

Chemistry Education and Sustainability in the Global Age

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Editors

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 Springer

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Preface: Proceedings of the 21st ICCE

Sustainability. The dictionary defines this term as “to maintain or endure.” And, following the work of the UN Brundtland Commission, we have learned to think of sustainability in the context of development that “meets the needs of the present without compromising the ability of future generations to meet their own needs.” It is long overdue that we begin to link this vitally important concept with the goals and learning outcomes of science education and think about what it means for chemistry education to be sustainable and contribute to sustainable development.

The 21st conference of the International Conference on Chemistry Education (ICCE) series, held in Taipei from August 8–13, 2010, created just such a linkage, with an overarching conference theme of “*Chemistry Education and Sustainability in the Global Age*.” This theme was developed in recognition of the International Year of Chemistry 2011, which highlights the role for chemistry in meeting Millennium Development Goals and environmental challenges.

This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during the 21st ICCE conference. Divided into 6 sections, the 31 papers published here pick up on the multiple meanings of the term sustainability. Themes for the sections will be of interest to chemistry educators who care that the learning environments in their classrooms motivate students to learn effectively, so that those learners are equipped to contribute solutions to the serious global challenges our planet faces. Efforts to improve chemistry education must also be sustainable – that is, they must be maintained and endure. And so the reader will sample here reports of research on topics ranging from globalization and chemistry education through a suite of issues related to learning and conceptual change; teaching strategies; curriculum, evaluation and assessment; e-learning and innovative learning; and microscale approaches to chemistry.

One of the unique and valuable dimensions to the ICCE conference series is the way the series brings chemistry educators together from around the world to discuss ways to serve learners better. The reader will discover that both common challenges and creative solutions emerge from very diverse settings – examples include the University of Venda in South Africa (Mammino), Pulau Pinang Matriculation

College in Malaysia (Teh and Yakob), Tokyo Gakugei University (Ogawa and Fujii), the MicroChem Lab in Hong Kong (Chan), and the National Taiwan Normal University (Chen, Lin, and Chiu). I hope you both enjoy and find valuable your engagement with their ideas in sustaining your own professional development in the global world of chemistry education.

Past Chair of Committee on Chemical Education of IUPAC

Peter Mahaffy

Introduction to Proceedings

It was a great honor for the Chemical Society Located in Taipei (CSLT) and National Taiwan Normal University to host the IUPAC's 21st International Conference on Chemical Education (ICCE) from August 8–13, 2010, in Taipei, Taiwan. A different country has hosted this international conference, held every other year, since 1969.

The ICCE, sponsored by the International Union of Pure and Applied Chemistry's (IUPAC) Committee on Chemistry Education (CCE), is one of the most well attended and informative international arenas for furthering chemistry education around the globe. IUPAC was founded in 1919 by chemists from industry and academia. Over the past nine decades, the Union has been successful in fostering worldwide communications in the chemical sciences and uniting the academic, industrial, and public sectors. As an international, non-governmental, non-profit, and independent scientific body, the Union promotes chemistry education via multiple channels, including the CCE, and its emergence as an influential leader in promoting chemistry education around the world.

The theme for the 21st ICCE was “Chemistry Education and Sustainability in the Global Age,” which was intended to inspire participants to reflect on global environmental and ethical issues. The CSLT and the Organizing Committee organized ten plenary lectures by well-known international speakers, five workshops, three symposia, one panel discussion with the presidents from chemical education societies of different countries, chemical demonstrations, and a variety of other activities. In terms of the panel discussion, the presidents or chair of science and chemistry associations from countries including Canada, Germany, Korea, Malaysia, the Philippines, Taiwan, and United States came together and discussed issues about chemical education, sustainability in the global age, and objectives and plans for the International Year of Chemistry.

The 21st ICCE had over 300 participants in attendance. Efforts to increase participation by under-represented professionals continued and included, for example, travel scholarships for female scholars provided by the IUPAC and the Asian Chemical Education Network (ACEN) of the Federation of Asian Chemical Societies (FACS). Such efforts encourage attendance at the ICCE and promote the conference's international and diverse focus.

Following the conference, 42 articles were submitted to the Organizing Committee and each article was reviewed by two experts in chemistry education. The articles were submitted from all over the world, and covered a wide range of topics. Twenty-nine articles were finally accepted for publishing. In this compilation we have categorized the articles into six sections. The six sections are: (1) Globalization and Chemical Education, (2) Learning and Conceptual Change in Chemistry, (3) Teaching Chemistry, (4) Curriculum, Evaluation, and Assessment in Chemistry Education, (5) E-learning and Innovational Instruction, and (6) Microscale Laboratory Work in Chemistry. Each section is introduced by a member of our editorial board. These topics were chosen because we, as chemistry educators, are concerned with increasing the quality of chemistry learning and teaching, promoting public understanding of chemistry, highlighting sustainability issues for our global community, and implementing innovative technology in school practice and research. These proceedings aim to further the understanding and focus the attention of the international chemistry education community so our citizens and our planet may benefit. We hope you enjoy reading this book and find effective ways to continuously promote chemistry education research and practice in your own country.

