ECTN4 Final Conference 2009

Dresden, Germany, 6-10 September 2009

"Chemistry and the Bologna Process – Current Status and Future Needs"

Evaluator's Report : Dr Tony Ashmore (Consultant, UK)

1. Introduction

The European Chemistry Thematic Network (ECTN) was established in 1996 as a network of universities and other organisations concerned with university chemistry level education in Europe. It operates through volunteer representatives of member institutions and is co-ordinated from CPE Lyon, France. The Network has 160 members in 29 countries and collaborations with institutions in North America, Africa and Asia. ECTN is grant funded by the European Commission. The current grant ends in Sept 2009 and the Dresden meeting was its final conference.

A legal entity, the European Chemistry Thematic Network Association (ECTNA) was established some years ago to provide a permanent and democratic basis for continuing activity.

The conference was co-sponsored by Dresden University of Technology (TU Dresden), German Rectors' Conference (HRK), German Chemical Society (GDCh), German Academic Exchange Service (DAAD) and BASF AG.

ECTN is combining with the corresponding Network for Chemical Engineering to form the European Chemistry and Chemical Engineering Education Network which will be funded by the European Commission until September 2012. ECTN is the longest continuously funded thematic network which is a testament to its achievements and management.

This is a report on the Dresden conference prepared by Tony Ashmore. The programme for the conference is appended.

2. Conference Aims

The aims of the conference were:

- To review the current state of development of the European Higher Education Area, and some of the contributions made by ECTN
- To identify major issues requiring further development, with particular reference to chemistry and chemical engineering.

3. Conference Structure

The conference comprised two full days, all in plenary session with a round table discussion session on each day. There were receptions on the arrival day before the conference and on both evenings.

4. Attendance

There were 115 participants from 23 European countries and a further 4 participants from outside Europe. Most participants were university faculty members.

5. Conference Organisation and Facilities

The conference was organised by Prof Reiner Salzer of the TU Dresden and Prof Terry Mitchell of the TU Dortmund. Information in advance was provided through an easy to use website. The onsite support from conference staff was excellent.

Accommodation for all participants was provided in convenient hotels with good facilities and the venue and catering facilities were all within walking distance. The choice of venue promoted interaction and social cohesion.

The room used for formal sessions was appropriate. The meeting ran in accordance with the published schedule.

The quality of food was very good. Refreshment breaks during the sessions and the evening receptions served to promote interaction between participants, contributing to an atmosphere that was conducive to the fulfilment of the conference aims.

6. Conference Content

The conference programme was well structured. The first day was devoted to stocktaking, reviewing the current status of the Bologna Process, with the second day looking forward towards 2020 and the further developments that would be necessary. Within each day there was a logical flow and the time allocated to each topic was appropriate.

Speakers were from a range of countries and the selection of a number who are not chemists contributed greatly to the richness of the programme through their different perspectives. All the speakers fulfilled their briefs and none of the delivery of the talks raged from good to excellent.

The benefits of co-sponsorship were evident from the range of speakers attracted.

6.1 Stocktaking

In the opening session speakers gave appropriately brief welcomes before setting the tone of a business like meeting:

- The Network Co-ordinator gave a succinct summary of ECTN's achievements and contributions to date and the two strands to its future – the establishment of a permanent, self funding Association (ECTNA) and the formation of an expanded network that also includes chemical engineering.
- The President of the German Rectors' Conference summarised what had been achieved by universities in Germany under the Bologna process and the challenges that still lay ahead. For chemistry, she highlighted the contributions made by the discipline to the Tuning Process and the benefits that it had derived in defining subject specific competences. Further engagement with employers, and students would be necessary to bring about fundamental changes in attitudes of all parties. Bachelors and Masters programmes required further adaptation to labour market needs as the PhD is still too dominant.
- The Pro- Rector for Science of the TU Dresden reviewed the approach of the host institution to reform. The managerial approach had been to promote bottom up discussion. This was bringing about more fundamental changes in the nature of the education provided, in addition to restructuring into 3 cycles with the adoption of ECTS. A period of consolidation, with improvements in quality management, was now the priority.

The rest of the morning reviewed the Bologna process from different perspectives:

- A chemistry perspective was provided by the Chair of the ECTN management committee by relating the development of the Network and its contributions to the Bologna Process. He emphasised the origins of the Process as coming from and being owned by universities and member states, rather than the EU.

- The representative of EURYDICE emphasised the cultural, as well as structural changes occurring in universities as a consequence of Bologna. The Process transcended national boundaries and gave European HE a much clearer identity globally. Europe is in the vanguard of the development of common degree structures, qualifications frameworks, learning outcomes and enhanced public responsibilities of universities. The economic crisis needs to be met by increased co-operation between universities, including across national boundaries, embracing reform as an opportunity.
- A perspective from the USA was provided from the Institute for Higher Education Policy, Washington DC. Other regions of the world are adopting aspects of the Bologna Process, illustrating that massive reform on a voluntary is possible without government intervention and that such reform is neither easy nor quick. Countries (and universities) that learn from each other grow whilst those that remain aloof do not. Qualifications frameworks are best developed initially on a disciplinary basis as a precursor to defining generic descriptors. The Lumina Foundation in the US is seed funding tuning exercises in 6 disciplines in 3 States.

