



NVAO • THE NETHERLANDS

INITIAL ACCREDITATION

WO-BACHELOR

DATA SCIENCE AND SOCIETY

University of Groningen

FULL REPORT

28 NOVEMBER 2021

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1 Peer review

The Accreditation Organisation of the Netherlands and Flanders (NVAO) determines the quality of a new programme on the basis of a peer review. This initial accreditation procedure is required when an institution wishes to award a recognised degree after the successful completion of a study programme.

The procedure for new programmes differs slightly from the approach to existing programmes that have already been accredited. Initial accreditation is in fact an ex ante assessment of a programme. Once accredited the new programme becomes subject to the regular review process.

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts forms the basis for the panel's final judgement and the advisory report. The agenda for the panel visit and the documents reviewed are available from the NVAO office upon request.

The outcome of this peer review is based on the standards described and published in the limited NVAO Assessment framework for the higher education accreditation system of the Netherlands (Stcrt. 2019, nr. 3198). Each standard is judged on a three-point scale: meets, does not meet or partially meets the standard. The panel will reach a conclusion about the quality of the programme, also on a three-point scale: positive, conditionally positive or negative.

NVAO takes an accreditation decision on the basis of the full report. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme.

This report contains the findings, analysis and judgements of the panel resulting from the peer review. It also details the commendations as well as recommendations for follow-up actions. A summary report with the main outcomes of the peer review is also available.

Both the full and summary reports of each peer review are published on NVAO's website www.nvao.net. There you can also find more information on NVAO and peer reviews of new programmes.

Because of COVID-19 temporary measures apply for this peer review.

2 New programme

2.1 General data

Institution	University of Groningen
Programme	BSc ¹ Data Science and Society
Variants	Fulltime
Degree	Bachelor of Science
Tracks	Cognitive Technology and Regulation, Governance and Innovation
Locations	Leeuwarden
Study load	180EC ²
Field of study	Nature

2.2 Profile

The University of Groningen (UG) intends to train students of the BSc Data Science and Society in becoming data scientists with a complementary set of skills that enables them to reflect on data-driven processes from different normative and societal perspectives. The new programme wants to meet the demands from academia and industry on the regional, national and international level for specialists who can act as a linking pin between different disciplinary approaches. The programme is unique in the Netherlands in its design and content. The proposed programme is offered by Campus Fryslân, the UG's youngest faculty. The programme corresponds with the UG Strategy Plan 2021-2026 and the strategic agenda of the faculty, which includes digital innovation, the inducement of interdisciplinarity, the reinforcement of the regional function of the faculty and the strengthening of collaboration with public and private stakeholders.

2.3 Panel

Peer experts

Prof. dr. Peter van der Sijde (*chair*), Professor Organisation, Entrepreneurship & Technology at Vrije Universiteit Amsterdam

Prof. dr. Paul de Hert, Full Professor in criminal and privacy law at Vrije Universiteit Brussel, Associated Professor at Tilburg University;

Prof. dr. Tamar Sharon, Professor of Philosophy, Digitalization and Society at Radboud University;

Drs. Bart Wezeman, Applied statistician and project leader at CBS³;

Ruward Karper (*student*) BSc., Student Joint Master Data Science & Entrepreneurship, Tilburg University & TU/e.

Assisting staff

Ikrame Faris MSc, secretary

Reina Louw MA, NVAO policy advisor and process coordinator

Site visit (online)

16 November 2021

¹ In Dutch: wo-bachelor

² European Credits

³ Central Bureau for Statistics

3 Outcome

The NVAO approved panel reaches a conditionally positive conclusion regarding the quality of the bachelor programme Data Science and Society offered by the University of Groningen. The programme complies with standards 1 and 3 of the limited NVAO framework and partially complies with standard 2.

The bachelor programme in Data Science and Society has established a challenging and interesting profile that will enable graduates to become data scientists who can bridge the gap between different disciplinary approaches in the field of data science. There is a high demand for specialists who possess technical skills and are also able to identify and adequately respond to the ethical, legal and societal implications of data science. Various stakeholders, notably representatives of the professional field, were closely involved in the process of developing the programme.

