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Your Excellency,

On 26 July 2018, the Cybersecurity Council (CSR) sent you an advisory letter concerning the abolition of enrolment restrictions. In that letter, the Council sounded the alarm on an urgent issue: a number of universities have said that due to capacity problems, they are unable to accommodate the growth in student numbers for their Artificial Intelligence programmes and related programmes, such as Data Science and Business Analytics, but also for their Computer Science programmes. The council therefore believes a solution to this problem must be urgently sought and feels that it is highly undesirable that, despite high demand, a shortage of lecturers and insufficient facilities and means should result in a failure to fully educate the influx of motivated and talented young people. This goes against the measures that are necessary for realising the ambitions in the government-wide National Digitalisation Strategy¹ and the National Cybersecurity Agenda.² In order to secure the digital future of the Netherlands, we must have highly educated people so that we can take full benefit from the existing opportunities. The council received your response to this letter on 3 October 2018.

On 21 June 2019, the Ministry of Education, Culture and Science (OCW) published a policy response to the Van Rijn Committee's research report '*Wissels Om* (Changing Track)'.³ In this response, you indicated your intention to adopt the recommendations from the research report and to make additional financial resources available to support scientific and technical study programmes. You have also agreed to ask the scientific and technical study programmes to submit a plan for increasing study success in those disciplines, to align the programme capacity to the demand from the labour market as effectively as possible and to improve the connection between education and the labour market in science and technology-related fields.

In light of this positive reaction, the council's subcommittee on Education has decided to sit down with a number of parties, including the Association of Universities in the Netherlands (VSNU) in order to identify targeted solutions for the lecturer shortage in scientific and technological study programmes. The CSR has incorporated the results of this consultation in a letter containing a number of potential

¹ Dutch Digitalisation Strategy: 'Getting the Netherlands ready for the digital future', Ministry of Economic Affairs and Climate Policy, the Ministry of Justice and Security and the Ministry of the Interior and Kingdom Relations, June 2018

² Dutch National Cybersecurity Agenda (A cybersecure Netherlands), Ministry of Justice and Security, April 2018

³ Report from the Advisory committee on Funding for Higher Education and Research, '*Wissels om* (Changing Track)', The Hague, May 2019

solutions that might enable you, the Minister of Education, Culture and Science, to combat the lecturer shortage and lack of facilities (such as study materials and a platform for bringing together lecturer-related supply and demand) in science and technology-related study programmes. These suggestions are particularly aimed at measures which could lead to a more structural relationship between universities and businesses, with an eye to high-quality education that is based on both science and professional practice.

Potential solutions

Through the present advice, the subcommittee of the council suggests a cohesive package of potential solutions which are specifically aimed at reducing the shortage of lecturers. Doing so will address the most important cause of problems related to enrolment restrictions. Public-private partnerships figure prominently in the suggested solutions. If we are to succeed in remedying the lecturer shortage as quickly as possible, each and every party involved – government, education and the private sector – must join hands in the creation of structural measures. Businesses and sector organisations such as VNO-NCW, NLdigital and FME have already indicated their willingness to participate in such efforts. The subcommittee feels that a budget of around 50 million euros should be allocated for the purpose of reducing the lecturer shortage. In addition, the subcommittee wishes to draw attention to the distribution of funding within the sector. Computer science (which includes Computer Security) is a discipline with a great many students – many more than Physics and Chemistry, for instance – which is not receiving proportionally generous means from the sector financing.

In summary, the Education subcommittee of the Cyber Security Council recommends the following potential solutions to the Minister:

- 1. Invest in a joint training programme for lecturers from the commercial sector and promote the development and use of digital tools in education.**
- 2. Stimulate flexible hiring policies among universities with regard to part-time lecturers from the commercial sector.**
- 3. Encourage the influx of lecturers and endowed professors from the commercial sector.**
- 4. Facilitate improved coordination of supply and demand with regard to lecturers and promote cooperation between education and the private sector.**

Re 1. Invest in a joint training programme for lecturers from the commercial sector and promote the use of digital tools in education.

1.1 Invest in a joint training programme for guest lecturers and those entering the teaching profession from the commercial sector

Training lecturers is a labour-intensive process and safeguarding continuity is difficult, as providing academic education requires a specific skill set. Lecturers who come to teaching from professional practice must be trained and supervised so that they (1) attain the proper academic level as defined in the University Teaching Qualification (UTQ); (2) understand and apply the values and standards of academic education; and (3) possess sufficient knowledge regarding day-to-day practice, the

organisation and the institutions within academic education. This requires certain efforts on the part of both knowledge institutions and the lecturers from the commercial sector themselves. Unfortunately, practical experience shows that, for a variety of reasons, lecturers from the commercial sector often opt not to continue teaching following the completion of their training. Where feasible, knowledge institutions could organise a joint programme for guest lecturers in scientific and technical study programmes. The teach-the-teacher programme run by the Netherlands AI Coalition is an example of this. Many universities already have a training centre in place for their own lecturers. Because this infrastructure is already present, it should be possible – within the existing structures – to develop a joint programme for lecturers from outside academia in the fairly near term. Combining the energy of multiple knowledge institutions will maximise the impact while limiting both efforts and costs.

Potential solution:

- *The Minister of OCW could invest in an inter-university track for a joint education and training programme for guest lecturers and new lecturers entering the profession from the commercial sector.*

1.2 Promote the use of digital tools

The power of academic education lies in lecturers' own inspiration and their interaction with their students. Experiences in other countries show that possibilities for teaching courses digitally can contribute to the expansion of educational capacity. In the Netherlands, too, we have the potential to offer study programmes or units of study in higher and academic education in digital form. Providing scientific and technical study programmes digitally, whether wholly or in part, will require certain investments in money and time on the part of lecturers and technical staff within the educational institutions. Space will need to be found for this, without additional increases in the existing workload of these employees.

