



Chemical Society Annual Report to the EuCheMS Division of Chemical Education for 2015-2016¹

1. Abstract

In 2015/16, 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 two conferences and one seminary; participation of our members in six conferences abroad; cooperation with universities, secondary schools and primary schools; participation in the realization of chemistry teachers' courses and the Chemistry Olympiad in the Czech Republic.

2. National educational policy

Primary and secondary education

The new framework of the educational programme of science education at primary and secondary schools (Biology, Chemistry, Physics, Geography) came to schools. School educational programmes were prepared in the school years 2007/08-2011/12, so almost all primary and secondary schools in Czech Republic now teach according to the new framework educational programmes. The problem is that these curricular documents are very general and don't bring the necessary change in the majority of schools. In 2015/2016, these programmes were gradually adjusted, and, based on the results of national and European projects, there was some effort to include and use the active educational methods in the chemistry education – problem education, project education, and especially ISBE.

The project on assessment of upper-secondary school students: National Graduation Examination finished for Chemistry and other Science subjects in 2013. National Graduation Examination currently only includes the following subjects: Czech language and foreign language or mathematics. A new project is the national exams at the end of lower secondary education, which, however, should once again only consist of solely Czech language and Mathematics.

Tertiary education

Two-degree study programmes, i.e. study programmes split into bachelor (3 years) and master (2 years), for education of chemistry pre-service teachers are now in their 12th year in Czech Republic. All the study programmes were, at this time, accredited by an independent Accreditation Committee.

The Committee has ended its activities on 30th June 2016; its place will be taken by a newly created Accreditation Bureau which is currently being prepared.

We can say that the two-degree study for pre-service teachers has its advantages, for example the Bc. title acquired after three years of studying, or greater options for the Master study programme choices; however, it also brings significant problems. The bachelor programme mostly teaches just the chemical disciplines while the master programme teaches pedagogy, psychology and didactics of chemistry so the continuity of these two degrees of study is problematic.

A PhD study programme (4 years) is designed to develop concept issues related to the education in respective subjects in accordance with current European trends. 54 students continued in their study in school years 2015/16 – 46 students at Charles University in Prague, Faculty of Science, and 6 students at University of Hradec Králové, Faculty of Science.

3. Events in chemical education

67th Conference of Chemical Societies - Chemical Education and History Section

Organized by Association of Chemical Societies in the High Tatra Mountains (Slovak Republic) from the 7th to 11th of September 2015 (18 participants from the Czech Republic and Slovakia).

4th Market of Ideas of Chemistry Teachers – national conference

Organized by the industrial upper-secondary chemistry school in Pardubice from 2nd to 4th of October 2015 (62 teachers, including 22 active speakers from the Czech Republic).

13th International Student Conference: Project-based Education in Science Education

Organized by the Pedagogical Faculty, Charles University in Prague from 29th to 30th of October 2015 (35 participants from Czech Republic, Slovakia and Poland and four other European countries).

11th International Seminary for PhD students

Organized by the Faculty of Science, Charles University in Prague from 16th to 17th of November 2015 (56 participants from Czech Republic, Slovakia and Poland).

4. Activities of the National Chemical Society

The committee of the Division has 11 members, chair is Prof. Hana Čtrnáctová, vicechair is Prof. Martin Bílek and secretary is Dr. Vladimír Sirotek. The activity of the Division was very well-appreciated by the Czech Chemical Society. The members of the Division worked in all abovementioned activities, which means: a new programme and new assessment of primary 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

ČTRNÁCTOVÁ, H., ČTRNÁCTOVÁ, L., ŠMEJKAL, P.: IBSE in Chemistry Education – Testing Students' Skills and Teacher Training. (Editors: Jan Lundell, Maija Aksela, Sakari Tolppanen). *LUMAT*, vol. 3, No. 4, 2015, 556-567 p. ISSN 2323-7112

