

The Department of Science at the University of Copenhagen invited the following 4 persons to participate in an evaluation of the Department for Science Education:

1. Professor Doris Jorde (Norway)
2. Professor Manfred Prenzel (Germany)
3. Professor Mick Healey (England)
4. Professor Mogens Niss (Denmark)

The Scientific Advisory Board was invited to the Department of Science Education during the time period 14-16 March, 2010.

The mandate of the Scientific Advisory Board was to:

1. Visit the Department of Science Education at the University of Copenhagen and listen to presentations from representatives of the department that would enlighten the board on the research, teaching and outreach activities of the unit.
2. After the visit, the board is given the responsibility of producing a 2-3 page public report describing the strengths and weaknesses of the department in the above mentioned areas in the light of international trends. In addition, a confidential report is to be submitted to the department head and the Dean of Faculty containing recommendations for reducing or strengthening support to current research/teaching groups and/or supporting the establishment of new areas.

Open Report

As a preliminary remark, whenever the term “science” is used in this report it is meant to include mathematics as well.

The Board welcomes the actions taken by the Faculty of Science in creating the Department of Science Education (DSE). This is a necessary component of any modern university where research, teaching and communication/public outreach are all a part of the department’s primary goals. By placing the DSE within the Faculty of Science, an emphasis on the special needs of this faculty is able to be met through the enhancement of teaching and learning in science and research on teaching and learning in science. The University and Faculty could strengthen the position and impact of the DSE further by developing a rewards system for teaching which matches that for research.

The DSE needs to be recognized for its work not only within the University and nationally but also internationally. This should be a strategic goal for the DSE.

The strengths of the DSE are many and include:

- A committed group of very competent people, enthusiastic about their work in the field of science education. The Board believes that it is essential that they be allowed to continue to develop their expertise together to improve future activities. The strength of the DSE lies in the fact that they are close to the Faculty of Science and not placed in unit across faculties or distributed throughout the University of Copenhagen.
- There is a good deal of diversity in research interests, scientific backgrounds and competencies within the group of people working at the DSE and this is advantageous. The staff are able to build on this to integrate projects with multiple perspectives. The climate for development of research and teaching is supportive for integrated projects.
- The connection to the natural history museum is a strength to the DSE in the way it is seen as an active learning environment for students at the university, for students in schools and for the general public. Opening a new, integrated museum will be an opportunity for the DSE to play an important role in the forming of the learning spaces within the museum. The Board sees the role of museum didactics as an important contribution to the DSE and the role they play in the communication of science in the informal arena. The DSE is able to become a leading player in the field of museum education.
- The group of researchers at the DSE have a satisfactory scientific production, with many publications in high-ranking international journals.
- According to the information available to the Board, the teaching activities of the DSE are met with considerable recognition amongst the recipients.

Fig 1 summarises our views on the areas in which we believe the Department should focus.

We recognise four ‘levels’ at which the department operates:

- Teaching and learning of science at secondary schools;
- Pre-service education of secondary school science teachers;
- Teaching and learning of science in higher education, including student transition into HE and retention within HE; and
- Museum education

and three ‘activities’ in which the department is engaged:

- Teaching, including teacher education
- Research; and
- Development

We think that the core focus of the department should be in the cross-shaped area in Fig 1 i.e. on research at each of the four levels and science teacher education and development in higher education, plus teacher education and development at the level of pre-service training for secondary school science teachers. The areas ticked provide a coherent set of areas in which the Department can concentrate its resources.

	Teaching	Research	Development
Teaching and learning of science at secondary schools		✓	
Pre-service education of secondary school science teachers	✓	✓	✓
Teaching and learning of science in higher education	✓	✓	✓
Museum education		✓	

Fig 1 Recommended focus for Department of Science Education

Recommendations

1. The Board would like to see a more directed mission statement from the DSE in which the challenges and problems that the Department will be dealing with are identified. The statement should be ambitious and should place the DSE on the map nationally and internationally. The focus should be on coherence – in maintaining and developing the existing strengths of the department.

The activities of the department should continue to include research on topics of teaching and learning in higher education, transition from secondary to higher education, and retention within higher education, museum education, pre-service teacher education and teaching in secondary schools.

Teaching activities should continue to include an emphasis on science teaching in higher education (including science communication) as well as science teacher education courses.

2. The Board would like to see more synergy between the activities related to research, teaching, service and museums. In order to accomplish this, it may be important for the DSE to prioritize some of the activities, while others should perhaps be scaled down. At the present time we see the large amount of diversity in the department's activities to be larger than needed and helpful for providing quality in the primary tasks of the department.
3. The structuring of research at the DSE seems to be diffuse or even artificial in some respects – something that happens with the creation of a new entity. However, the time seems to be right for identifying a few research areas that will draw the current staff together in a few common projects. The Board recommends that research on science teaching in higher education is a key part of the research portfolio.
4. Priorities for the core activities identified in points 2 and 3 should serve as the basis for applications for external funding. The DSE needs to say no to projects that do not relate or contribute to the core activities (those in the mission statement). Those activities that are not fully financed by external funding should not be accepted unless contributing to the core activities of the department.
5. The DSE should develop two scenarios for future development. In the first the DSE stays the size it is today with a more concentrated focus on a few core activities. In the second, the DSE allows for growth and has a plan for areas to expand into related to its mission. In the growth scenario, the emphasis should be on further consolidating and extending the present strengths of the Department rather than on adding new areas to its profile.
6. The DSE should have a plan for personnel development of all staff members so that they have career goals that also benefit the future of the department. PhD and Postdoc students should be included in this exercise.
7. The DSE should be encouraged to conduct a study in the different models for teacher education of senior secondary teachers – with and without teacher training before taking a job.
8. The DSE should be encouraged to play a role in advising and researching the development of the learning spaces at the two new buildings being planned at the university: Niels Bohr Science Park and the new Natural History Museum.