

Danish report to EuCheMS DivCEd council meeting 2019 for the period July 2018-May 2019.

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 with roughly 800 members.

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1. The enrolment into tertiary pure and applied chemistry programmes follows the cohort. Accreditation of Universities with extensive internal quality assurance mechanisms is currently replacing systematic accreditation of programmes. Chemistry departments at universities are routinely involved in open house arrangements and other recruitment events preferentially for upper secondary school students. There are signs that the increased tendency to governmental regulation of university's internal systems and procedures may level off or even be reduced. The Danish Chemical Society is without a Division of Chemical Education
2. **National educational policy**
 - The University Board of Directors (for a single university and with a majority of external members) appoints new members and the chairman. Political ideas have been discussed that the chairman should have a closer link to the ministry (or even be appointed by the minister). The question has not been settled, and the idea doesn't seem to be supported currently.
 - Accreditations of all tertiary programmes have run for a decade. This system is now gradually replaced by accreditation of the universities quality assurance programmes. Most universities and other tertiary education institutions have been through such a process. The remaining will follow during the next few years. Much effort has been spent on developing and implementing quality assurance procedures and routines at each single tertiary education institution.
 - While a new funding system for the financing of education at universities is being discussed the general governmental 2% budget-saving act has reduced the university budgets cumulatively for some years. Universities have reacted by abolishing minor subjects, by reducing staff and rethinking administrative systems. Teachers complain of higher teaching load. Students complain of reduced teaching, especially reduced running response to performance during the teaching and learning processes.
 - The Danish student living grant system (the SU system) is said to be extraordinary generous and it is indeed rather expensive. In response to that the government has introduced narrow time limits within which the students have to pass examinations and graduate. Those failing are exmatriculated and their grant stopped. Another mechanism discussed lately (to save unproductive grant money) is to shorten the period students receive living grants, but no decision has been taken.
 - In DK, the ECTS grading system implemented ten years ago use numbers (12 10 7 4 2 0 and -3) instead of letters (A to F). By tradition, the average of grades obtained in all exams in a programme package (e.g. the upper secondary school leaving certificate) is used as a one dimensional parameter to rank students. Weaknesses are now discussed in public. Especial-

ly the lack of opportunity to acknowledge the outstanding performance is stressed. No decision has been taken to change the present situation.

- The university enrolment system is from time to time under debate: Since there is no fee, degree programmes are dimensioned by the ministry. Several programmes witness too many applicants and in such cases, the average of grades obtained in the upper secondary school leaving certificate has been used to rank the applicants. An obvious disadvantage (felt as injustice by the relevant students) is that students with a certain average are enrolled while those with a tiny smaller average are rejected. It is discussed that also the grades in relevant subjects should influence the students' ranking. No decision has yet been taken.
- Enrolment in the STEM degree programmes at tertiary level is not increasing to cover societal needs for such graduates. While pure science subjects (some with a C as the lower admission average) tend to get a smaller number of freshmen, technology and IT witness a slightly increased interest.
- In certain areas some schools seem to accumulate bilingual pupils. This is seen as a challenge to integration and the learning environment in such classes, and an upper limit a more even distribution of pupils is discussed.

3. Events in chemical education.

- As usual universities arrange "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 PR-reformulation of the opportunity to get a lecturing researcher to an upper secondary school. Some universities hire some of their own students to perform "chemistry road shows" at local music festivals and other events to get in touch with young people. It seems as if increasing efforts (and money) are put into such enterprise in order to get students into science.
- The Danish participation in IChO's for more than 25 years is a well established annual event which is sponsored by industry and universities. The 2018 IChO in Prague and Bratislava this year only resulted in two bronze medals to the Danish participants. The Danish team for the 2019 IChO in France has been formed.

4. The **Division of Chemical Education** of the Danish Chemical Society is closed, since it is not backed up by university and industrial chemists in The Society. Other priorities apparently exist among university chemists. It has not been possible to appoint new member(s) for the DivCED council, even from the relatively new departments of science education at a couple of universities. As stated above in the head of this report, the upper secondary school teachers in chemistry have their own association, which is still operating with meetings and a little joint journal in Danish together with mathematics, physics and (the new subject) biotechnology in school.

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 is still published. If a direct proportionality between the difficulty of a subject and the number of contributions to the journal existed, chemistry is not a very difficult subject, while mathematics is very much so, especially at the primary and secondary levels.
- The monthly Journal "Dansk Kemi" (Danish Chemistry) has main focus on applied and industrial chemistry, although it brings news of interest to chemistry teachers and from time to time material directly related to chemistry teaching.