Chairperson, 21st ICCE Organizing Committee

Mei-Hung Chiu
Editor-in-chief
Hsiao-Lin Tuan, Hsin-Kai Wu,
Jing-Wen Lin,
and Chin-Cheng Chou
Editors

Contents

Part I Globalization and Chemical Education

Mei-Hung Chiu

- Dissemination of Achievements in Chemical Education (Research) via EU Projects** 3
Anna Kolasa and Iwona Maciejowska
- Polish Education Reform and Resulting Changes in the Process of Chemical Education** 15
Hanna Gulińska

Part II Learning and Conceptual Change in Chemistry

Jing-Wen Lin

- Assessment of Chemistry Anxiety Among College Students**..... 27
Chen@Chong Sheau Huey
- Teacher-Student Interactions: The Roles of In-Class Written Questions** 35
Liliana Mammino
- Probing and Fostering Students' Reasoning Abilities with a Cyclic Predict-Observe-Explain Strategy** 49
Jia-Lin Chang, Chiing-Chang Chen, Chia-Hsing Tsai, Yong-Chang Chen, Meng-Hsun Chou, and Ling-Chuan Chang
- A Trial of Placement and Embodiment of Images for Chemical Concepts in the Lesson Model of a "Surface Active Agent" Through SEIC** 59
Haruo Ogawa and Hiroki Fujii

Part III Teaching Chemistry

Hsiao-Lin Tuan

Chemistry Pre-service Teachers' Mental Models of Science Teaching and Learning in Malaysia	73
Maryam Sulaiman and Zurida Haji Ismail	
Chemistry Teachers Enhance Their Knowledge in Contemporary Scientific Areas	85
Rachel Mamlok-Naaman, Ron Blonder, and Avi Hofstein	
Practical Science Activities in Primary Schools in Malaysia	97
Norita Mohamed, Mashita Abdullah, and Zurida Haji Ismail	
Teaching Chemistry Effectively with Engineering Majors: Teaching Beyond the Textbook	109
Yermesha Kyle, Stephen Bacon, Amber Park, Jameka Griffin, Raicherylon Cummins, Raymond Hooks, Bailu Qian, and Hua-Jun Fan	
Problem-Based Learning as an Approach to Teach Cell Potential in Matriculation College, Malaysia	121
Kai-Li Teh and Nooraida Yakob	
Teaching Catalysis by Means of Enzymes and Microorganisms	131
Peter Grunwald	
The Application of the SATL in Biochemistry	145
Suzana B. Golemi	

Part IV Curriculum and Assessment in Chemistry Education

Mei-Hung Chiu

An Alignment Analysis of Junior High School Chemistry Curriculum Standards and City-Wide Exit Exams in China	157
Hongjia Ma, Gavin W. Fulmer, Ling L. Liang, Xian Chen, Xinlu Li, and Yuan Li	
A National Survey of Students' Conceptions and Their Sources of Chemistry in Taiwan: Examples of Chemical Equilibrium and Acids/Bases	171
Jing-Wen Lin and Mei-Hung Chiu	
The Use of Electronic Media for Chemical Education Research	185
Francis Burns and David Frank	
Investigation of Tertiary Chemistry Learning Environment in Sabah, Malaysia	197
Yoon-Fah Lay and Chwee-Hoon Khoo	

The Evaluation of Chemistry Competence for Freshmen at Technology Colleges in Taiwan	211
Ji-Chyuan Yang, Ching-Yun Hsu, Wen-Jyh Wang, Chia-Hui Tai, Hong-Hsin Huang, and Ping-Chih Huang	
Changes in Teachers' Views of Cognitive Apprenticeship for Situated Learning in Developing a Chemistry Laboratory Course	221
Hui-Jung Chen and Mei-Hung Chiu	
Part V E-learning and Innovative Instruction Hsin-Kai Wu	
Application of Mind Maps and Mind Manager to Improve Students' Competence in Solving Chemistry Problems	235
Zhen Lu, Zheng Zou, and Yitian Zhang	
An Integrated-ICT Assessment for College Students' Performances of Chemical Learning	247
King-Dow Su	
Academic Performance and Attitude Toward Computer-Aided Instruction in Chemistry	257
Ronaldo C. Reyes	
Integrating Instant Response System (IRS) as an In-Class Assessment Tool into Undergraduate Chemistry Learning Experience: Student Perceptions and Performance	267
Tzy-Ling Chen, Yan-Fu Lin, Yi-Lin Liu, Hsiu-Ping Yueh, Horn-Jiunn Sheen, and Wei-Jane Lin	
Part VI Microscale Lab Chemistry Chin-Cheng Chou	
Aqueous Cationic and Anionic Surfactants for Microscale Experiments in Organic Chemistry Teaching Laboratories	279
Masayuki Inoue, Yuko Kato, Emi Joguchi, and Wataru Banba	
Development of an Analytical Method of Gaseous Mixtures Using a Syringe	293
Takashi Yasuoka	
Microscale Experiments Using a Low-Cost Conductance Meter	303
Jose H. Bergantin, Jr., Djohn Reb T. Cleofe, and Fortunato Sevilla III	
Introducing Microscale Experimentation in Volumetric Analysis for Pre-service Teachers	311
Mashita Abdullah, Norita Mohamed, and Zurida Haji Ismail	

Innovative Techniques in Microscale Chemistry Experiments	321
Kwok Man Chan	
Microscale Experiment on Decreases in Volume When Forming Binary Liquid Mixtures: Four Alkanol Aqueous Solutions	335
Tetsuo Nakagawa	
Index	347