Republic and Slovakia).

7th Market of Ideas of Chemistry Teachers – national teachers' conference

Organized by the Secondary Medical School in Hradec Králové from 5th to 6th October 2018 (52 teachers, including 20 active speakers from the Czech Republic).

16th Project-Based Education and Other Activating Strategies in Science Education

Organized by the Faculty of Education Charles University in Prague from 9th to 10th November 2018 (56 participants from Czech Republic, Slovakia and Poland and four other European countries).

DidSci Plus – International Conference on Research in Didactics of the Sciences

Organized by the Pedagogical Faculty of University in Trnava from 25th to 27th June 2019 (100 participants from Czech Republic, Slovakia, Poland and Russia).

4. Activities of the National Chemical Society

The committee of Division has 11 members, chair is Prof. Hana Ctrnactova, vicechair is Prof. Martin Bilek and secretary is Dr. Vladimír Sirotek. The activity of Division was appreciated by Czech Chemical Society very good. The members of Division worked in all mentioned above activities, it means new programme and new assessment of secondary school pupils, new programmes and credit system and PhD studies in tertiary education, organization of events in chemical education for in-service teachers and secondary school students, etc.

5. Publications - examples

Bílek, M. Intercultural learning: Challenges for current science education. *Journal of Baltic Science Education*, 17(4),532-534.

Čtrnáctová, H. & Čížková Věra. The Conception of Teacher Education in the Czech Republic and its Changes in 20th and 21st Century. EDULEARN18 Proceedings, 2018, pp. 6550-6557.

Čtrnáctová, H., Šmejkal, P., Teplá, M. & Stratilová Urválková, E. Focusing and Creating of IBSE Chemical Activities. *Science Teaching in the XXI Century*, 2018, pp 7-21.

Chlebounová, I. Air Subject as a Part of the Whole-school Project High School Students. *New Perspectives in Science Education*, 2018, pp. 313-317.

Matúš, I., Šulcová, R. & Teplá Milada. Students' Ability to Apply Mathematical Skills in Chemical Tasks. In Rusek, M., Vojří, K. (Eds.): *Project-based Education in Science Education: Empirical Texts XV.*, Prague: Faculty of Education Charles University, 2018, pp. 101-109.

Šmejkal, P., Skoršepa, M. & Stratilová Urválková, E. Evaluation and Comparison of Newly Designed IBSE Oriented MBL Activities and of Work with MBL Systems by Slovak and Czech Teachers (a Comparative Study). *Science Teaching in the XXI Century*, 2018, pp. 51-71.

6. Liaison with the chemical industry

In the school year 2018/2019, we continued our cooperation with companies oriented to scholastic products. This included resellers of products of AV-media, Pasco, Profimedia, Smart Technologies, Vernier etc. There is also a collaboration with Czech producing companies in Plzeň (beer production) and in Prague (Veolia Water, Veolia Environment - PVK, Museum of water treatment, SÚRAO – State institution for treatment of radioactive waste repository, National technical museum and iQLANDIA Liberec – knowledge support, discussions, IBSE resources and concepts).

7. International and European initiatives

In 2018/19, the members of the Division of Chemical Education in the Czech Chemical Society (team of Faculty of Science University of Hradec Kralove leded by prof. M. Bilek) participated in solving the project Erasmus Plus: IncluSME (Intercultural Education in Science and Mathematics) <https://inclusme-project.eu/>.

Members of the Division of Chemical Education in the Czech Chemical Society are actively participating as members of the scientific committee of DidSci conference (Trnava – June 2019), 018) and EDULEARN (Palma de Mallorca – July 2019). Prof. Ctrnactova participated in International conference New Perspectives in Science Education (March 2019, Florence).

Other events and activities

A national event organized for the seventh time is the Market of Ideas of Chemistry Teachers. This conference is attended by teachers who themselves show the results of their work to their co-workers – new teaching methods, processing of new subject matter, new uses of ICT in the lessons, interesting experiments, etc., things that went well for them and so they can recommend them to their colleagues. One part of the conference is always an excursion to some interesting chemical company.

The number of the participants in the conference shows that the teachers are interested in improving their teaching and that event like this are meaningful.

Another important activity is the yearly seminar of the students of the PhD programme in chemistry education; this year, it was the 14th one. The students have the interest in this seminary, as it allows them to get acknowledged with problems solved by other students, and at the same time, to get them acquainted with their own problems and hear the suggestions and notes of other students, and especially of the university educators. This helps a lot in the further focusing of the students' research work.

Until 2023 the revision of Framework Educational Programme, a national curriculum, shall be done. Each subject committee is working on revising its subject. Regarding the chemistry, it is a part of educational area Man and Nature (at lower and higher secondary education level). The theoretical studies are being worked out to support needed changes. Researchers from chemistry education take part in this activity and a special issue of journal *Scientia in Education* is being prepared – this issue will contain studies on each subject, mostly a comparative analysis.

8. Name of delegate and deputy

Prof. Hana Čtrnáctová, Ph.D. and Eva Stratilová Urválková, Ph.D.

9. Contact details of delegates.

Department of Teaching and Didactics of Chemistry, Faculty of Science – Charles University,
Albertov 6, Prague 2, Czech Republic

e-mail: hana.ctrnactova@natur.cuni.cz, urvalkov@natur.cuni.cz