

Young Ambassadors for Chemistry (YAC) in Taipei, Taiwan (10 - 12 December 2007) and Mauritius (31 July – 2 August 2008)

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After a series of four Young Ambassadors for Chemistry (YAC) courses / events (IUPAC project 2003-055-1-050, 2004-2007) in Taiwan, Argentina, Russia and South Africa (www.iupac.org/web/ins/2003-055-1-050) with an extra leg during the Year of Chemistry (2006) in Korea, to train teachers to help students communicate the benefits of chemistry, we submitted a new project proposal (IUPAC project 2007-005-2-050, 2008-2009): 'Research-based evaluation of the Young Ambassadors for Chemistry project' (www.iupac.org/web/ins/2007-005-2-050). As our initial project already generated a lot of spin off in e.g. Bulgaria (Plovdiv, Sofia), Egypt (Alexandria), Jordan (Tafila), Korea (with Korean teachers during ICCE 19 in Seoul), Taiwan (Yilan) and Lithuania (Vilnius) the new task group wanted to know how to secure the sustainability of the YAC project and how to attract future sponsors.

In this new project three target countries were strategically identified: Taiwan (because of three earlier successful events), Mauritius (because of ICCE 20) and Kenya (because of the satellite conference after ICCE 20). Communication with Kenya failed, so this report is restricted to YAC Taiwan and Mauritius and when possible with comparisons with the former YAC South Africa.

The Young Ambassadors for Chemistry project is a partnership between the Committee on Chemistry Education (CCE) and the Science Across the World (SAW) programme, to facilitate the flow of ideas between chemistry and society, using young people as mediators.

Young Ambassadors for Chemistry in Taipei, Taiwan: course and event



Fig.1 Students produce bath salts



Fig.2 Presentation of a 30 second TV commercial

Mei-Hung Chiu and Erica Steenberg made a successful start in Taiwan in December 2007. The course took place in the National Taiwan Normal University, the YAC event was held at the busy Taipei main train

station with 34 high school students and 120 members of the public participating in the activities.

Media coverage

As one of the aims of the project is to have young students promote chemistry, we try to generate as much as possible media coverage, so we were happy to see the YAC event reported in the second biggest Taiwanese newspaper!

Evaluation

As part of the evaluation task, we developed three sets of questionnaires for teachers, students and the public. Some



Fig.3 Article in the second biggest newspaper in Taiwan: 'High school students producing hair gel at Taipei main train station'

items in the questionnaires were first used in South Africa and modified for Taiwan.

1. Teachers: comparison between Taiwan and South Africa

The teachers in Taiwan completed a questionnaire trialled in South Africa. The questionnaire consisted of 11 questions, exploring aspects such as teachers' use of chemicals; their attitude to science and chemistry; awareness and teaching of chemistry and a more general question on their views on a scientist. We also developed new items based upon the results from the first trials for Taiwan and used them for Mauritius later. In Taiwan, as for teachers, we used two sub-sets of questions: one about the general image about chemistry (such as naming the chemicals families use at home and the purposes of the use of these chemical products), the other set about their reflections on the YAC workshop. The results from the teachers showed they enjoyed the YAC workshop and would like to participate in follow-up activities. Their proposed action is to use the Science Across the World topic *Chemistry in our lives* in their teaching. They also like to use the internet for exploring cooperation and exchanging results with teachers and their students in other countries.

Direct comparisons between teachers' responses in South Africa and Taiwan could be drawn. The results showed that approaches in Taiwan are much more sophisticated than those in South Africa. Teachers in Taiwan will use ICT to improve public understanding of chemistry, whereas South African teachers regard workshops and training programmes as more valuable. The poor accessibility of ICT facilities in South Africa is clearly reflected.

Most teachers in South Africa said that they would be prepared to organise a YAC event in their district, but they were afraid they might experience difficulties in obtaining the chemicals and containers for the practical work. These materials are not as easily available in the rural areas as in the cities.

In Taiwan, teachers express their enthusiasm to adopt the Science Across the World programme (as *Chemistry in our lives*) in their teaching, but they are concerned about their competence in communicating with foreign teachers and students in English.

