

Danish report to EuCheMS DivCEd council 2009-meeting in Manchester for the period June 2008-June 2009.

The Danish Chemical Society serves around a thousand members, mainly chemists from industry, chemical research institutions and universities. Chemistry graduates from a technical university are further organised in the chemistry section of The Society of Danish Engineers. The chemistry teachers of the upper secondary school are by tradition organised in the Chemistry Teachers Association.

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1. **Summary:** The new accreditation council has been in operation beyond pilot-projects. The accreditation of all existing university programmes in Denmark have been scheduled (2009-2011). The Chemistry and other Science departments at the universities are becoming smaller as a result of the persistently smaller enrolment in science these years. Until now, no chemistry department has been closed down. The late upper secondary school reform did not result in Chemistry being chosen by as many students as in the old system. Chemistry departments at universities are routinely involved in open house arrangements preferentially for upper secondary school students to increase enrolment.
2. **National educational policy**
 - The ECTS grading system has been implemented throughout the Danish educational system from 1st of September 2007. All regulations of programmes (which are approved) by the university senate has been reformulated to include descriptions of consistent aims assessment criteria. Each of the letters A-F are additionally equivalent to a corresponding number. In Denmark, enrolment in higher education is regulated by the grade point average of the school leaving certificate: admission to a given programme (with a limited enrolment number) is given in order of decreasing GPA. A key for translation of old grades to the ECTS scale has been devised in order to be able to give a GPA for all graduates.
 - Until lately, university programmes have been approved by the Ministry of Science, Technology, and Innovation. A new act has introduced an accreditation institution for new and existing programmes. After a pilot period the national accreditation council has entered the large job to quality assess all existing and new programmes offered at tertiary level. Accreditation of existing Chemistry programmes have been scheduled (2010-2011)
 - Entrance qualifications to tertiary education in all science subjects, incl. bio- and geo-sciences have been regulated lately: Mathematics at A level and physics and chemistry at B level. The rationale is to get upper secondary school students to choose subjects according to their wishes for a career, and to make the starting level clearer for the universities. Still, many of the new students have to improve their level of Chemistry turbo-wise during the summer, because they didn't choose Chemistry at a sufficient high level in their upper secondary school programme.
 - In the primary and lower secondary school there is still a large need for science teachers. The teacher training programme has been reformed lately and has been operating for those enrolled pr. 1st of September 2007. It was experienced, however, that the new programme with 3 or 2 subjects of specialisation (instead of the current 4) was not a way to meet the demand for more science teachers in school.
 - No steps seems to have been taken to comply with the need for replacement of retiring science staff in upper secondary schools, which seems to increase in the coming years.

- The enrolment at tertiary level in science (e.g. chemistry) and engineering was lower in 2008 than the average of the 5 preceding years, possibly due to the increased entrance qualification demands.
3. **Events in chemical education.**
 - During the last year several universities arranged "open house" or visiting days with lectures and demonstrations preferentially for upper secondary school classes. The format and volume varies from university to university. Chemistry has of course been involved in such activities at the universities. "Order a researcher" is a new PR-reformulation of the opportunity to get a lecturing researcher to an upper secondary school.
 - The Danish participation in IChO's for 25 years is a well established annual event which is sponsored by industry and universities. The 2008 IChO in Hungary resulted in a bronze medal to all four Danish participants.
 4. During the year the **Division of Chemical Education** of the Danish Chemical Society arranged meetings and a session at the annual Danish Chemical Society meeting. Besides the cooperation with the physicists there is a co-operation potential with The Division of Environmental Chemistry about teaching of environmental chemistry.
 5. **Publications.** The national journal on science and mathematics education in Danish with peer review, "MONA" (an acronym for mathematics and science) covering science and mathematics education issues from early school to university level was funded by the government for two years. It seems to continue so far due to interested readers and the university science departments being willing to pay for it. If there were a direct proportionality between the difficulty of a subject and the number of contributions to the journal, chemistry is not very difficult, but mathematics very much so.