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ConfChem Conference on A Virtual Colloquium to Sustain and Celebrate IYC 2011 Initiatives in Global Chemical Education: Young Ambassadors for Chemistry in IYC 2011

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Supporting Information

ABSTRACT: This communication describes how the Young Ambassadors for Chemistry (YAC) project facilitates the flow of ideas between chemistry and society, using young people as mediators. The project uses a "train the trainers" model: teachers are trained to help students communicate the benefits of chemistry. In doing so during local public awareness events, young students acting as ambassadors for chemistry create public interest in chemistry. We work with teachers, predominantly from grades 7−12, also teacher trainers and instructors in science centers, to provide meaningful content related to the students' daily life and to provide student-centered instructional methodologies. These include approaches and strategies such as group work, inquiry, hands-on activities, discussions, and reporting about results. We also invite English teachers to apply their understanding of communication so different subject teachers can learn from each other. During IYC 2011, YAC received invitations from Ethiopia, Kuwait, Jordan, Puerto Rico, and Bulgaria that resulted in enhanced exposure to the initiative. This communication summarizes one of the invited papers to the ConfChem online conference: *A Virtual Colloquium to Sustain and Celebrate IYC 2011 Initiatives in Global Chemical Education*, held from May 18 to June 29, 2012 and jointly hosted by the ACS DivCHED Committee on Computers in Chemical Education and the IUPAC Committee on Chemistry Education.

KEYWORDS: *Continuing Education, General Public, Elementary/Middle School Science, High School/Introductory Chemistry, Public Understanding/Outreach, Collaborative/Cooperative Learning, Communication/Writing, Applications of Chemistry*

The Young Ambassadors for Chemistry (YAC)[1] initiative (Figure 1), launched in 2003 when the IUPAC Project Committee approved the project, is to facilitate the flow of ideas between chemistry and society using young people as mediators. The goals are achieved by showing teachers (all levels, but mainly grades 7−12) and teacher trainers possible meaningful content related to students' daily life. Student-centered methodology is used such as group work and discussions. Collaborations with other subject teachers and joining international projects such as the Science Across the World (SAW) exchange program,[2] which provides access to valuable resources such as "Chemistry in Our Lives",[3] are utilized. SAW additionally offers a Facebook group[4] for ideas, reports, and finding exchange partners. The first YAC event occurred in Taiwan in 2004. The program was modified and then repeated in different countries across the world to meet local needs for promoting chemistry.

Figure 1. YAC project logo.

IYC 2011 YAC PROJECT

Cosmetics, a topic in which all students are interested, was chosen as the IYC 2011 YAC course for teachers and event for students. During the 1.5−2.5 day training (usually shorter for small projects), groups of teachers carried out experiments, produced four products—perfume (pour l'homme), shampoo, hair gel, and a cream (lotion)—and learned about the related science. After making the products, the groups advertised their cosmetics in a live 30-s TV commercial. The best performing group was awarded a prize.

On the last day of the project, the trained teachers guided the student groups with the experiments and the TV commercial in a public venue (Figure 2), with substantial media coverage and as many VIPs as possible present. Part of the students act as roving

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Figure 2. Students in Taiwan (A) producing and (B) presenting their cosmetic line.

reporters to interview the general public and show their practical work while the other students carry out the experiments and the TV commercial. Then the groups of students change roles. The trainers interview organizers, and teachers and students fill out an evaluation form. These questionnaires have been a valuable resource for our evaluations, as we aim to make YAC a sustainable and self-supporting project.

In developing countries, this way of teaching and organizing an event may be new and it is sometimes difficult for the participants to visualize what is expected. To increase their understanding, in-depth guidelines are provided with pictures and videos about former courses and events.