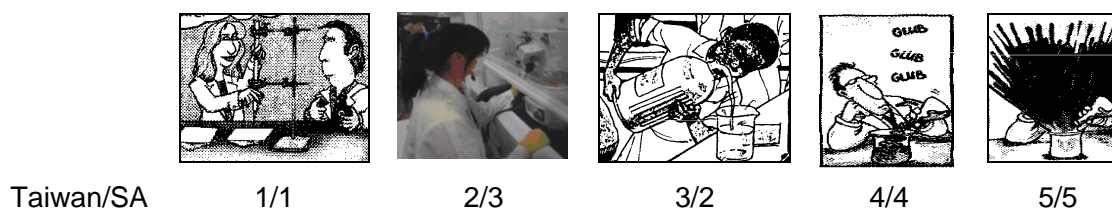


Fig.4 Ranking pictures about the image of chemistry in Taiwan and South Africa

Teachers were also asked to rank five pictures provided by the researchers from their best till their worst image of chemistry (in South Africa, the second picture showed an African girl). Figure 4 shows the results. 1 stands for the most representative picture (two chemists, one female and one male, working on a chemical experiment). Picture 2 (the female chemist) was ranked 2 and the bomb/explosion was 5. In South Africa, the ranking of the first and the last two pictures was similar and the order of the middle two pictures reversed.

2. Roving (student) reporters, interviewing the public

The questionnaire for the public was first trialled in South Africa and modified for use in Taiwan. In Taiwan 76% of the public considered that 'chemistry' has a positive impact on their daily lives and showed their support about having similar YAC activities in school science learning.

In South Africa, 95% of the public said that science has something to do with their everyday life. The public in South Africa is still very wary of chemicals, with 87% stating that 'chemicals are dangerous'. Programmes on television and activities by learners are thought to be most valuable to increase the knowledge of the South African public about chemistry.

Young Ambassadors for Chemistry in Mauritius: preparation

Young Ambassadors for Chemistry Mauritius took place just before ICCE 20 with an official opening ceremony at the University of Mauritius with the Dean of the Faculty, Prof Henri Li Kam Wah (also President of ICCE 20), Prof Ponnadurai Ramasami, Prof Minu Gupta-Bhowon, Prof Sabina Jhaumeer-Laulloo (chairman and organisers of ICCE 20) and Mrs Selamawit Alemayehu (British Council Mauritius). We started with an introduction about both programmes (Young Ambassadors for Chemistry and Science Across the World) and a hands-on session in the



Fig.6 All teachers and trainers

computer room to get to know the available resources, concentrating on two topics: 'Chemistry in our Lives' and 'Climate Change'. Lydia Rhyman and Maugeene Rengenchetty from the University of Mauritius (UOM) assisted us with the preparations and during the whole course.

On the second day we made a start with the teacher's training on the practical work the students were going to show the public during the YAC event (train the trainers!). As the Mauritian College of the Air (MCA), the educational television station, asked our permission to record and

broadcast the whole course / event, a professional TV crew arrived and set up their equipment. The teachers worked hard on the preparation - the designing, production and marketing - of a new Mauritian cosmetics line. MCA interviewed two of them about their views on the Mauritian



Fig.7 MCA crew recording during the practical training



Fig.8 Launching of the YACKI products in a 30 second TV commercial

educational system and on our ideas about using students as Young Ambassadors for Chemistry to promote chemistry.

With many wonderful new products on the tables a marketing campaign on TV was launched.

On the last course day we prepared

the Young Ambassadors for Chemistry event for the students, dividing tasks and sorting out the needed chemicals and additional materials.



Fig.5 Group work to get to know the resources

Young Ambassadors for Chemistry in Mauritius: the event

We asked for 30 students, 70 came! The allocated space in the Trianon Park, outside the Shoprite Food Market was quite small for the number of students (and teachers) and the masses of public that visited this busy place on a Saturday afternoon. Our roving reporters did a great job interviewing the public and guiding them to the

tables where their class mates were working hard on their new cosmetic products. The organizers provided us with a real disc jockey and the television crew showed up again. The



Fig.11 Students acting a real TV commercial!



Fig.9 Prof Wah, Prof Gupta-Bhowon, Prof Jhaumeer-Laulloo and external evaluator Jan Apotheker at the start



Fig.10 Teachers organizing their students in front of the Shoprite Food Market



Fig.12 A good selection of the creative products

students presented very creative TV commercials so our VIP jury, Jan Apotheker and Minu Gupta-Bhowon had a hard time to appoint winners from the 14 presenting groups. We saw role plays around a selection of nicely smelling cosmetic products with well designed, coloured labels and

heard songs, supporting the commercials.

The students even 'composed' their own lyrics and asked the disc jockey to help them, so they could use their i-pods for background music.

We ended with the price giving to the winners, handed a GlaxoSmithKline bag with goodies to all participating students and received many thank you's with wonderful well-appreciated presents.

Media coverage

We were thrilled by all efforts of the Mauritian College of the Air (MCA) to cover the course and the event for a television broadcast. After the event they even interviewed the three organisers in a real professional studio.

