

FECS – Division of Chemistry and the Environment

Environmental Chemistry Education in Europe: Setting the Agenda

1st Workshop organised by the Committee on Education in Environmental Chemistry (CEEC) of FECS – Division of Chemistry and the Environment (DCE) in Rome, Italy, January 10–12, 2002

Reported by: Uri Zoller, Chairman of CEEC and 1st workshop organiser

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Following the establishment of its CEEC, the Division of Chemistry and the Environment of FECS (Federation of the European Chemical Societies), in its Executive meeting held in London (March 4, 2000), has approved the proposal to organise an intensive future-oriented workshop on 'Environmental Chemistry Education in Europe: Setting the Agenda'.

Being aware of (a) the ever-increasing, consensually accepted importance of the environment in the sustainable development/science-technology-environment-society (STES) context; (b) the substantial meaningful contributing works by European organisations/networks, e.g. the ECTN (European Chemistry Thematic Network), Chem Division of FECS, the US ACS-related Green Chemistry Institute and other environmental education (EE) associations and educators world-wide, concerned with the 'state of the art' in this and related areas; and, most important, (c) the current disciplinary/correction-interdisciplinary/prevention paradigm shift concerning the environment, the CEEC has gathered a select group of experts, people interested in and involved in Environmental chemistry Education and representatives of the above mentioned European FECS divisions and networks, for a 2-day workshop to be held in Rome on January 10–12, 2002, with the Italian Consiglio Nazionale del Chimici being the host.

By capitalising on the already accumulated relevant experience, state of the art type reports, and available data and research literature, the guiding model for the workshop was not 'environmental chemical education – quo vadis?', but rather, 'where *should* environmental chemistry education go?'; that is, actively to set the agenda and lead it in the direction agreed upon. Therefore, the following five pre-formulated goals have been forwarded to the participants as a guiding framework for the workshop:

1. **Development/production** of a vision of **Education in Environmental Chemistry for Sustainable Europe**, to serve as the guiding model for future action (of the CEEC); i.e., *What should be done?*
2. **Analysis** of the contemporary state of affairs in Europe concerning environmental chemistry education, to serve as the starting point for future **implemental** education and training in environmental chemistry: i.e., *what can be done, given the existing constraints?*
3. **Selection, Adaptation and Refinement** of alternative (to the traditional) **teaching and assessment strategies**, to be implemented (or to be creatively adopted) within new courses/programs in environmental / chemistry education for different target groups; i.e., *How to do what is agreed upon?*
4. **Identification/Characterisation** and initiation of the development of core and / or exemplary courses / curricula and case studies in environmental chemistry (and closely related areas) which are in consonance with the vision of the Division of Chemistry and the Environment; i.e., *What/which core of knowledge, contents and skills, particularly higher order cognitive skills (HOCS), are essential for students to acquire in order to become environmental chemistry literate?*
5. **Promotion** of environmental chemistry (EC) in the relevant science and chemical education journals and of environmental education (EE) in the professional chemistry/environmental chemistry journals.

These goals served as the guiding constructs of the participating group's mini-workshops which followed the opening keynote lecture entitled 'Environmental Chemistry in the Context of HOCS Development – An Imperative in Chemical Education'.

The conceptual framework of the workshop and its agenda were determined by the goals formulated above and were reflected in the mini-workshops and extensive discussions that followed the introductory keynote address by the CEEC Chairman, the essential message of which was that:

"Within the context of (a) the environmental imperatives; and (b) the limited economical feasibility of most of the innovative/advanced technologies, the switch from the currently dominated *corrective* paradigm to the *preventive* practice world-wide, is unavoidable. This, in turn, requires a revolutionised change in the guiding philosophy, rationale and models of our thinking, behaviour and practice. Therefore, *environmental chemistry* education is imperative in chemistry education at all levels, meaning the development of our students higher-order cognitive skills (HOCS) – question asking, system critical thinking, decision making and problem solving in the STES context – which will facilitate their becoming environmental chemistry literates."

