Chemical Society Annual Report to the EuCheMS Division of Chemical Education for 2020-2021

National educational policy

Main goals:

1. Increasing the interest of the young generation in chemistry and more so in their gaining an insight into the significance key role of chemistry in the context of daily social and economic life.

2. Increasing the interest in chemistry and its contribution to science, technology, environment and society at large.

3. Increasing the positive attitudes of society towards the chemical industries which comply with the pollution prevention regulations.

4. Linking chemistry with other disciplines in the science

1. Events in chemical education

- A monthly calendar consisting of historical documentation about chemists and chemical innovations (in the framework of the National Center for Chemistry Teachers), was produced.
- Monthly events aimed at the large population. For example: "The Chemists Night", which already took place in several locations in Israel (including pubs), and consisted of formal and informal conversations with chemists, as well as demonstrations.
- The National Center of Chemistry Teachers (headed by Dr. Dvora Marchak), conducts regularly long-term professional courses for high school chemistry

teachers, e.g., courses aimed at leading chemistry teachers, in which chemistry leading teachers are prepared to support novice teachers. **Due to the COVID 19, all the activities were conducted on-line.**

Additional activities at the National Center of Chemistry Teachers:

- (1) An annual meeting in which the participating chemistry teachers attend scientific courses as well as chemistry teaching related pedagogical workshops, (2) publications of two journals targeted at chemistry teachers, (3) a website consisting of: Learning materials which are developed by teachers, summaries of scientific lectures, announcements, and individual related materials. Additional details may be found at: http://stwww.weizmann.ac.il/chemcenter
- A long-term course of creating "Communities of practice" for chemistry teachers all over Israel. During 2017 there were 7 "Professional Learning Communities (PLCs)": the Leaders' community, and six communities of teachers close to their homes. Each community of teachers was leaded by two leading teachers, who were prepared during the meetings of the Leaders' community.
- Virtual Chemistry classroom which started on 2014: This project aims at web-based chemistry teaching and learning. In many schools there are only few students who wish to learn advanced chemistry, and due to financial and organizational constraints the school principals cannot provide it. In other schools especially in the far periphery, a good chemistry teacher is not always available. Teaching chemistry on-line is a mutual project of Davidson Institute and the department of science teaching at the Weizmann Institute of Science. The on-line classroom will be accompanied with lab summer schools. Dr. Yael Shwartz from the department of science teaching at the Weizmann Institute of Science is coordinating this project, and has the scientific responsibility. On 2017 80 students enrolled the program, and for next year we exceed 40 registered students. The participants come from diverse geographic location and sectors (Jewish, Arab, Religious, scholars and students with special needs). Students learn 3 hours per week, of which 1.5 hours on line synchronously, accompanied by the use of videos and presentations. In addition, students have 1.5 hours of training, devoted to accomplish a task asynchronously on the course website. Asynchronous tasks are given as homework or preparation for a lesson in the form of "flipped classroom". The students come twice a year to carry out lab experiments in the Davidson Institute,

in addition to domestic laboratories performed using the kit sent to their home laboratories. The project is accompanied by research investigating the self-learning learning of the students.

Activities of the National Chemical Society

Science educators and science education researchers from Israel are involved in international committees of chemical education in Israel and in Europe, and attend conferences, meetings and symposia all over the world. Chemical science education Research in Israel is rather strong, being conducted currently, mainly in the Weizmann Institute and the Technion, whereas research in the context of science education at large, is being pursued at all the country's universities and most of the Academic Teachers' colleges.

Publications

Blonder, R., & Mamlok-Naaman, R. (2019). Factors affecting the study of chemistry in different countries around the world: Findings from an international survey. *Israel Journal of Chemistry, 59*, 1-11h.201800100

Hofstein, A., Dkeidek, A., Katchevitch, A., Levy Nahum, A., Kipnis, M., Navon, O., Shore, R., Taitelbaum, D., & Mamlok-Naaman, R. (2019). Research on and Development of Inquiry-type Chemistry Laboratories in Israel. *Israel Journal of Chemistry, 59*, 1-11. DOI: 10.1002/ijch.201800056

Mamlok-Naaman, R., & Taitelbaum, D. (2019). The Influences of Global Trends in Teaching and Learning Chemistry on the Chemistry Curriculum in Israel. *Israel Journal of Chemistry, 59*, 1-11.

Cai, J., & Mamlok-Naaman, R. (Eds.). (2020). Posing Researchable Questions in Mathematics and Science Education (Special issue). *International Journal of Science and Mathematics Education, 18*(1).

Mamlok-Naaman, R**.** (2020). Professional Learning Communities (PLCs) of Chemistry Teachers**.** *Journal of Chemistry and Chemical Engineering*, 14, 30-36.

Mamlok-Naaman, R. (2021). Socio-cultural developments of women in Science. *Pure and Applied Chemistry*. https://doi.org/10.1515/pac-2021-0104

Liaison with the chemical industry

Due to the COVID 19, many activities were postponed.

International and European initiatives

- Involvement in Twinning (SciCar), a project in the framework of Horizon, conducted by Professor Miia Rannikmae from the Tartu University, Estonia.
- Rachel Mamlok-Naaman is an external evaluator of 2 European projects in the framework of ERASMUS: ESTA an DISSI.
- Rachel Mamlok-Naaman is a titular member of the Committee of Chemistry Education, IUPAC. She as one of the 12 distinguished women in chemistry and chemistry engineering for 2020.

Name of delegate and deputy

Delegate: Dr. Rachel Mamlok-Naaman

Deputy: Professor Ron Blonder

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CV of delegate.

The CVs were sent in previous reports.