ČTRNÁCTOVÁ, H., TEPLÁ, M., ČTRNÁCTOVÁ, L.: Teaching with Mysteries Incorporated in the Czech Republic. *Chemistry in Action!*, No. 107, 2016, p. 13-17. ISSN 0332-2637

ČTRNÁCTOVÁ, H., MOKREJŠOVÁ, O.: Experimental and Practical Teaching in Contemporary Schools. Editors: K. E. Egorova, O. M. Krivošapkina, M. P. Andreeva, R. P. Sofronov, A. V. Jakovleva. In: Science Education in the Conditions of Transition to New State Educational Standards. North-Eastern Federal University, Yakutsk 2016, p. 147-153. ISBN 978-5-7513-2236-6

IVAN, M., ŠULCOVÁ, R. (ed.) 11. *Mezinárodní seminář student doktorského studia oboru Didaktika chemie (11th International Seminary for PhD students of Didactics of Chemistry). (Proceedings)*. P3K s.r.o., Prague 2016. 144 p. ISBN 978-80-87343-59-3

RUSEK, M. (ed.) *Projektové vyučování v přírodovědných předmětech (Project-based Education in Science Education)*. Proceedings of the 13th International student conference. Charles University, Prague 2015, 40 p. ISBN 978-80-7290-842-4

NODZYŃSKA, M., KOPEK-PUTAŁA, W. (ed.) *Co w dydaktykach nauk przyrodniczych ocalić od zapomnienia? (What to Save from Oblivion in Science Education?) (monograph)*. Pedagogical University, Kraków 2015, 276 p. ISBN 978-83-7271-967-6

6. Liaison with the chemical industry

In the school year 2015/2016, our cooperation with the companies oriented to scholastic products continued. This included resellers of products of Vernier, Pasco, Promethean, Smart Technologies, AV-media, Profimedia, Edufor – suppliers of sensors and accessories, educational tools etc., to some extent development and modifications of units. There is also a collaboration with Czech producing companies in Planá (plastics processing) and in Pardubice (chemical materials production) – knowledge support, helpful in development and modifications of units, discussions, excursions; Veolia Water, Veolia Environment (PVK, Museum of water treatment) – development and modifications of units; SÚRAO – State institution for treatment of radioactive waste repository – excursions, knowledge support, discussions; National technical museum and iQLANDIA Liberec – knowledge support, discussions, IBSE resources and concepts.

7. International and European initiatives

In 2015/16, the members of the Division of Chemical Education in the Czech Chemical Society participated in solving the European projects MASCIL and TEMI.

They were actively participating as members of the scientific committee of ECTN (Gdansk – Poland, April 2016), ScienEdu conference (Bratislava – Slovak Republic, June 2016) and DidSci conference (Krakow – Poland, June 2016).

8. Other events and activities

Based on the results of the research about teaching of the didactics of chemistry from 2014 achieved in the individual subject didactics, including this questionnaire survey, a comprehensive monography about the development, current state and perspectives of the subject didactics in the Czech Republic was written. Hana Čtrnáctová and Martin Bílek are the authors of the chapter "The Didactics of Chemistry – Development, Current State and Perspectives".

Hana Čtrnáctová has used the results of her longtime work in the area of teacher preparation and inquiry-based education as a co-author of selected chapters of the publication *A Guidebook of Good Practice for the Pre-Service Training of Chemistry Teachers* (Editors: Iwona Maciejowska & Bill Byers). Jagiellonian University in Krakow (Drukarnia Scriptor), Krakow 2015, 280 p. ISBN 978-83-943754-0-9

One important event that has been already organized for the fourth 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 increasing number of the participants in the conference shows, that the teachers are interested in improving their teaching and that an event like this is meaningful.

Another important activity is the yearly seminar of the students of the PhD programme in chemistry education; this year, it was the 11th one. The students have a great interest in this seminary, as it allows them to get acknowledged with the problems solved by other students, and at the same time, to get them acquainted with one's 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.

9. Name of the delegate and deputy

Prof. Hana Čtrnáctová, Ph.D.

10. Contact details of delegates.

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