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B Technology and Liberal Arts & Sciences
University College Twente (ATLAS)
University of Twente

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Project code P2310

Contents

Summary

Standard 1. Intended learning outcomes

ATLAS is an open bachelor's programme aimed at educating interdisciplinary engineers that are trained to consider societal perspectives on complex engineering challenges. The panel found the profile as well as the set-up of the programme unique, innovative and very relevant. The ATLAS educational vision, that centres on five core values and their translation into the concept of self-directed learning, is strong and gives the programme a distinctive position in the landscape of engineering as well as LAS programmes. The panel advises to keep working on a common language to describe the programme vision, and to showcase the unique profile of ATLAS to the outside world.

The profile is adequately translated into an open set of intended learning outcomes, that clearly demonstrate the requirements for academic bachelor's programmes, as well as the above-average level and broadening of skills and attitudes required of programmes small-scale and intensive education. The open formulation of learning outcomes allows students to formulate their own path towards the realization of the learning outcomes through self-directed learning.

Standard 2. Teaching-learning environment

The panel appreciates the open, flexible and individual set-up of the ATLAS curriculum, where students determine their own study programme to a large extent through self-directed learning. Next to a mandatory core containing the common body of interdisciplinary knowledge and skills as well as the challenge-based semester projects, the curriculum has a large amount of free space that students can use to formulate their individual path towards the realization of the ATLAS final learning outcomes, including electives, personalized learning activities (Personal Pursuit), an optional internship and the thesis capstone project. Alignment with the programme learning outcomes is safeguarded through an individual planning and reflection cycle in which students discuss their plans and their realization with teaching staff members. This results in a tightly knit learning community of staff and students, that is further promoted by the programme-specific facilities where staff and students can meet and interact, and engage in extracurricular activities.

The panel supports the programme's choice for the use of English in education and in the programme name, and believes this to be in line with the vision and ambitions of the programme. The admissions procedure and requirements are aimed at selecting motivated and talented students, and after admission to the programme, students are supported by a student buddy as well as the study advisor and the core teaching team. The members of this team also fulfil the role of mentors in the programme. Sufficient facilities are provided for students with functional impairments. The panel concludes that the curriculum is feasible, and that the success rates are appropriate for a small-scale and intensive programme. The curriculum structure focusing on semesters as single educational units promotes timely completion. The four-year success rates in particular of the programme are favourable. The panel supports efforts by the programme, such as the student tracking system, to improve the three-year success rates, lower the number of drop-outs and increase coherence of mentoring. The ATLAS teaching staff is well-qualified and able to deliver small-scale and intensive education. They are praised by students for their engagement with students and informal approachability.

A point of improvement according to the panel is student guidance and support regarding self-directed learning. Although in the end most students and alumni appreciate the learning process they went through,

students at times can feel overwhelmed with the expectations and possibilities of shaping their own learning trajectory. The panel recommends introducing some mandatory elements to the mentoring system to shift some of the responsibility of seeking guidance back towards the programme, and use this, as well as other opportunities, to communicate and explain the educational philosophy, and give students additional help in setting realistic goals. This communication should already start with prospective students, in the light of the relatively high number of drop-outs in the programme.

Standard 3. Student assessment

The panel concludes that the programme has a valid, reliable and sophisticated system of assessment in place. It acknowledges that the assessment system is in accordance with the self-directed learning character of the programme. It concludes that students are supported in their learning process by the assessment system. The assessment system is based on the semester goals that students formulate in their PDP, which includes both mandatory FLOs and personal goals. This framework gives the student a great deal of agency regarding their own exam programme. The assessment of the Capstone Projects is organized an in an insightful and transparent way, with ample written feedback. The Board of Examiners is performing its legal duties well. The Board oversees the quality of the assessment process through taking samples from different products in the PDP-system, as well as the Capstone Projects. With these checks and balances, the quality of the assessment system is ensured within the programme.

