



Slovensko kemijsko društvo
Slovenian Chemical Society

Hajdrihova 19

p.p. 660

SI-1001 Ljubljana

Tel: +386 1 4760 252

Fax: +386 1 4760 300

E-mail: chem.soc@ki.si

WEB: <http://www.chem-soc.si>



Chemical Society Annual Report to the EuCheMS Division of Chemical Education for 2020-2021¹

1. Abstract

There were no official changes in national educational policy in Slovenia in the last year except the project that is currently going on can suggest some guidelines for future changes. But discussions for changing lower and upper secondary school chemistry national curriculums are starting. Centre KemikUm carried out experimental activities for primary, secondary and university students before COVID-19 lock down in March 2020, afterwards the some of the activities were carried out through on-line presentations. As in previous years, a Commission for Chemical Education of Slovenian Chemical Society cooperated with ZOTKS, an organisation that organises chemical competitions for primary and secondary school students. Some papers about chemical education research were published in Acta Chimica Slovenica. Division of Chemical Education in the Slovenian Chemical Society has organised the 9th Eurovariety Conference in July 2021 in Ljubljana.

2. National educational policy

¹ July 2020-July 2021, all levels of chemistry education: primary, secondary schools, universities, LLL, general and vocational education.

There were no changes in national educational policy in Slovenia in the last year regarding chemistry education. A project (<https://www.zrss.si/objava/projekt-na-ma-poti>) supported by the European Structural and investment funds (https://www.eu-skladi.si/?set_language=en) Slovenian Ministry of Education, Science and Sport (<http://www.mizs.gov.si/en/>) led by National Education Institute Slovenia (<https://www.zrss.si/en/>) in cooperation with three major Universities in Slovenia (University of Ljubljana (<https://www.uni-lj.si/eng/>), University of Maribor (<https://www.um.si/en/Pages/default.aspx>) and University of Primorska (<https://www.upr.si/en>) who educate science teachers for primary and secondary school try to implement scientific literacy development activities into the curriculums from kindergarten to upper secondary school is still running.

However, also a national group for reforming national chemistry curriculums for lower and upper secondary school is formed and a few online zoom meetings were held. According to the analysis of national curriculums the reform will be done in the next few years. The exact plan is still unknown.

Because of the COVID-19 situation most of the students (except last years of lower and upper secondary school) did most of the school year by distant learning, but at the end of the school year they went back to the school and finish it in June 2021 mostly in schools. In September 2021 the new school year will start in schools at all levels following the special protocols of testing and vaccinating against COVID-19.

3. Events in chemical education

In the period from June 2020 to June 2021 Centre KemikUm didn't organise experimental workshops in the laboratory for primary and secondary students due to the COVID-19 situation in the country. Schools were closed and students did not visit any institutions. However, in order to maintain the collaboration with primary and secondary schools, some of the activities were successfully carried out through on-line presentations. In May 2021, Centre KemikUm became the official supporter of the national programme Science on Stage. As a part of these activities, in July 2021, three Slovenian teachers, were selected to present their work on the 12th European Science on Stage festival, which will take place from 24-27 March 2022 in Prague, Czech Republic. In September 2021, Centre KemikUm proposed three projects for possible inclusion in the programme of European Researchers' Night in years 2022 and 2023, which involve presentations and experimental workshops for primary and secondary students in various parts of Slovenia.

4. Activities of the National Chemical Society

Even if COVID-19 caused online teaching and learning for lower and upper secondary schools for the most of the school year, the Commission for Chemical Education of Slovenian Chemical Society with ZOTKS organised chemical competitions for primary and secondary school students in March, April and May 2021, when students returned into schools. This competition was organised in cooperation with Faculty of Chemistry and Chemical Technology (University of Ljubljana) they also prepare secondary school students for Chemical Olympiad.

5. Publications

Slovenia Chemical Society publishes SCI journal Acta Chimica Slovenica ACS (<http://chem-soc.si/acta-chimica-slovenica>) – four issues per year. There is also a section Chemical Education Research in the journal and from the last report only one paper was published:

(1) **Students' Achievements in Solving Authentic Tasks with 3D Dynamic Sub-Microscopic Animations About Specific States of Water and their Transition** by Miha Slapničar, Valerija Tompa, Saša A. Glažar, Iztok Devetak and Jerneja Pavlin (Acta Chim. Slov. 2020, 67(3), 904-915) presents the differences in the justification of the selection of 3D dynamic submicroscopic-representation (SMR) of the solid and liquid states of water, as well as the freezing of water presented in selected authentic tasks. According to students' achievements in solving these tasks at different levels of education, their explanations were identified. To explain in greater detail how students attempted to solve the authentic tasks, an eye-tracking method was used to identify the differences in the total fixation durations on specific areas of interest at the specific SMRs between successful and un-successful students in three age groups. A total of 79 students participated in this research. The data were collected with a structured interview conducted with students when solving three authentic tasks displayed on the computer screen. The tasks comprise text (as problem and questions), macro-images (photos of the phenomena) and SMRs of the phenomena. The eye-tracker was also used to measure the students' gaze fixations at the particular area of interest. The results show that successful students' justifications for a correct SMR include macroscopic and sub-microscopic representations of the chosen concepts. Along different stages of education, the selection success increases and sufficient justifications comprise the sub-microscopic level. It could be concluded that there are mostly no significant differences between successful and unsuccessful students within the same age group in the total fixation duration at the correct SMR. Further studies are needed to investigate the information-processing strategies between high and low achievers in solving various authentic tasks comprising SMRs and those that integrate all three levels of the representation of chemical concepts.