The result of the 45 minutes broadcast is a DVD on which the interview is combined with shots from the teachers' course and the Young Ambassadors for Chemistry event and a short interview with two of the participating teachers.



Fig.13 Roving reporter interviewing the public. The student reporter collected 57 completed questionnaires



Fig.14 Mei-Hung Chiu handing the Young Ambassadors for Chemistry prizes and bags to the winners

Follow up in Mauritius

During the course the teachers got more and more enthusiastic about this type of activities. We promised the group to keep in contact, so we can support future initiatives. In a meeting during ICCE 20, the Dean Prof Wah, Prof Gupta-Bhowon and Prof Jhaumeer-Laulloo promised the group of teachers could use the University's facilities for future meetings.

Young Ambassadors for Chemistry evaluation after Mauritius

1. Teachers, comparison between Mauritius, Taiwan and South Africa

One of the questionnaires the teachers in Mauritius completed, allows comparisons across South Africa, Taiwan and Mauritius. In Mauritius and South Africa, teachers regard newspapers and television as valuable resources for knowledge about chemistry. In Taiwan, activities by students were rated twice as valuable as information obtained from newspapers or television. The fact that courses at universities are regarded as valuable resources for knowledge about chemistry by teachers in all three countries is perhaps a consequence of the YAC workshops in all cases being hosted by universities.

95% of the teachers in Mauritius and 100% of the teachers in Taiwan would like to participate in YAC similar activities in the future and adopt them into their science teaching. During informal conversations in Mauritius and Taiwan, school headmasters showed their interest in organizing YAC events in their communities.

In South Africa, 86% of the teachers indicated that they would be prepared to organise YAC activities in the future. Rural teachers have reservations about their ability to obtain the chemicals (e.g. detergent and polymer), but are very willing to act as 'seed teachers'.

2. Students, comparison between Mauritius and Taiwan

In Mauritius, 90% of the students liked the practical activities. Although they enjoyed the work, they were not sure whether they qualify to act as an ambassador for chemistry. 70% of the Taiwanese students indicated their willingness to be a young ambassador for chemistry in the future.

More results about students' ideas, the students as roving reporters and conclusions will be reported later.

3. Roving (student) reporters, interviewing the public, comparison between Mauritius and Taiwan

Figure 15 shows that the impression about chemistry was quite positive in both Taiwan and Mauritius. Relatively low percentages of teachers expressed a negative impression about chemistry. This result revealed that a considerable effort might have been made by chemists, educational systems, or media to raise the public image of chemistry.

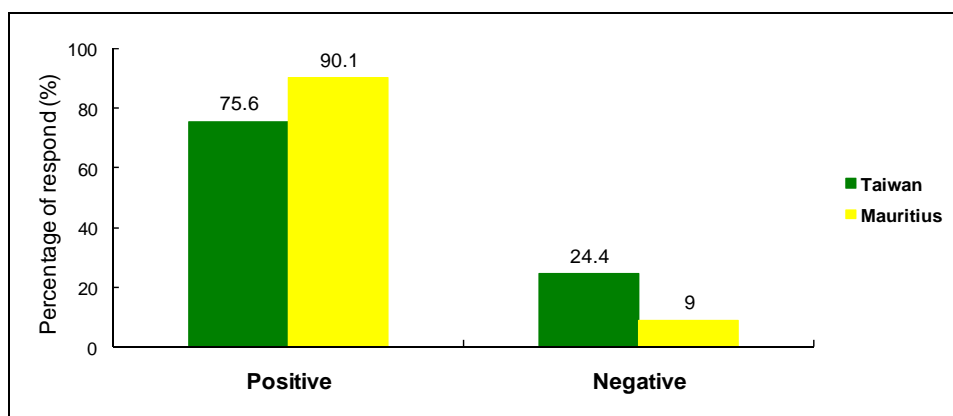


Fig.15 Responses of the public to the question 'What is your impression about chemistry?'

In addition, the public thinks that the practical chemistry activities with the students that we presented in the public area, will be beneficial for students' learning in science. Figure 16 shows a very high consensus from the public in Taiwan and Mauritius (this question was not asked in South Africa during the earlier trial).

