

**PacifiChem
Honolulu, HI
16 December 2000**

COMM 80

Chemical education in the service of world needs.

J. J. Lagowski*, *U of Texas Austin, Chem. & Biochem., Univ. of Texas at Austin, Austin, TX, 78712, USA, Fax: 512/471-3288

The globalization of human activities--commerce, entertainment, etc.--brings to focus the place of chemical education in such activities. Discussed here are the roles of pre-college/university systems of chemical education, college/university systems, and graduate education; the interactions among these and potentials for international cooperation. Serious questions of methods of coordination of such international activities are addressed.

COMM 94

Understanding chemistry through everyday chemicals.

R. Hollingworth*, *U of New England, Chemistry, Chemistry, UNE, Armidale, NSW, 2351, Australia, Fax: ++612 6773 3268

Students often find chemistry too abstract a subject with little personal meaning for them. And yet chemistry and chemicals are around us everywhere, all the time. If too much emphasis is given to the microscopic and symbolic aspects of learning chemistry, then students have less chance to meaningfully incorporate this new chemical knowledge into their existing knowledge bases. By connecting our students' learning of chemistry to the chemicals and chemical phenomena, that they see around them everyday, we can lead them to a more meaningful understanding of much chemistry. We report here on the development of a web site under the international Virtual Chemistry Education Project. The Virtual House of Chemistry allows students to make a tour of a virtual house to find out information about common chemicals. The web site allows access to students all over the world and invites their participation in building the site.

COMM 95

Educating high school science teachers: The need for reform.

G. A. Crosby*, *Washington State U, Department of Chemistry and Program in Materials Science, Pullman, WA, 99164-4630, USA, Fax: 509-335-8960

The education of high school teachers for the sciences (biology, chemistry, physics) has been shared traditionally among the corresponding departments and Schools of Education. The student majors in one science and complements his/her education with courses in the other sciences as required. Sometimes a dual major in two sciences has been undertaken. In the opinion of the author, this model has become obsolete, both theoretically and practically. The merging of the sciences (molecular biology, material sciences) and the impact of technology forces a new assessment of the kind of education teachers should acquire. The realities of the modern high school as an employer dictate an educational background that is broader in the sciences and different from the foundation the conventional model provides. Finally, the implications of the National Science Education Standards for the education of teachers cannot be ignored. The author will attempt to define future directions for curricular developments in colleges and universities that are commensurate with the task of producing science teachers who can prepare students for the realities of the 21st century.

COMM 216

Education experiments using natural radioactivity which can be conducted at school in Japan.

M. Kamata*, *U of Tokoy, Tokyo, Tokyo, 1212, Japan, Fax: 202-638-1212

Although a good understanding on radiation and radioactivity is needed from view point of energy and/or environmental education, it is difficult to conduct an educational experiment with radioactivity at school in Japan. This is not simply because the usage of radioactivity is strictly regulated by the law, but also because most Japanese have very negative feeling against radioactivity. This paper presents a couple of radiochemical experiments using extremely small amount of natural radioactivity (e.g. ^{214}Pb , ^{214}Bi) dissolved in mineral spring water or calcium superphosphate sold as fertilizer. While these experiments are safe and inexpensive enough to be conducted at high school and university, they are quantitative enough for learners to observe half life of radioactive species and to understand the concept of radioactive equilibrium between them. Furthermore, it is expected that learners will cease to take radioactivity as something artificial and specially dangerous through these experiments.

COMM 97

Global standardization of chemical education via the Internet.

Y. Takeuchi*, *Kanagawa U, Department of Chemistry, Faculty of Science, Hiratsuka-shi, 259-1296, Japan, Fax: 81 463 58 9684

The role of chemistry in the 21st century is to realize the sustainable development of human activity and I believe that this goal can only be achieved through education. In practice, the world needs a large number of chemists and chemical engineers who are competent enough to solve problems in any part of the world. Since chemical education has been much influenced by the political, social, economical, and religious structure of each country, the background of chemists and chemical engineers are rather diverse. The coming 21st century will require a kind of "standardization" of chemical education. One way of achieving this goal is through a common textbook and common evaluation system, which could be produced by interested parties world-wide. My thesis is that such standardized textbooks should be available on the web page of the Committee on Teaching Chemistry (CTC) of IUPAC. Students can use such texts, without any charge, for self-study and self-evaluation

COMM 81

Internationalization of chemical education via IUPAC CTC.

Y. Takeuchi*, *Kanagawa U, Chemistry, 2946 Tsuchiya, Hiratsukashi, Kanagawa, 259-1293, Japan, Fax: 81-463-58-9684

In the age of IT, we must innovate the method of teaching chemistry. This must apply to the way of promotion of chemistry among citizens and young people, particularly the latter who have lost the habit of reading books. Use of Internet is an inevitable alternative to books. IT produced a number of good teaching materials used via Internet. The problem is how to locate these and select good ones quickly and effectively. Because of the rapid increase and non-commercial nature of such materials, the usefulness of search engines may have limitations. IUPAC CTC has proposed WCEN (World-wide Chemical Education Network) as the hub of teaching materials to be used via Internet. IUPAC CTC now proposed to publish a new electronic journal not only for chemical educators but also for citizens and young people. Such projects will enhance internationalization of chemical education in the 21st century.

COMM 91

It's a small world: JCE and international chemical education.