Strong elements of the teaching-learning environment include the quality of the teaching staff and the didactical concepts of project-based and challenge-based learning that bring together theoretical and practical aspects of data science. Nonetheless, the panel also identified points for improvement. The rationale behind the two specialisations was not entirely clear. This especially applies to the way the specialisation *Regulation, Governance and Innovation* leads to the intended graduate profile. The panel is of the opinion that more balance could be created between technical courses and courses on ethical, legal and societal aspects (ELSA), also in the first year. In addition, the ELSA-courses could be better tailored to data science. Finally, the exact function of learning lines within the programme should be made more explicit.

The bachelor programme has a sound and transparent assessment system in place. Adequate measures are applied to ensure reliability and validity in assessment. The Board of Examiners is requested to remain alert on the challenges of interdisciplinary assessment, especially in relation to theses.

The panel concludes that it is convinced of the potential of the proposed programme BSc Data Science and Society. However, the attention points related to the design and content of the curriculum need to be addressed. All in all, the panel assesses the quality of the programme as conditionally positive.

By 26 May 2022 at the latest, the following conditions need to be met:

- 1 Explain the rationale behind the choice for the two specialisations and the way they contribute to the achievement of the intended graduate profile.
- 2 Create a more even balance between technical courses and courses on ethical, legal and societal aspects (ELSA) in the core curriculum, in particular in the first year, and specifically tailor ELSA-courses to data science.
- 3 Clarify the exact role of the three learning lines in the programme.

Standard	Judgement
1. Intended learning outcomes	meets the standard
2. Teaching-learning environment	partially meets the standard
3. Student assessment	meets the standard
Conclusion	Conditionally positive

4 Commendations

The programme is commended for the following features of good practice.

1. Involvement professional field – The professional field, represented in an Advisory Council, was closely involved in the design of the programme.
2. Scientific and societal need – The programme addresses an important scientific and societal need in the field of data science. The panel applauds the UG's integrated approach and considers the programme timely and much needed.
3. Teaching staff – The teaching staff is characterized by professionalism, enthusiasm and dedication. The staff members bring in a wide array of expertise from various disciplines. Their vast experience instils confidence in their ability to deal with the challenges of interdisciplinary teaching.
4. Group effort – The development of the programme was a truly collaborative effort by the teaching staff and programme management. All staff members seem well involved and have developed into a close-knit community that is very supportive of this bachelor programme.
5. Project-based and challenge-based learning – The educational concepts of project-based and challenge-based learning contribute to a valuable connection between theoretical and practical aspects of data science.

5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. Extend scope of mandatory literature – Incorporate more literature from critical data studies, especially by computer scientists, in the mandatory literature to better tailor courses on ethical, legal and societal aspects to data science.
2. Number and complexity mandatory literature – Review the number and complexity of the mandatory literature of ELSA-courses, especially in the first year, to ensure better correspondence with the level of starting students.
3. Challenges of interdisciplinary character – Be aware of the challenges the interdisciplinary character of the programme can pose for students who are either technically or socially-oriented.
4. Marketing of programme – Be attentive to the way the programme is marketed and communicated towards prospective students.
5. Interdisciplinary assessment– Remain alert on the challenges of interdisciplinary assessment, especially in relation to theses.

6 Assessment

6.1 Standard 1: Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Judgement

Meets the standard.

Findings, analysis and considerations

The BSc Data Science and Society aims to train students in acquiring applied data skills with the ability to identify and appropriately address data-related opportunities and challenges for society from a wide range of perspectives. The programme is interdisciplinary by nature and design. It teaches students how to combine technical aspects of analysing complex data sets, e.g. statistics, programming, data management and visualisation, with the ability to reflect and evaluate on data-driven processes from normative (law and politics) and societal (sociology and philosophy) perspectives. The programme approaches data science through three complementary lenses; data *OF* society teaches students how data is being generated, data *IN* society concerns itself with interpretation and data *ON* society is related to the ethical, legal and societal implications of data.