The afternoon focussed on particular aspects of Higher Education:

- ECTN and Chemistry had led the way in the development of discipline based quality labels. Up to April 2009, 48 Eurobachelor and 28 Euromaster labels had been awarded to 39 institutions in 16 countries. ECTNA owns the trademarks for the labels and has partnership agreements with accreditation agencies in the UK (also covering Ireland), Italy, Germany and Poland. Standards required conform to the Dublin Descriptors of the HE Qualifications Framework, as customised for chemistry and published as the "Budapest Descriptors".
- A study of employability of bachelors degree graduates has been published by ECTN. Employers value practical professional skills more greatly than specialist scientific knowledge at this level. There is, however, a "wait and see" attitude amongst employers as graduates with these new (in most countries) qualifications enter the labour market. Universities need to make much greater efforts to engage with employers if the qualification is to succeed in the labour market. Follow up work and studies at other qualification levels are needed.
- A "Founding Angel" (an entrepreneur) with a PhD in chemistry and an MBA described the process of facilitating the spin out of research ideas through founding start up companies to eventual sale and realisation of financial gain. Such individuals require scientific understanding coupled with management expertise and financial resources to partner inventors.
- Innovation in teaching methods had been a working group of ECTN and had resulted in a substantial publication involving more than 30 university teachers. The Bologna Process and the Lisbon Agenda were both drivers for change. There now needed to be greater efforts devoted to generic and subject specific training for university teachers.

The day concluded with a round table discussion on mobility and recognition. Mobility becomes more desirable as treatment of content and overall experiences become more varied. But recognition for transfer of credit becomes easier where such differences are small. However, diversity is important so approaches to recognition have to overcome conservatism and protectionism. Ultimately recognition has to be on the basis of trust between institutions and of qualifications. The working assumption should be that recognition is presumed unless evidence is to the contrary. Much work is still needed to reconcile the Bologna and Copenhagen (vocational) frameworks and to give recognition to informal or work based learning). The discussion was lively and wide ranging, but remained on topic.

6.2 Future Needs

The second day started with presentations on the development of HE in the next decade:

- The EU suggests three areas that require further reform:
  - updating curricula, adoption of learning outcomes as part of the Bologna Process
  - governance of universities to improve accountability and enhance autonomy
  - increasing funding by considering matters such as public/private funding, student fees and developing enterprises.

  Education Ministers have charged the Commission in the short term with developing targets for mobility, improving the collection of comparative data, widening access to HE, promoting adoption of the Bologna Process globally and improving transparency. The latter could become controversial if plans for a feasibility study on ranking universities become reality.

  Ministerial meetings are planned throughout the next decade and will run alongside a Policy Forum that will include countries from outside Europe.

- Third cycle education to PhD is crucially important to chemistry. The European Universities' Association's (EUA) Council on Doctoral Education is developing a new vision for doctoral education in Europe and intends to publish it as "Salzburg II Principles" in 2010. Doctoral education is fundamentally different in nature to the first and second cycles with the use of ECTS as a measure of study being inappropriate. Universities need to create research communities of critical mass in which members take collective responsibility for developing the scientific and professional skills of early stage researchers. The EUA is seeking to challenge conservatism and create research environments that have the training of researchers and their professional development at their heart.

- A student view of doctoral education was presented on behalf of the recently formed European Young Chemists Network. Differences in the experiences of doctoral students were discussed – requirements to support teaching, for publications, for language competences and of assessment. There is a mismatch between the assessment criteria for the award of a PhD and the competences required in the labour market.

A comprehensive review of the first two years of the European Research Council was presented. The Council has a budget of €1.1b pa to cover the sciences, social sciences and humanities. The bulk of funding goes to the sciences, supporting individual scientists with either starting grants or advanced grants for established researchers. Chemistry receives an appropriate share of funding. A successful environment for research, requires freedom for, and trust of, the researcher and flexibility in use of funds and working conditions. Issues of concern to the ERC are gender imbalances at PhD level and beyond, with women significantly under represented and the need to step up efforts to attract scientist who have left Europe to return. The ERC's approach to funding is well matched to the EUA's vision of doctoral training.

Skills training for future industrial needs in an innovative and sustainable Europe, is the subject of a major SUSCHEM study. Currently the skills base is very variable across Europe and so the Bologna process needs to go forward if the European chemical industry is to remain competitive. Within chemistry there is a mismatch between course content and the needs of industry. For example, whereas training in synthesis is strong, there is a lack of training of skills in formulation despite its crucial importance in industry. It is not simply a matter of producing more chemists; the need is to stimulate courses that meet the needs of particular countries and industries. SUSCHEM needs stronger academic input to help it in its work.

The second round table discussion was also lively and informative, focussing on the contribution of education and research to industry. Each university should take a long term view in developing its research strategy, supporting strengths and defining learning outcomes that are achievable and reflect professional needs. Graduates should be authoritative in their subject areas, be able to evaluate the significance of results, creative and able to communicate with specialists in other

fields. Much of Europe's chemical industry is found in SMEs, with a consequential low capacity to provide industrial training place.

6.3 Finale

The conference ended with a demonstration of spectacular experiments which, commendably, was open to local schools.

7. Conclusions

The meeting was one of the most successful this Reviewer has attended for some time, both in respect of content and organisation.

It contains some significant steers for the new Network, particularly with regard to the culture of chemistry and chemical engineering departments, the crucial importance of the third cycle to these disciplines and engaging with both employers and students over matters such as skills development and employability.

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