Standard 4. Achieved learning outcomes

The capstone theses demonstrate that students realize the intended learning outcomes of the programme, and show that students are capable of engaging in interdisciplinary work with a clear societal focus. Graduates of the programme are admitted to a broad range of relevant and demanding master's programmes. Combined with the positive assessment of the programme's success rates, which is discussed under 'Learning environment' in standard 2, the panel concludes that ATLAS demonstrates the achieved learning outcomes that befits a programme with small-scale and intensive education.

Score table

The panel assesses the programme as follows:

Bachelor's programme Technology and Liberal Arts & Sciences

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

The panel assesses the Distinctive Feature Small-scale and Intensive Education of the bachelor's programme Technology and Liberal Arts & Sciences as follows:

Criterion A: Intended learning outcomes	meets the standard
Criterion B: Curriculum – contents	meets the standard
Criterion C: Curriculum – learning environment	meets the standard
Criterion D: Intake	meets the standard
Criterion E: Staff	meets the standard
Criterion F: Facilities	meets the standard
Criterion G: Achieved learning outcomes	meets the standard
General conclusion	positive

Em. prof. dr. Ton van Haaften, panel chair

Peter Hildering MSc., panel secretary

Date: 12-07-2024

Introduction

Procedure

Assessment

On 22 and 23 April 2024, the bachelor's programme Technology and Liberal Arts & Sciences / University College Twente (ATLAS) at the University of Twente was assessed by an independent peer review panel as part of the cluster assessment Liberal Arts and Sciences. The assessment cluster consisted of 12 bachelor's programmes, offered by University College Twente (University of Twente), Leiden University College (Leiden University), Amsterdam University College (University of Amsterdam/Vrije University Amsterdam), University College Roosevelt, University College Utrecht and the School of Liberal Arts (Utrecht University), Erasmus University College (Erasmus University Rotterdam), University College Groningen (University of Groningen), University College Maastricht, University College Venlo and the Maastricht Science Programme (Maastricht University) and University College Tilburg (Tilburg University). The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (valid from 1 April 2024). It also applied the Criteria Pertaining to Distinctive Feature of Small-scale and Intensive Education (also published in the 2024 Uitvoeringsregels Accreditatiestelsel Hoger Onderwijs Nederland).

Quality assurance agency Academion coordinated the assessment upon request of the cluster Liberal Arts and Sciences. Fiona Schouten acted as coordinator and panel secretary. Peter Hildering, Irene Conradie, Adrienne Wieldraaijer-Huijzer and Marieke Schoots also acted as panel secretaries in the cluster assessment. They have all been certified and registered by the NVAO. Peter Hildering acted as panel secretary for the assessment of University College Twente.

Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members as well as consistency within the cluster. On 1 March 2024, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on his role in the site visit according to the Panel chair profile (NVAO 2016).

The programme composed a site visit schedule in consultation with the coordinator (see appendix 3). The programme selected representative partners for the various interviews. It also determined that the development dialogue would be made part of the site visit in the form of thematic sessions. A separate development report was made based on this dialogue.

The programme provided the secretary with a list of graduates over the period January 2019 – August 2023. In consultation with the secretary, the panel chair selected 15 theses of the programme. They took the diversity of final grades and examiners into account, as well as the various types of theses (research or design). Prior to the site visit, the programme provided the panel with the theses and the accompanying assessment forms. It also provided the panel with an information file and additional materials (see appendix 4).

The panel members studied the information and sent their findings to the secretary. The secretary collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary meeting, the panel discussed the initial findings on the information file and the theses, as well as the division

of tasks during the site visit. The panel was also informed on the assessment frameworks, the working method and the planning of the site visits and reports.

Site visit

During the site visit, the panel interviewed various programme representatives (see appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation hour. No consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

Report

After the site visit, the secretary wrote a draft report based on the panel's findings. This report is structured along the four NVAO standards, and integrates the seven criteria of the distinctive feature Small-Scale and Intensive Education in the discussion of the respective standards for the bachelor programme. The report was first submitted to the coordinator at Academion for peer assessment and then to the panel for feedback. After processing this feedback, the secretary sent the draft report to the programme in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalised the report, and the coordinator sent it to University College Twente and the University of Twente.