Graduates can pursue a master degree in technical-oriented programmes or programmes of a more interdisciplinary nature, depending on their choice of specialisation and minor courses. Suitable master programmes are offered by the University of Groningen (UG), including Campus Fryslân, and other universities in and outside of the Netherlands. Examples of programmes offered by the UG are the MSc Sustainable Entrepreneurship, the MSc Computing Science and the MSc Voice Technology. Alternatively, graduates may opt for a professional career. Labour market research shows a high demand on the regional, national and international level for specialists who act as bridge-builders within multidisciplinary teams to develop and implement fair and responsible data-driven practices. The panel recognizes the scientific and societal need for this programme and acknowledges the added value of data scientists who are able to operate at the intersection of different disciplinary approaches.

The profile of the programme is translated into 27 intended learning outcomes (ILOs) that correspond with the Dublin descriptors at bachelor level. The learning outcomes are inspired by programmes with comparable disciplinary components as in the BSc Data Science and Society. The learning outcomes are constructed in a matrix to illustrate the relationship with individual courses and learning lines. In the online discussion with the development team, it was clarified that the relatively large number of learning outcomes is necessary to measure whether objectives with regard to interdisciplinarity are met. In order to provide more clarity to students about the objectives that need to be achieved, learning lines are integrated in the programme as a converging factor. The panel establishes that the ILOs are in line with the Criteria for Academic Bachelor Curricula.

The panel initially had difficulty understanding the profile of the programme and the type of graduates it aimed to deliver. Judging from the application file, the programme seemed to display an inclination towards humanities and social science rather than data science which was thought to affect the eventual profile of graduates. However, the online discussion created a more nuanced picture. The panel was pleased to learn that several actors, including representatives of the professional field (Advisory Council), were involved and consulted in all stages of the development process of the programme. The members of the Advisory Council have convincingly argued that the professional profile of the programme was carefully thought out and developed through intensive collaboration. They are confident that the programme contributes to a graduate profile that is well-aligned with (international) professional needs and demands in the field of data science. Also, it was emphasized that the programme will continue to consult with representatives of the professional field to effectively adjust to evolving needs within the sector.

It is clear to the panel that the programme was developed after careful and thorough deliberations and that it responds adequately to labour market demand. The panel considers stakeholder involvement a strong suit of the programme. Whilst the concerns on the graduate profile were sufficiently addressed, the panel proposes

adjustments to ensure that the envisaged balance in the programme is also clearly reflected in the curriculum (see standard 2).

The panel concludes that it is highly appreciative of the initiative by UG to develop an educational programme with a holistic approach to data science. The programme has established an interesting and challenging set of intended learning outcomes that enables graduates to meet the needs and demands of the professional field. The panel finds the involvement of industry representatives in the development of the programme particularly laudable. In order to guarantee better alignment between the profile of the programme and the actual curriculum, some modifications are proposed by the panel (see standard 2). Overall, the panel concludes that this standard is met.

6.2 Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Judgement

Partially meets the standard.

Findings, analysis and considerations

The curriculum design aims to balance courses with a focus on technical aspects and application with courses that contextualise data-driven practices, based on the model of the 'T-shaped professional'. In the initial phase the curriculum design focuses on providing a broad overview on data science. After successful completion of the core curriculum students are given the opportunity to deepen their knowledge and expertise by choosing from two specialisations: *Cognitive Technology* and *Regulation, Governance and Innovation*. Finally, the programme is concluded with a bachelor thesis of 15 EC within the specialisation. According to the panel, whereas the specialisation *Cognitive Technology* shows an obvious link with the intended graduate profile, it is not entirely clear how the specialisation *Regulation, Governance and Innovation* contributes to the delivery of data scientists with adequate technical and applied skills. The specialisation seems to be more heavy on ethical, legal and societal aspects and the courses are not tailored enough towards data science. This also applies to the core curriculum. The programme developers explained to the panel that in preparation for the macro-efficiency procedure technical courses were dropped from the first year in favour of ELSA-courses. However, they are willing to reconsider the current set-up and to address the remarks with regard to the specialisations.