PARTICIPANTS IN THE INTERNATIONAL YEAR OF CHEMISTRY (IYC) 2011

The YAC team submitted YAC as an idea for IYC 2011.[5] The idea was well received, with invitations for full or smaller projects and presentations from Ethiopia, Kuwait, Jordan, Puerto Rico, and Bulgaria. Prof. Temechegn Engida, president of the Federation of African Societies of Chemistry (FASC), initiated IYC 2011 (Figure 3). After approval by UNESCO and IUPAC was received, he also initiated the first YAC in February 2011. The University of Addis Ababa hosted and facilitated YAC Ethiopia with help of UNESCO. The public YAC event took place in front of the Ministry of Education with 41 teachers, 40 students, and hundreds of civilians. The uniqueness of the event was that Addis Ababa never had such an activity for the public before. The learning experience and the atmosphere for teachers, students, university staff, and the public was stimulating and inspiring, although it was challenging at the beginning of the workshop. The whole event was recorded and published in the national press. Information about the other IYC YAC presentations is listed in Table 1.

Figure 3. FACS logo.

SUSTAINABILITY AND THE FUTURE

To ensure a future for YAC, the local organizers or participating teachers must take ownership. Good examples are Taiwan, where projects are adapted to local possibilities and often repeated[7,8] and Cyprus,[9] where a new event in another city is carried out every year. In the Philippines (2010), the YAC event was sponsored by a shopping mall that wants it to be repeated. Experiments from YAC Puerto Rico are adopted by the ACS outreach program "Ambassadors for Chemistry". Our evaluations show that the teachers like to repeat new knowledge and skills in their classrooms. Organizers are prepared to repeat the course and events with local ideas, possibilities, and materials that meet their needs. During a future project, the trained teachers can use new content and methodology and spread the idea (train the trainers).

SAFETY

YAC provides a great opportunity to promote awareness of chemical safety and hygiene issues, where the norms may vary from country to country. Safety is central to the design of our public experiments, which can be carried out in any kitchen. The experiments involve foolproof procedures such as stirring, mixing, and dissolving and require no heating or exposure to toxic raw materials, so safety is well considered.

YAC BEYOND IYC 2011

Young Ambassadors for Chemistry is an ongoing project involving youth in their communities promoting chemistry that was highlighted in 2011. In 2012 YAC Tanzania,[10,11] Panama (with 110 students!), and Mexico[12] were successfully organized. Plans include YAC Cambodia and YAC Thailand for 2013. In a future project, the YAC team will consider other subjects such as materials.

This paper was discussed from May 25 to May 31 during the spring 2012 ConfChem online conference: *A Virtual Colloquium to Sustain and Celebrate IYC 2011 Initiatives in*

Table 1. Smaller YAC Courses and Events

Location	Invitation by	Date	Occasion
Kuwait, Science Centre, Kuwait City	Dr. Abdulaziz Alnajjar, President Kuwaiti Chemical Society	April 17−18, 2011	2nd Kuwaiti Meeting, Chemistry Teachers Association
Jordan, Yarmouk University, Irbid	Prof. Sultan Al-Orabi, President Yarmouk University	April 19−20, 2011	6th International Chemistry Conference in Jordan
Puerto Rico, San Juan	Prof. Dr. Ingrid Montes, Chemistry Department University of Puerto Rico−Rio Piedras	July 29, 2011	IUPAC General Assembly workshop with teachers, Ph.D. students and few secondary school students[6]
Bulgaria, Hristo Botev School, Gorna Malina	English teacher Kirilka Stankova	November 8, 2011	prize giving ceremony for the Global Stamp Competition, another IYC 2011 idea

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Global Chemical Education. This conference was jointly hosted by the ACS DivCHED Committee on Computers in Chemical Education (CCCE) and the IUPAC Committee on Chemistry Education. The conferences are open to the public and can be assessed at http://www.ccce.divched.org/spring2012confchem.

■ ASSOCIATED CONTENT

Supporting Information

Full paper from the ConfChem conference. This material is available via the Internet at http://pubs.acs.org.

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Notes

The authors declare no competing financial interest.

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(3) Resource 'Chemistry in our Lives'. http://www.nationalstemcentre.org.uk/elibrary/resource/1739/chemistry-in-our-lives (assessed Aug 2013)
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