

Summary of advisory report 41

VITALITY AND CRITICAL MASS

Strategy for the natural and technical sciences

The Minister of Education, Culture and Sciences (OCW) requested the AWT for advice on a strategy to be pursued with regard to scientific and technical education and research at the Dutch universities; see annex 1.

Trend in student numbers

Talk about the future of all these specialist fields is generally sombre, attention being drawn to the declining number of students in the sciences. Interest in other countries is said to be much greater.

Both positions contain prejudices in which it is possible to draw subtle distinctions.

In the last thirty years the interest in science studies has not fallen; the percentage of students opting for a science course has been remarkably constant for decades, among both men and women, although the interest is substantially lower among women than it is among men. Because university education in the last 25 years has expanded mainly due to the increase in the number of women students, the relative proportion of science courses in the total number of courses has fallen. In absolute terms, the number of science students up to the early 1990s increased. The decline that has occurred since then is a result of demographic developments; the number of eighteen-year-olds has fallen by twenty-five per cent in less than ten years.

Compared with other countries, the Netherlands occupies the centre ground as regards interest in science studies, but this does not alter the fact that within the domain of the sciences a number of worrying developments are taking place.

Big shifts have occurred in the domain of the sciences in the last few decades. In the 1980s, the relative share of the intake to the technical sciences grew at the expense of courses in the natural sciences. In the 1990s, a shift occurred within the natural sciences from the exact sciences to the life sciences. In addition, new courses were set up, e.g. information technology. These changes in the choice of studies tie in with the needs of the labour market.

All these developments together have resulted in a drop in the intake for mathematics, physics and chemistry in particular at the six general universities, and to a lesser extent at the technical universities. This development is worrying, certainly if it continues. On the one hand, the decline gives cause for alarm in regard to the continuity of industry, on the other it results in inefficiencies in the courses concerned. The Council does not expect any spectacular effects from large-scale efforts on the part of the government to turn the tide of shifting interest; the underlying changes are too structural in nature for this. It recommends broadening the courses so that they tie in better with the needs of the labour market and increase their power of attraction to students. It also thinks the science component in the arts and social sciences courses should be increased.

However, in a number of fields the situation is so worrying that specific attention is necessary. This applies in particular to the low number of students for mathematics. In many areas of science the importance of mathematics as a support discipline is increasing. This requires people with mathematical training in all manners of disciplines, whereas within mathematics itself an ever broader area of application needs to be covered. There is also an acute and socially unacceptable shortage of teachers in the science subjects.

Concentration

From the education point of view the Council deems it undesirable to maintain complete, independent courses at all general universities for mathematics, physics and chemistry. It is an inefficient use of resources. The current situation is not effective either; there is on average per university too little potential for creating space for innovation in education.

A concentration, or at least an administrative centralisation, is also desirable for research. In general, the quality of research can certainly be deemed to be good, but as a whole the system is too vulnerable to allow high quality to be maintained in the future. Fragmentation means there are insufficient opportunities for picking up new developments adequately and there is not enough international visibility.

The Council therefore concludes that the present distribution among six general and three technical universities requires a major change, aimed at centralising and concentrating the existing teaching and research capacity. As a guideline, the Council recommends halving the number of independent science courses at the general universities. The allocation of capacity should be worked out in conjunction with the three technical universities and the agricultural university. Research at the para-university institutes should also be taken into consideration. The ETH Zurich can be taken as a standard; a university in a small country that covers the entire field of the technical and natural sciences and partly, as a result of the concentrated use of Swiss research resources, is among the top in global science.

The conclusion *that* a rigorous concentration is necessary is followed by the question *how* that concentration can be achieved. The Council advises the Minister to adopt the *that conclusion* and to pass on the *how question* in the first instance to the universities. Another reason for submitting it to the universities is because different universities are already holding discussions on mutual exchange and supply in connection with the importance of science subjects for other courses. As this process is currently guided mainly by local considerations, it will result overall in lesser concentration than is necessary from a national point of view. The stakes will have to be raised. In order to encourage the universities to make a greater effort, the Minister should request the universities to put forward a proposal that will lead to an efficient and effective concentration of science teaching and research. Only if the desired goal proves unattainable by this means should the Minister impose measures from above. Proposals that result in the planned goal require a reorganisation budget in order to be able to realise the changes with the necessary speed.