Based on the course descriptions, the panel also observed that the ELSA-courses were either too specific or too general. With regard to the specificity of some courses (such as *Human Dignity*), the teaching staff relies on its teaching expertise and methods to address and discuss topics on a first-year bachelor level. Concerning the generality of courses and the panel's appeal to also tailor ELSA-courses in the core curriculum to data science, the teaching staff clarified that this is being addressed through projects and case studies (part of project-based and challenge-based learning, bringing together theory and practice) and the involvement of guest lecturers from other disciplinary fields, for example in the course *Collection and use of Biometric Data*. The panel commends this and makes the additional suggestion of incorporating more critical data studies (namely the abundant literature on algorithmic bias, different approaches to privacy, explainable AI, transparency, machine ethics, etc. written specifically for computer/data science practitioners) in the mandatory literature to ensure better tailoring of courses towards data science. The panel has confidence in the abilities of the teaching staff and the added value of project-based and challenge-based learning, but reiterates the necessity of creating more balance between technical and ELSA-courses.

The didactical approach is strongly characterised by interdisciplinarity and transdisciplinarity. The latter is manifested in the courses Simulation Exercise and the Living Lab, in which collaboration between different stakeholders takes place to connect academic and experiential knowledge. Furthermore, learning communities and an international classroom are established to develop soft skills and to provide students with a diverse learning environment and international experience. The panel asks that consideration be given to the demands the interdisciplinary character of the programme might put on students who are either technically or socially-oriented. Since general admission requirements are applicable and no additional prerequisites are defined, the panel believes it important for the compulsory courses to bring all students to the same academic level. This could

partly be achieved by reviewing the number and complexity of the mandatory literature in the core curriculum. The programme management took note of this recommendation and underlined that the expertise of the teaching staff and experience gained in other interdisciplinary programmes will help to achieve these objectives.

The programme has developed three learning lines in close consultation with the Advisory Council. The relationship between learning lines, learning outcomes and individual course units are illustrated in a matrix. The panel appreciates the explanation of the management that the learning lines form a unifying element and that they are aligned to the wishes of the professional field, but asks for further clarification of the exact function of the learning lines in the programme.

The panel considers the programme management and teaching staff well-equipped to implement and coordinate the programme. It is impressed by the (academic) background of lecturers and establishes that the teaching staff is systematically trained in their teaching and assessment skills through the University Teaching Qualification (UTQ). The teaching staff is acquainted with adaptations in teaching and assessment as a result of the COVID-19 pandemic. When speaking to representatives of the teaching staff, the panel was met with great enthusiasm and willingness to make this new programme work. Building on the experience in comparable interdisciplinary programmes provided by Campus Fryslân, such as the bachelor programme *Global Responsibility and Leadership*, the panel is confident that the teaching staff possesses the didactical skills to deal with the challenges of interdisciplinary teaching.

The language of instruction is English. The programme management substantiates its choice by arguing that the nature of the scientific field, the international background of the teaching staff and the diverse influx of students who will be working as data scientists in a global labour market necessitate an English-taught programme. This choice is supported by the Advisory Council and regional partners (e.g. Innovation Cluster Drachten). The management also emphasized that the choice for English does not conflict with the regional orientation of the programme since provincial policy strongly encourages internationalisation. The panel supports the considerations of the management.

In the online discussion it was explained that students will receive the necessary guidance throughout the bachelor programme, with specific attention for first year students (following UG policy). In the first year a tutor system is in place to get students acquainted with the study programme and its strategies for success. Also, following the example of other programmes at campus Fryslân, additional meetings will be offered for first year students to provide extra support. Finally, students can draw on university-wide facilities, such as the career service, student support services and training services. For community-building purposes students can join the campus-wide study association *Nobis Cura Futuri* and activities organised as part of the introduction week. The panel considers the level of study guidance appropriate for a bachelor degree.

Since the site visit was conducted online, the panel was unable to have a tour of the facilities. Instead, it was provided with a detailed description of the available facilities in the application file. The panel is impressed by the range of excellent facilities that the recently renovated building 'De Beurs' provides, especially the modular room that is designed specifically for the Living Lab. Furthermore, all classrooms are equipped with state-of-the-art technology to optimize student learning experience. Students can also make use of the Frisian Historical and Literacy Centre Tresoar, the largest library in the province and one of the partners of Campus Fryslân. The panel is of the opinion that the proper infrastructure is in place to provide students with a stimulating learning environment.

The Programme Committee gathers six times per year. The Programme Committee will be composed of three lecturers and three students of the programme. Students will be recruited immediately after the start of the programme. The procedure for recruiting staff and students is described in the Faculty Regulations.