J. W. Moore*, E. A. Moore, J. L. Holmes, M. E. Saecker, *U of Wisconsin-Madison, Chemistry, 1101 University Avenue, Madison, Wisconsin, 53706-1396, USA, Fax: 608-265-8094

For 77 years the Journal of Chemical Education has served as a focal point for communication among those interested in chemical education. As means of communication have improved, JCE has kept pace. We now include computer software and are available online via the World Wide Web as well as in print. Less obvious is the extent to which JCE has become an international journal. Authors, subscribers, and

reviewers come from all over the world, and roughly a third of our issues are shipped outside the U.S.A. Viewpoints on chemical education expressed in JCE have broadened commensurately, enhancing all of our perspectives on the teaching of chemistry.

COMM 92

International information exchange in chemical education on the Internet: More expected than realized?

M. M. Ito*, *Soka U, Faculty of Engineering, 1-236 Tangi-cho, Hachioji, Tokyo, 192-8577, Japan, Fax: 81-426-91-9312

Increasing attention has been paid to the use of the Internet in chemical education. It is used as a source of information for both teachers and students, which is not sufficiently available in a classroom or library. Efforts have been made to utilize the Internet for various types of distance education. The mutual publication and exchange of information, the most characteristic feature of the Internet, are increasingly active in many countries, at least on domestic basis. On the international basis, on the other hand, this kind of work is not so active as was expected for the widening and popularization of the international network. The cause of the stagnation and future prospect for overcoming it will be discussed.

COMM 93

On-line formative and summative assessment: The development of shared databases.

G. Crisp*, *U of Adelaide, Department of Chemistry, University of Adelaide, Adelaide, South Australia, 5005, Australia, Fax: 61 883034358

The development of online assessment in both formative and summative mode offers great flexibility to both academic staff and students. It also offers immense opportunities for academic staff to collaborate, both on a national and international basis, on sharing resources and so benefit from professional interactions and benchmarking. The Faculty of Science at the University of Adelaide has implemented a program to develop online assessment opportunities using the commercial software package TestPilot. Test Pilot was chosen after a survey and initial investigation of a variety of commercial software. It is designed to provide for the easy creation and deployment of online assessment without excessive administrative costs. It is platform independent and can be administered by the test creator, therefore the staff member responsible for the test. The creation of the tests is relatively simple and the databases can be shared with others. After the initial establishment costs there are no further licensing fees. This project will provide opportunities for collaboration on both the national and international level and allow coordination in the development of appropriate forms of assessment for different types of students. This presentation will highlight some of the student and staff feedback on

TestPilot, online assessment and discuss the opportunities for collaboration for academic staff.

COMM 84

Virtual chemical education for the globalization society.

H. Yoshida*, *Hiroshima U, Department of Chemistry, Graduate School of Science, Kagamiyama 1-3-1, Higashi-Hiroshima, , 739-8526, Japan, Fax: +81-824-24-0727

The recent evolution of the World Wide Web has introduced new Internet-based learning and teaching materials for chemical education. Such rapid change in the Internet leads us to expect the innovation of the traditional style in education. The geographical restriction is no longer a serious problem, and hence, teachers and students far apart from one another can communicate without difficulty. Under such circumstances, the Virtual Chemical Education (VCE) project has been proposed by Prof. Takeuchi at the meeting of the CTC during the 39th IUPAC General Assembly as a new paradigm for chemical education on the Internet. The virtual society will generate the new age of the chemical education by the distributed teaching and learning materials on the global Internet. In the conference, our examples of VCE, such as hypertext learning materials, interactive Java learning materials, 3D virtual reality learning materials and so on, will be presented.

COMM 96

Chemical weapons convention: An international law relevant to the professional education of chemists.

J. Webb*, *Murdoch U, Department of Chemistry, Murdoch University, South Street, Murdoch, WA 6150, Australia, Fax: 61-8-93105005

The horror of chemical weapons, etched in our minds by images of gassed, suffocated and blinded soldiers of trench warfare in World War I, has been reinforced by more recent images: civilian deaths in Iraq and the activities of the UN teams inspecting Iraqi facilities for chemical weapons production. The Organisation for the Prohibition of Chemical Weapons (OPCW) was born out of the Geneva Conference on Disarmament to support a new international treaty, the Chemical Weapons Convention (CWC) that is now established international law. The OPCW has established global programs of education, training, monitoring and inspections. The OPCW has initiated a regional program to inform and educate the chemical profession, both in industry and academia, about the CWC. In 2001, a regional Conference will bring together senior chemists from Southeast Asia and the Pacific together with their Australian counterparts, in support of the CWC. The conference will discuss the historical, technical, legal and ethical background to this Convention and the strategies for incorporation of an awareness of this international law into the professional education of current and future chemists.

COMM 82

J. E. Boggs*, *U of Texas, Department of Chemistry and Biochemistry, Austin, Texas, 78712, USA, Fax: 512-471-8696

Students being educated today can expect to have a productive career extending to at least 2050. One of the more certain predictions for the first half of the 21st century is that the current trend toward creation of trans-national industrial organizations will expand and be dominant in the professional lives of the students we are now training. Scientific employees can expect to have lengthy assignments at company components in various countries. What changes are needed in the American educational system to permit our typical monolingual, monocultural students to compete in such an environment? Europe is increasingly requiring its chemistry students to do at least a year of their undergraduate studies in a foreign university. Opportunities are rapidly becoming available for American students to participate in similar programs with the resulting gain of fluency in a second language and close familiarity with a different culture. Methods for accomplishing this will be discussed and results described.