Potential solution:

- *The Minister of OCW could promote efforts to provide scientific and technical study programmes digitally, whether wholly or in part, and could make financial resources available for the development of digital study material that may be collectively used by the universities.*

Re 2. Stimulate flexible hiring policies among universities with regard to part-time lecturers from the commercial sector.

In the Netherlands, the tasks, roles and responsibilities of academic staff have been formally established by the VSNU in what are known as UFO job classification profiles⁴. These UFO profiles serve as the basis for hiring and advancement policy at the universities. Academic education may be provided by academic staff at various job levels. Based on the UFO profiles, universities are increasingly choosing to deploy lecturers with PhDs (Lecturer level or higher), while lecturers without doctorates are either being phased out or receiving new appointments less and less often. The NVAO accreditation system, which includes critical consideration of the balance between lecturers with PhDs and those without, serves to reinforce these efforts.

⁴ See https://www.vsnunl/en_GB/job_classification_ufo.html

In practice, however, it seems that universities enforce a maximum allowable percentage of non-PhD lecturers within a given study programme, that lecturers without a PhD are not allowed to teach at all in certain study programmes, nor are they authorised to act as examiners in certain programmes.

Universities' strict policies with regard to the deployment of non-PhD lecturers is a barrier to the recruitment of potential lecturers from the commercial sector. While lecturers entering academia from professional practice can often draw upon years' worth of knowledge and rich experience, they typically do not have a PhD. As a result, they encounter only limited opportunities for, or are even barred from, deployment in academic education. Loosening the restrictions on the hiring and advancement of lecturers in scientific and technical study programmes could make a positive contribution to resolving the capacity issues faced by those programmes.

Potential solution:

- *In consultation and cooperation with the VSNU, the universities and the NVAO, the Minister of OCW could – for those fields of study where a drastic lecturer shortage exists – loosen the policy restrictions on hiring and advancement in higher education and thereby remove the most significant impediment to effective deployment of lecturers and guest lecturers.*

Re 3. Encourage the influx of lecturers and endowed professors from the commercial sector.

The number of potential lecturers that wish to transition from professional practice to a research university or university of applied sciences must be structurally increased. One possible impediment to new lecturers arriving from the commercial sector is that salaries in higher education are not commensurate with the (typically higher) wages in the corporate sphere. Extensive experience with recruitment tracks for non-academics has revealed methods to overcome this barrier. For those in the commercial sector who find a full-time transition to be too great a step, part-time endowed professorships may offer an alternative, so long as the individual in question holds qualifications at the appropriate level. Both potential solutions will require that long-term commitment, the ability to inspire and efforts to ensure quality are embedded at an early stage.

Potential solution:

- *The Minister of OCW could promote possibilities for potential lecturers and endowed professors entering academia from the commercial sector, based in part on past experiences with other recruitment tracks for non-academics in the educational sector.*

Re 4. Facilitate improved coordination of supply and demand with regard to lecturers and promote cooperation between education and the private sector.

Many people with relevant knowledge and experience are employed in the private sector. There is sufficient reason to believe that the willingness to contribute to the development of knowledge in potential future employees is great among parties in the commercial sector. From discussions the CSR has held with various stakeholders from both science and education, however, it would appear that universities are insufficiently aware of the supply of potential lecturers from the commercial sector, and vice versa. In other words: supply and demand must be coordinated more effectively. One idea

might involve an online platform where universities can post their lecturer vacancies in combination with the deployment of actual 'matchmakers' who establish these connections based on their own network and accumulated trust. Organisations such as VSNU and dcypher can then, in combination with platforms like Talent for Technology, play a key role in mobilising their membership for this purpose. The VSNU and the Netherlands Association of Universities of Applied Sciences can likewise play a role in mobilising universities with regard to this theme.

Potential solution:

- *Following the example set by the database of female talent, the Minister of OCW could (through financial incentives) promote the creation of an online platform in combination with personal matching that will facilitate coordination of supply and demand in connection with lecturers.*

Generally speaking, academic positions in the Netherlands should be sufficiently appealing and challenging, with a healthy balance between the education and research aspects (including discretionary research) and in terms of the student-staff ratios. This is intended not only to combat brain drain – an acute problem in the fields of cybersecurity and artificial intelligence in light of the heavy investments being made in neighbouring countries – but also to ensure that the world of academia is attractive enough to individuals working in the commercial sector. While this letter deals with the topic of education, within an academic context, education is inextricably linked with research. Many steps have been set in motion in this area using sector funding and via the aforementioned response to the Van Rijn report⁵. At the same time, the actual implementation of the Verhoeven-Rutte House motion (34 775 VI dated 30 Nov. 2017) concerning additional investments in academic cybersecurity research has been delayed in connection with an incendiary letter from professors in that field⁶.

We look forward to discussing the aforementioned potential solutions with you.

On behalf of the members of the Education sub-committee of the Cyber Security Council,

Ms Tineke Netelenbos
Chair of the Education sub-committee

⁵ Report from the Advisory committee on Funding for Higher Education and Research, 'Wissels om (Changing Track)', The Hague, May 2019

⁶ Herbert Bos, Michel van Eeten, Bart Jacobs (November 2017), *De noodzaak tot Nederlandse zelfredzaamheid gebaseerd op de nationale behoefte aan eigen hoogwaardige expertise, via kennisontwikkeling en circulatie* [The need for Dutch self-reliance based on the national need for high-quality Dutch expertise, through knowledge development and circulation], <https://www.dcypher.nl/sites/default/files/uploads/documents/Cybersecurity-behoud-versterking-v1.6.pdf>