In sum, the panel finds that the programme offers a suitable teaching-learning environment. Strong elements are the quality of the teaching staff and the didactical principles of project-based and challenged-based learning. Nonetheless, points for improvement are identified. The advices with regard to the specialisations and learning lines, the emphasis on ELSA-courses and their current design and focus need to be followed up. Also, the panel

recommends to be attentive to the way the programme is marketed and communicated towards prospective students. Taking into account these considerations, the panel judges this standard as partially met.

6.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Judgement

Meets the standard.

Findings, analysis and considerations

The system of assessment of the bachelor programme in Data Science and Society is guided by the faculty policy of Campus Fryslân. In accordance with faculty policy and as part of the Teaching and Examinations Regulation (TER), the programme has an assessment plan that explicates the assessment and evaluation of the curriculum in a systematic manner. This includes a description of how learning outcomes of the programme will be realised and the modes of assessment that apply.

Due to the interdisciplinary character of the programme a wide array of assessment methods are being deployed. Examples include assignments, written and oral exams, active participation, projects and reports as well as more innovative assessment methods such as student-led sessions. Every form of assessment is tailored to the learning outcomes, the teaching methods applied and to ensure validity of skills and knowledge. All formal exams are peer reviewed before administration ('four-eyes' principle). The Board of Examiners (BoE) assures that examiners, including members of the Board, have ample experience in the usage of a multitude of assessment forms. Therefore, it does not foresee any difficulties in terms of feasibility.

On being asked, the BoE explained that rubrics have been developed for the assessment of active participation, but that it is aware of the accompanying challenges as the personality of students greatly influence the degree of participation. The BoE also explained that there is no general policy on the assessment of individual contributions in group work, but that criteria are set up by examiners preceding the commencement of the course and are communicated clearly to students. The BoE is attentive on both points.

Upon request of the panel the assessment form for the bachelor thesis was shared prior the online visit. The panel was able to verify that the assessment criteria for the several components of the thesis trajectory were appropriate. However, it did express concern with regard to interdisciplinary assessment in general and especially in relation to theses. The panel believes it challenging to integrate different perspectives in (thesis) assessment. Considering the involvement of examiners in several other interdisciplinary programmes, the BoE is confident that they are properly equipped to carry out this system of assessment. It also points out that in cases of irreconcilable views or differences the quality assurance policy requires the involvement of a third examiner. The panel is satisfied with this explanation, but advises to keep a close eye on the assessment procedure.

The BSc Data Science and Society will fall under the authority of the Board of Examiners of Campus Fryslân, currently responsible for one bachelor and three master programmes. In the discussion, the Board explains that it has been closely involved in the development of the programme and has scrutinised the assessment of all first year courses. Once the programme has started, the Board will be expanded with a representative of the teaching staff of the programme Data Science and Society to bring in substantive expertise and insight.

The validity, reliability and transparency of assessment are ensured by the use of the assessment plan. The plan is established by the programme director and reviewed by the BoE every three years from a quality assurance point of view. Within a course, grading rubrics and multiple moments of feedback safeguard reliability. Transparency is achieved by full information on assessment in the syllabi. Teaching staff are trained in assessment through the UTQ programme and expert advice is offered within the faculty for further support. The panel is positive that these measures help to assure high quality in assessment.

The panel determines that the bachelor programme has a sound and transparent system of assessment in place. It is characterised by a wide variety of (innovative) assessment forms and provides sufficient insight into the relationship between the intended learning outcomes and learning objectives of a given course. However, it is

given the advice to remain alert on the challenges of interdisciplinary assessment, especially when it comes to the evaluation of theses. Overall, the panel concludes that the BoE plays an important role in ensuring assessment quality, has the necessary level of independence and fulfills its tasks in line with its statutory duties. As a result, the panel judges that this standard is met.

6.4 Degree and field of study

The panel advises awarding the following degree to the new programme: Bachelor of Science

The panel supports the programme's preference for the following field of study: Nature.

Abbreviations

BoE	Board of Examiners
BSc	Bachelor of Science
EC	European Credit
ELSA	Ethical, legal and societal aspects
ILO	Intended Learning Outcomes
NVAO	Netherlands Flanders Accreditation Organisation
UG	University of Groningen
UTQ	University Teaching Qualification