Panel

The following panel members were involved in the cluster assessment:

- Em. prof. dr. T. (Ton) van Haaften, professor emeritus at the Leiden University Centre for Linguistics of Leiden University [panel chair];
- Em. prof. dr. L. (Laurent) Boetsch, professor emeritus in Romance Languages at Washington and Lee University in Virginia (United States) and founding executive co-director and president emeritus of the European Consortium of Liberal Arts and Sciences (ECOLAS) [panel chair Leiden University];
- Dr. S. (Samuel) Abraham, rector/president of and professor in Political Science at the Bratislava International School of Liberal Arts (Slovakia);
- Prof. dr. M.K. (Marlies) Van Bael, professor in Chemistry at Hasselt University (Belgium);
- Prof. dr. S.B. (Stéphanie) Balme, director of the Center for International Studies (CERI) of the research university Sciences Po (France);
- Prof. dr. W.J.P. (Wim) Beenakker, professor in High Energy Physics at Radboud University;
- Prof. dr. H. (Helen) Brookman, professor of Liberal Arts & Interdisciplinary Education at King's College London (United Kingdom);
- Em. prof. dr. G. (Gerda) Croiset, professor emeritus in Education and Training in Health and Life Sciences at the University of Groningen;
- Dr. M.M.T.E. (Maud) Huynen, assistant professor at the Maastricht Sustainability Institute of Maastricht University;
- Dr. W.D.B.H.M. (Wim) Lambrechts, associate professor at the Faculty of Management of the Open University;
- Dr. B. (Bente) Nørgaard, associate professor at the Center for Problem-based Learning in Engineering Science and Sustainability of Aalborg University (Denmark);
- Em. prof. dr. J. (Janneke) Plantenga, professor emeritus in Economics of the Welfare State at Utrecht University;
- Dr. Ing. S. (Sabine) Sané, lecturer in Earth and Environmental Sciences at University College Freiburg (Germany);

- Prof. dr. J. (Jenny) Slatman, professor in Medical & Health Humanities at Tilburg University;
- Prof. mr. dr. H.S. (Sanne) Taekema, professor in Jurisprudence at the Erasmus University Rotterdam;
- Prof. dr. J. (Jolanda) Vanderwal-Taylor, professor in Dutch and German at the University of Wisconsin-Madison (United States);
- Prof. UAS. dr. J.I.A. (Irene) Visscher-Voerman, professor of applied sciences in Innovative and Effective Education at Saxion University of Applied Sciences;
- Prof. dr. H. (Henrik) von Wehrden, professor of Normativity of Methods at Leuphana University Lueneburg (Germany);
- N.B. (Nara) Coutinho, bachelor's student Liberal Arts and Sciences at University College Venlo (Maastricht University) [student member];
- M. (Milan) Gomes, bachelor's student Technology and Liberal Arts & Sciences at University College Twente (University of Twente) [student member];
- B.L. (Borbála Lucy) Karvalits, bachelor's student Liberal Arts and Sciences at Erasmus University College (Erasmus University Rotterdam) [student member];
- J.G. (Jamie) Wolvekamp, bachelor's student Liberal Arts and Sciences at University College Tilburg (Tilburg University) [student member].

The panel assessing the bachelor's programme Technology and Liberal Arts & Sciences at University College Twente consisted of the following members:

- Em. prof. dr. T. (Ton) van Haaften, professor emeritus at the Leiden University Centre for Linguistics of Leiden University [panel chair];
- Dr. B. (Bente) Nørgaard, associate professor at the Center for Problem-based Learning in Engineering Science and Sustainability of Aalborg University (Denmark);
- Em. prof. dr. J. (Janneke) Plantenga, professor emeritus in Economics of the Welfare State at Utrecht University;
- N.B. (Nara) Coutinho, bachelor's student Liberal Arts and Sciences at University College Venlo (Maastricht University) [student member].