However, we have to mention also a paper by Devetak Iztok and Vesna Ferk Savec, even if it was not published in the ACS who wrote a paper entitled **"Chemical education research in Slovenia after 1991: a systematic review"** published by CEPS journal: Center for Educational Policy Studies Journal (2020, 10(1), 9-36). This paper presents an important overview of chemical education in Slovenia in the last 30 years, after Slovenia was separated from Yugoslavia.

6. Liaison with the chemical industry

Pharmaceutical industry in Slovenia (Lek and Krka) sponsor chemical competitions organised by ZOTKS (see above).

7. International and European initiatives

Members of the Commission for chemical education participated at Eurovariety conference 2021 (Ljubljana, Slovenia, 2021). Members of the Commission for chemical education and other commissions in the Slovenia chemical society organised the 9th Eurovariety conference in Ljubljana, University of Ljubljana, Faculty of Education from 7 - 9 July 2021 (<http://www.eurovariety2021.si/>).

EUROVARIETY 2021 conference report

European Chemical Society, Division of Chemical Education, Slovenian Chemical Society, University of Ljubljana, faculty of Education, Department of biology, chemistry and home economics, Chair of chemistry and chemical education and Centre KemikUm organized the 9th European Variety in University Chemistry Education Conference from July 7 – 9 2021. Prof. dr. Iztok Devetak, professor of chemical education at the Faculty of Education, University of Ljubljana chaired the conference and the local organizing committee, with the extensive support by prof. dr. Vesna Ferik Savec.

The organizing committee, European Chemical Society, Division of Chemical Education and Slovenian Chemical Society has gone to great lengths to plan a memorable event and to ensure the presentations and content meet a high standard.

All information were available to the participants at <http://www.eurovariety2021.si>.

This conference includes a forum of researchers and university teachers in chemistry and chemical education. Altogether 111 participants attended the conference. Participants shared information, ideas and insights and above they all learn from each other, how to teach chemistry effectively at the university level. The program and the book of abstracts are available online.

Taking into account the global COVID-19 pandemic, this was exclusively a virtual conference. We had been quite optimistic until a few months ago and hoped it could have been organized at least as a hybrid one. The COVID-19 situation in Slovenia has recently been improving but the decision made by the Division was, that it is safer to organize the conference online only. Let us hope that in two years' time, we will be able to meet face-to-face at our next Eurovariety conference.

The conference also includes the competition for the best poster. The selection Board assessed the posters and the best one entitles "" by was awarded a voucher for free books at the Royal Society of Chemistry books: Advances in Chemistry Education.

Also each conference attendee received a discount code for 35% discount for the Royal Society of Chemistry books. A sponsor JMP sponsored the conference with 500 euros and they had different opportunity to give information about their work to the participants of the conference (presentation, email information, information in the book of abstracts...).

Dean of Faculty of Education Dr. Janez Vogrinc welcome the participants at the University of Ljubljana, Faculty of Education.

Secretary-General of European Chemical Society Dr. Nineta Hrastelj Secretary-General of European Chemical Society said a few words in the name of EuChemS.

President the Division of Chemical Education at EuChemS Dr. Rachel Mamlok-Naaman introduced the importance of the conference to the audience.

President of Slovenian Chemical Society Dr. Peter Venturini introduced Slovenian Chemical Society as a co-organizer of the conference.

During three days, participants were able to listen to 3 inspiring and thought-provoking plenary lectures, 7 stimulating and gripping workshops, two of them were dedicated how to publish in relevant academic journals (EuChemS DivChemEd journal: Chemistry Teacher International and Royal Society of Chemistry journal: Chemistry Education Research and Practice), 33 oral presentations in 7 parallel sessions, one of them being specifically for Slovenian chemistry teachers in primary and secondary education. We were also inspired by the research findings presented in 15 posters.

Conference participants has also the opportunity to write and publish a chapter of their work presented at the conference in the monograph that will be published at the University of Ljubljana.

We would like to express our deep sense of gratitude to everybody who helped to organise this event. First of all, the members of the International Scientific Committee, the members of the Local Organising Committee from the University of Ljubljana and the University of Maribor, which was led by prof. dr. Iztok Devetak. Special thanks go to the reviewers for their efforts in improving the proposals. Thank you, Sanja Jandrinović, for preparing the conference webpage and organising zoom sessions. Last, but not least important, I would like to thank Nina Zupanc, Aljaž Debelak, Katarina Mlinarec, Špela Hrast, Luka Vinko and Miha Slapničar for their organizational and technical support during the online sessions.

8. Other events and activities

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9. Name of delegate and deputy

Delegate: Prof. Dr Iztok Devetak

Deputy: Prof. Dr Vesna Ferik Savec

10. Contact details of delegates.

Dr Iztok Devetak, Prof. for Chem. Ed.

Head of the Department of Biology, Chemistry and Home Economics

Head of the Chair of Chemistry and Chemical Education, Faculty of Education

Editor in Chief CEPS Journal

University of Ljubljana

Faculty of Education

Kardeljeva pl. 16

1000 Ljubljana

Slovenia

EU

e-mail: iztok.devetak@pef.uni-lj.si

tel. +386(0)1 58 92 204

fax. +386(0)1 58 92 233 for dr. Iztok Devetak

www:

<https://www.pef.uni-lj.si/1086.html>

https://www.researchgate.net/profile/Iztok_Devetak

Dr Vesna Ferk Savec, Prof. for Chem. Ed.

Head of KemikUm

University of Ljubljana

Faculty of Education

Kardeljeva pl. 16

1000 Ljubljana

Slovenia

EU

e-mail: vesna.ferk@pef.uni-lj.si

tel. +386(0)1 58 92 237

fax. +386(0)1 58 92 233 for dr. Vesna Ferk Savec