The group discussions, which followed brief communications by the sessions' leaders/co-ordinators, were concluded by short lists of recommendations that were submitted to the general assembly of the workshop for a further, thorough, in-depth discussion – analysis – syntheses – evaluation cycle, leading to a long list of recommendations for future action – to be applied and acted upon, right away, in the environmental chemistry education context within the European community.

The following is the essence of these recommendations – aiming at setting the agenda for environmental chemistry education in Europe:

With respect to Goals 1 & 3: Environmental literacy is imperative for all chemists. This requires the integration of environmental sciences into chemistry, the development and

implementation of specially designed environmental chemistry modules, core chemistry courses and appropriate problem solving-oriented case studies in chemistry teaching.

With respect to Goal 2: Attaining environmental literacy requires, among other things, the adaptation of the recommendations included in the ECTN report; the interdisciplinary conceptual approach as the leading teaching strategy; the exposure of students to a wide variety of resources; and the persistent fostering of students' HOCS for transfer.

With respect to Goal 4: Provide students with the opportunities (a) to understand 'how the environment works'; and (b) to develop their HOCS; i.e. lateral thinking, problem solving Since evaluation constitutes a major driving force in the learning context, define outcomes, benefits and consequences first, only later to be followed by the actual assessment process of any environmental program / activity in chemistry teaching / learning.

With respect to Goal 5: (a) To report about this workshop, its recommendations and outcomes in national and international journals, newsletters of chemical societies as well as in other appropriate communication channels, including ESPR, the ECTN newsletter and others (this published short report is within the latter frameworks).

(b) To plan a second follow up workshop for further development of relevant conceptual approach and accord action to be taken in European environmental chemistry education.

The agenda has thus been set in its first approximation. The all pervasive question is: Can we get it right?

An extended, detailed version of this report and its recommendations will follow in a special document format for dissemination.

Actively participated in our Workshop: Buszewski B., Buszewska T., Bennett S., Childs P., Facchetti S., Gagan M., Hajeresen D., Jarosz M., Jastorff B., Jensen A.A., Karayannis M., Macciejowska I., Morselli L., and Zoller U. (from Poland, the UK, Ireland, Italy, the US, Germany, Denmark, Greece and Israel), who enjoyed both the in-depth discussions in the working sessions as well as the wonderful local organization and hospitality of our CEEC member Sergio Facchetti. The next follow-up and future planning Meeting of the CEEC is scheduled to be held in conjunction with our next FECS Div. of Chem. & the Environ. Conference, to be held in Greece, Aug.31-Sept.4, 2002. Those who are interested in the CEEC work and activities are welcomed to join. (E-mail: uriz@research.haifa.ac.il).

Conference Announcement

European Conference: Substitution of Hazardous Chemicals in Products and Processes

13 and 14 June 2002, Hamburg, Germany

Ökopol GmbH and Kooperationsstelle Hamburg are organising this two-day conference funded by the European Commission (Directorate-General Environment and Directorate-General Health and Consumer Protection).

Substitution is seen as a key instrument to reduce chemical risks to workers, consumers and the environment.

National and European documents highlight substitution as one of the most important strategies in future chemical policies. Hence, it is one of the basic principles the EU Commission proposes in its new Strategy on a future Chemicals Policy.

The following issues will be covered:

- Towards a common substitution policy – Roles, responsibilities and market forces
 - Practical cases – Lessons to be learned from success and failure
 - How to compare the risk – Concepts and tools to make the best choice
- Towards a common understanding of substitution – Policy measures and instruments needed to support development and use of safer chemical products in Europe

The views expressed at the conference and new information on substitution cases and approaches will be documented and integrated into a guide on substitution for the industry. No registration fees are required. The conference language is English. For pre-registration or any other information, please mail to Renate Böhm: boehm_koop@public.uni-hamburg.de (Tel ++49-40-2858-644); <http://www.kooperationsstelle-hh/>