Information on the programme

Name of the institution:	University of Twente
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive
Programme name:	Technology and Liberal Arts & Sciences
CROHO number:	50427
Level:	Bachelor
Orientation:	Academic
Number of credits:	180 EC
Location:	Enschede
Mode(s) of study:	Fulltime
Language of instruction:	English
Submission date NVAO:	1 May 2025

Description of the assessment

Recommendations previous accreditation panel

The previous accreditation panel did not issue strong recommendations to the programme, but provided some suggestions for improvement, such as making the role of the humanities in the programme more explicit and improving the written feedback on the capstone assessment forms. The panel found that this advice has been considered carefully. The programme has made the contributing scientific domains more explicit by referring to natural sciences, mathematics and social sciences as the relevant domains in the intended learning outcomes. Furthermore, assessment forms now generally include extensive written feedback. See standard 3 for further discussion on this topic.

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.

Findings

Profile and aims

The bachelor's programme Technology & Liberal Arts and Sciences (UCT-ATLAS, or ATLAS) is an interdisciplinary programme aimed at educating a new type of engineer with competences to tackle complex challenges from multiple disciplinary perspectives. Students are educated as interdisciplinary engineers that integrate disciplinary knowledge, academic and professional skills and an academic attitude. The programme believes that modern-day challenges are too complex to be addressed from a singular disciplinary perspective, and aims for its students to engage in knowledge integration and creative design processes in interdisciplinary settings. To this end, students should also engage in communication and collaboration.

The programme is organized by the Faculty of Geoinformation Science and Earth Observation (ITC), and combines the expertise of all five faculties of the University of Twente (UT). UCT-ATLAS fully embraces the high-tech, human-touch vision of the university through its transdisciplinary set-up, and is often a pioneering programme for the university regarding educational innovations. The programme uses a small-scale, intensive educational setting that rests upon five core values:

- *Self-directed learning:* ATLAS students are taught to be self-directed learners with broad interests, as well as to have an open, independent, and critical attitude.
- *Personal development:* ATLAS students should be intrinsically motivated to develop themselves holistically and can critically reflect on their own growth, developing a sense of purpose.
- *Interdisciplinarity*: ATLAS students learn to tackle challenges from various disciplinary perspectives and social contexts, collaborating with a range of disciplines and translating expert knowledge for different stakeholders.
- *Community:* ATLAS students are strongly embedded in a community of learners and experts, as well as local and global communities, and are committed to the collective efforts of addressing the challenges facing these communities, being sensitive to ethical and social implications of their choices and actions.

- *Trail-blazing*: ATLAS students dare to enter the unknown, pursue radical but appropriate solutions, and are comfortable to step out of their comfort zones as trailblazers, exploring new ways of thinking and acting.

These core values culminate in the educational philosophy of self-directed learning, that is used as the guiding principle of ATLAS education. This means that students have a large freedom to pursue the realization of the programme's intended learning outcomes, and can to a large extent tailor the curriculum to their personal learning and development goals (see standard 2).

The panel studied the programme's profile and educational philosophy and discussed this with various ATLAS representatives during the site visit. It was very impressed with the programme's unique, innovative and open set-up. The programme's vision on educating interdisciplinary engineers that are able to take into account seriously the societal perspective of complex engineering challenges, is strong and very relevant for modern society. The focus on core values and the translation of this into the educational vision of self-directed learning gives ATLAS a unique and valuable profile in the landscape of engineering as well as liberal arts and sciences programmes. As the panel understood that the programme is in need of higher student numbers (in 2023-2024 only nine students enrolled, a far cry from the envisioned fifty students per year), it encourages the programme to keep showcasing this uniqueness to the outside world to prospective students and other stakeholders. The panel firmly believes that ATLAS in its current form has the potential to be relevant and attractive to a larger group of students than the programme currently attracts.

The panel learnt that ATLAS is in the process of leaving turbulent times. A 2022 report issued by the Executive Board of the UT highlighted a number of pressing issues concerning governance, leadership, vision and organizational culture. These issues, which have been discussed elsewhere and are largely outside the scope of this accreditation, were noted by the panel to have the full attention of the new leadership of the programme. The panel is confident that sufficient action is taken to address these issues and that the programme is in good hands with the current programme management. Part of the transition in the past two years has been the forming of a shared vision on the programme. The panel noted with appreciation that the programme has been largely successful in this. Staff and students showed themselves to be very engaged and dedicated to the current set-up of the programme, particularly to the concept of self-directed learning. The panel found the programme and its educational vision to be coherent and well-designed. At the same time, the transition was still noticeable to the panel through the different images and terms used by management, staff and students to describe the same elements of the programme. The panel encourages the programme to keep working towards formulating a shared story about the programme, using a common language. This might also make it easier for current and prospective students to grasp the concept of the programme and understand what is expected of them throughout the curriculum.