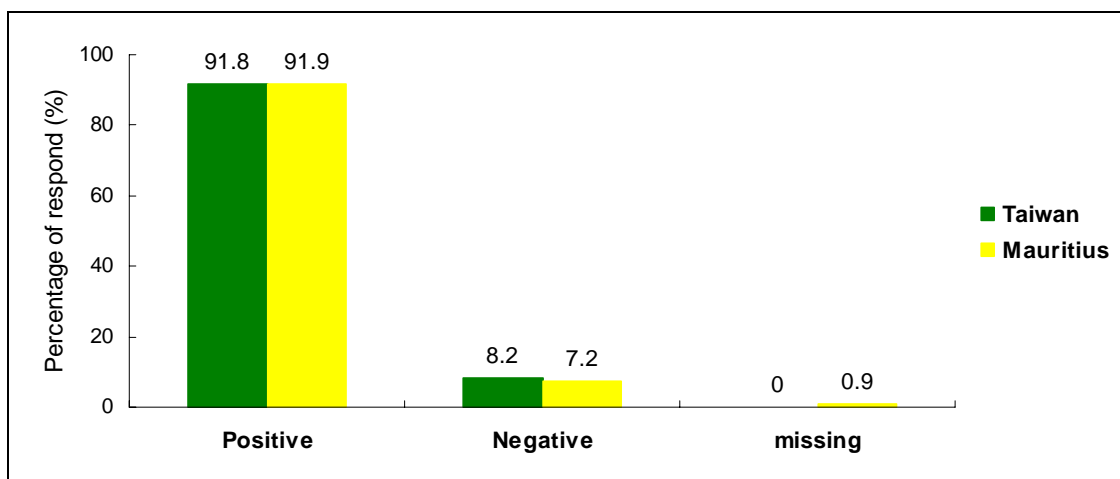


Fig.16 Responses of the public to the question 'Do you think this activity is a good activity for students?'

4. External evaluators in Mauritius

Three external evaluators (Chin-Cheng Chou, assistant professor from HungKung University in Taiwan, Dr Fawzia Narod from the Mauritius Institute of Education (MIE) and Jan Apotheker, lecturer in chemistry education, Department of Chemistry Education, University of Groningen, the Netherlands) were asked to observe the activities during three days (YAC course and public event). Three perspectives were designed to be evaluated by the external evaluators: teachers' course, students' involvement and the public setting and engagement of the public. The results from the reviewers showed their high agreement on innovative resources for chemistry teachers provided by the YAC instructors. The evaluators also reported that the YAC programme stimulates the teachers to learn not only the chemistry activities, but also stimulates the use of internet resources for teaching chemistry. As for the YAC event, the reviewers reported that the public was very involved in the chemistry activities with the chemistry students and teachers. Hence the public was very cooperative in the interviews by the students.

Conclusions

Up till now 6 conclusions can be made from our project.

1. The teachers highly value the YAC course and event and express their interest in learning more about chemistry in their lives.
2. The students mention that YAC activities made them further realize the meaning and connections between chemistry and their daily lives. Interestingly, we also find a relatively high percentage of the students with positive perceptions of chemistry. This is consistent with the ideas about chemistry by the public found in Mauritius, Taiwan and South Africa.
3. The public considers a YAC event as an appealing and important activity for the students to understand chemistry with a different approach. This finding supports that more YAC workshops and events are needed to promote public understanding of chemistry.
4. Teachers as well as students can play the role of ambassadors to make the public understand chemistry better.

5. We might have to explicitly guide teachers to help their students to be a Young Ambassador for Chemistry during future courses.
6. Finally, the evaluation process provides us with detailed information about achievements and what can be done better in the future for teachers, students and the public in understanding the relevance and merit of chemistry in our lives.

Acknowledgements

- **IUPAC Committee on Chemical Education (CCE)**;
- **Science Across the World** (www.scienceacross.org);
- **National Science Council, Taiwan** (grant # NSC 96-2515-S-003-006) and **National Taiwan Normal University** for organizing and sponsoring the course / event in Taipei (2007);
- **University of Mauritius** for organizing and sponsoring the course / event in Mauritius (2008);
- **British Council Mauritius** for sponsoring;
- **Mauritian College of the Air (MCA)** for producing a wonderful television broadcast (open channel) about the whole Young Ambassadors for Chemistry course / event at the University of Mauritius and the Trianon Shopping Centre; after the broadcast they made a dvd available for future promotion purposes;
- **Cognis** (www.cognis.com), for donating the detergent, the raw material for the production of a shampoo;
- **Seppic** (www.seppic.com), for donating the emulsifier for the production of a cream;
- **Bio-Rad** (www.bio-rad.com) for donating a Genes-in-a-bottle kit, being the prize for the best acting Science teacher;
- **GlaxoSmithKline** (www.gsk.com) as the former main sponsor of the Science Across the World programme, for goody bags for all participating teachers and students;
- **Roche** (www.roche.com) for donating the educational cd-rom 'Roche Genetics'.