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Evidence from the Royal Society of Chemistry – STM 13

National Assembly for Wales Consultation

Follow-up inquiry into Science, Technology and Mathematics (STEM) Skills

Response from Royal Society of Chemistry

The Royal Society of Chemistry is the largest non-government supporter of chemistry education in the UK. Our activities encompass lifelong learning, including formal and informal education, and are grouped into three key areas: schools and colleges, higher education and continuing professional development.

The Royal Society of Chemistry is pleased to be given the opportunity by the National Assembly for Wales' Enterprise and Business Committee to submit evidence to its Follow-up Inquiry into STEM Skills, and would like to advance the following points:

- Programmes such as the Royal Society of Chemistry's Spectroscopy in a Suitcase are popular amongst schools and have been proven raise aspirations, provide added confidence and change preconceptions of Chemistry.
- The Royal Society of Chemistry recognises that there is currently a high demand from teachers for support in teaching STEM subjects; suggesting a lack of resource and confidence for teaching the STEM subjects.
- There is currently insufficient data and understanding of the big-picture of STEM Enhancement and Enrichment activities taking place across Wales and a lack of a coordinated approach in delivering these activities nationally.

Spectroscopy in a Suitcase.

Spectroscopy in a Suitcase (SIAS) is an outreach scheme that takes portable spectrometers into schools. The delivery of the scheme is sub contracted to local Universities and trained postgraduate students deliver the workshops. A 'standard' SIAS kit includes a portable IR spectrometer and a UV-Vis spectrometer. Thanks to funding from the Welsh Government through a National Science Academy grant, we have been able to pilot the use of a portable NMR spectrometer here in Wales.

In Wales, we have sets of equipment hosted by:

- Bangor University (with NMR)
- Cardiff University (with NMR)
- Aberystwyth University (IR only at this time)

So far this year the scheme has delivered workshops in 75 schools across Wales and engaged with more than 3000 students (50% in North Wales and 50% in South Wales). By the end of the 2013-14 academic year we expect to have visited a total of 100 schools and delivered workshops to nearly 4000 students.

The hands-on school workshops and follow-up activities exploiting the SpectraSchool web site have been extremely popular with teachers and students, with solicited and unsolicited feedback being excellent. Through these activities students have gained a better understanding of the techniques and have benefitted from the opportunity to talk to undergraduate/postgraduate ambassadors discovering what it is like to study for a chemistry degree, raising aspirations, giving added confidence and changing preconceptions.

In line with point 5.3 in the 'Increasing the science and engineering talent pool' section of *Science for Wales*, programmes such as SIAS have been coordinated and supported by the National Science Academy with proven success. The Royal Society of Chemistry would suggest that this activity is in high demand and increasing capacity for schemes such as these is necessary in continuing to meet the needs of schools across Wales. In some areas, Universities are unable to meet requests from the schools, resulting in some learners missing out on this aspiration-raising resource. In order to fully meet its objectives, the National Science Academy should consider increasing resource for these activities to ensure that every learner has access.

As resources such as these are offered in schools to whole classes, the activities provide equal opportunity for both males and females to be inspired and enriched by the activities. In addition the scheme is supported by undergraduate and postgraduate University students, providing inspiring role-models for all learners.

Education Coordinator Network

There is currently one RSC Education Coordinator in Wales, based in the Cardiff University. The Coordinator's main role is supporting the teaching and learning of chemistry by building networks of teachers. Throughout the past three years, the Coordinator in Wales has been in high demand by the RSC community. Their work focused on three key areas:

Increased engagement and confidence of those teaching chemistry

The Education Coordinator connected with 270 teachers and 51 trainee teachers in 2013 at 13 events. These events included: cluster teacher events, Initial Teacher Training, regional networks, CPD sessions and other events such as local and national science festivals across Wales. These connections provided opportunities to promote many Royal Society of Chemistry projects and activities with a priority on Learn Chemistry, Enrichment and Enhancement Activities, CPD opportunities and additional projects such as competitions. Each of these projects and activities are aimed at increasing confidence in teaching the STEM subjects, providing opportunities for professional development for teachers, and to offer a bank of resources which will continue to improve teaching in STEM.

Increased interest of 11-18 year olds in studying Chemistry

ChemNet is the Royal Society of Chemistry's free network for 14-18 year olds who are interested in chemistry. The Coordinator promoted ChemNet throughout Wales and has been

central in sourcing local events. Their contribution at these events included: training ambassadors, arranging ambassador school visits and responsibility for events to support members. In 2013 there were 4 ChemNet events across Wales reaching 51 students, there are now 692 students members of ChemNet across Wales. The ChemNet membership connects like-minded students from across the world; members have access to exclusive events, support with their studies, and information about the latest advances in Chemistry and careers information.

Maintain knowledge of region and develop networks of local contacts

The Education Coordinator built strong regional contacts with their RSC Local Sections and RSC Members, Education Support Organisations, HE staff, Industry and the wider chemical science community. This has led to more collaborative working with like-minded organisations throughout Wales and further broadened the scope of our connections with core audiences.

Currently, our Coordinator covers a very large geographical area, the need to travel large distances limits their available time and reduces their visibility across the region. The Royal Society of Chemistry is significantly investing in locally-managed outreach activities by growing our network of locally-based Education Coordinators. In 2014, one new Education Coordinator will be recruited in order to broaden RSC reach throughout Wales. The additional coordinator will be hosted by a local educational establishment, which will increase the reach of our outreach activities, and better support our members and other advocates. Coordinators will be able to offer more support for teachers, ITT students and the general public across Wales. This will enable our Education Coordinators to create more positive perceptions of STEM across the Welsh Society.

The Education Coordinator has held a number of CPD sessions in recent years (In line with point 5.4 of the 'Increasing the science and engineering talent pool' section in the *Science for Wales* report.) with varying success. CPD events have been under-subscribed on numerous occasions despite a clear demand for support in developing subject knowledge for non-specialist teachers. The Royal Society of Chemistry suggests that until a high importance on CPD is communicated by both the government and the school, enabling teachers to attend these events, efforts in providing valuable CPD will continue to be challenging.

There is currently a lack of statistics in Wales which would provide the Educational community with a clear picture of local gaps in provision of STEM enrichment activities. As a result, it is problematic for institutions to provide a coordinated approach to supporting and developing the STEM skills across Wales. We recommend that there is a focus in gathering clear information on this provision.

Royal Society of Chemistry
22nd May 2014.