Intended learning outcomes

The final learning objectives (FLOs) of ATLAS (see appendix 1) are organized through four learning lines:

1) *Disciplinary Lenses for Understanding* (disciplinary knowledge in mathematics, natural sciences and social sciences);
2) P*rocess of Creation* (creating solutions through research, design and development using interdisciplinary theories and models);
3) *Communication and Collaboration* (collaboration with various groups and individuals, and appropriate communication in a socially and culturally sensitive way); and
4) *Academic Approach and Attitude* (acting in an academic and socially responsible manner, and reflecting on the own learning process).

In line with the requirements for small-scale and intensive programmes, the learning outcomes aim for achieving an above-average level in the student's academic profile. This includes interdisciplinary and problem-solving skills, as well as self-directed learning, personal development and advanced skills in collaboration and communication.

The panel studied the intended learning outcomes and noted that they are concise and well-structured. They include all elements relevant for academic bachelor's programmes, and align with the general requirements for liberal arts and sciences programmes as formulated in the 2023 domain-specific framework for LAS programmes. With the learning outcomes focused on interdisciplinarity the programme clearly aims for an above-average level, and broadening and development of personal skills and attitudes are woven through the FLOs as a central element. The open formulation of the FLOs aligns well with the self-directed learning approach of the programme, which encourages students to formulate their own path towards the realization of the learning outcomes.

Considerations

ATLAS is an open bachelor's programme aimed at educating interdisciplinary engineers that are trained to consider societal perspectives on complex engineering challenges. The panel found the profile as well as the set-up of the programme unique, innovative and very relevant. The ATLAS educational vision, that centres on five core values and their translation into the concept of self-directed learning, is strong and gives the programme a distinctive position in the landscape of engineering as well as LAS programmes. The panel advises to keep working on a common language to describe the programme vision, and to showcase the unique profile of ATLAS to the outside world.

The profile is adequately translated into an open set of intended learning outcomes, that clearly demonstrate the requirements for academic bachelor's programmes, as well as the above-average level and broadening of skills and attitudes required of programmes small-scale and intensive education. The open formulation of learning outcomes allows students to formulate their own path towards the realization of the learning outcomes through self-directed learning.

Conclusion

The panel concludes that the programme meets standard 1 of the NVAO framework.

The panel concludes that the programme meets standard A of the framework for the Distinctive Feature "Small-scale and Intensive Education".

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.

Findings

Curriculum content

The programme's final learning objectives are translated in the ATLAS curriculum through the four learning lines *Disciplinary Lenses for Understanding*, *Process of Creation*, *Communication and Collaboration,* and *Academic Approach and Attitude* (see standard 1). These are not only a way to organize the FLOs, but also constitute the main design elements of the ATLAS curriculum. Using the learning lines in conjunction with

the programme's core values, the teaching team derives semester goals for each of the six semesters, aiming for coherence in goals between courses and learning activities in such a way that the semesters jointly contribute to the attainment of the programme's learning outcomes. See appendix 2 for a curriculum overview.

Each semester has a specific focus. For the first four semesters, this is a thematic focus: Health & Mobility (S1), Sustainable Cities (S2), Digital Societies (S3) and Engineering for a Resilient World (S4). These semesters contain a mix of domain courses in natural sciences, mathematics and social sciences, as well as a semester project (5 EC). These are group projects where students analyse a societal challenge related to the theme of the semester, and use the knowledge and skills obtained in the courses to design a solution.

Alongside the mandatory activities for all students in the semesters, the curriculum has a minimum of 88 EC of free space, mostly in the form of electives and the Personal Pursuit. Each semester, except for S1, has room for electives, that students use to develop their academic interest and profile. These can be followed within ATLAS or at other UT bachelor's programmes, and can either deepen or widen the disciplinary knowledge of students. Students can also develop their own learning activity in the form of a capita selecta, where they formulate a learning goal and activities together with a disciplinary expert of the UT. In the Personal Pursuit (6 EC per year), students develop an academic educational project with clear learning objectives related to their own personal interests and development. These projects can consist of a wide variety of activities in or outside academia as long as they add to the development of the student's competences. In the third year, students can also choose to replace the Personal Pursuit with electives. With the Personal Pursuit, the programme aims to step away from the traditional distinction between curricular and extracurricular activities, and give students the opportunity to pursue extra relevant activities as part of the curriculum. Each Personal Pursuit is supposed to include a contribution to the community, and is presented at the ATLAS Expo at the end of each semester to fellow students, family, friends and external contacts. This promotes that extracurricular activities contribute to the learning community as a whole.

S5 is titled 'Aware & Away', and consists of 30 EC to be spent on a semester abroad or on an internship. The learning goals formulated for the internship have to refer to the student's aspirations regarding profile and academic development and to the general purpose of internships: exploration of career prospects, gaining practical experience, and developing profile and skills. It is supervised by a core teaching staff member, with daily supervision of an external supervisor connected to the internship institution. The final semester (Signature & Celebration) is focused on electives (10-15 EC) and the capstone project (15-20 EC). The capstone project is a project in which students dive into a topic that fits their academic profile as well as explore the broader academic and social context, and further develop their research and/or design skills. Students either choose their own topic or follow a suggestion from their supervisor. The project is supervised by one of the core teaching staff members, together with a disciplinary expert from outside ATLAS, with the latter usually being the daily supervisor. The Capstone Project can be combined with an Internship to form a larger project.

The panel studied the curriculum structure of ATLAS and discussed this with staff and students. It was pleasantly surprised by the open, flexible and individual set-up of the curriculum, where students determine to a large extent how they realize the programme's final learning outcomes. The mandatory educational activities combined with the semester goals safeguard a common body of knowledge and skills, whereas the individual activities tied to these semester goals provide students with the opportunity to work on the broadening of their skills and the personal development within the context of the programme's learning outcomes. The panel found the Personal Pursuits to be an innovative concept to integrate extracurricular activities that characterize small-scale and intensive programmes into the curriculum. The panel noted that

there is a high attention to both academic and professional skills in the curriculum, which culminate in the semester projects and the thesis capstone project. The group projects in the first four semesters are challenging activities that often involve real-world engineering challenges tied to societal issues brought in by external parties from government and industry. The panel considers this to be a strong asset of the programme that could be further highlighted in external communication about the programme. The capstone projects are suitable final products of the programme, and allow students to demonstrate their academic, interdisciplinary and personal skills. They can also serve as proof of competence in a field that the student aims to pursue in a master's programme. Finally, the panel appreciated the opportunity for students to do electives and an internship outside of ATLAS, which contributes to career orientation and skills development.

Learning environment
The ATLAS programme emphasizes self-directed learning as core educational concept of the programme. To this end, the programme uses a 'planning and reflection' cycle. Students write a personal development plan (PDP) at the start of each semester in which they specify learning activities through which they aim to realize their personal goals in relation to the learning lines of the programme. The PDP covers the fixed semester goals based on the FLOs, complemented with personal learning goals. Halfway the semester, students have a mid-term evaluation (MTE) in the form of an oral discussion with teachers to discuss progress. At the end of the semester, students present a self-evaluation and reflection (SER) to a panel of teachers, and discuss with them their academic and personal development in that semester. This SER forms the basis of the assessment for that semester. In S1, students follow workshops aimed at making them familiar with self-directed learning, and learn how to compose and reflect upon a PDP. The teaching methods employed in the courses and learning activities are based on the small-scale character of the programme, such as interactive lectures, peer learning and challenge-based learning in individual and group projects.

Although the various curriculum components that constitute a semester have separately scheduled learning activities, semesters are treated as a single educational unit as much as possible. Courses are for instance deliberately organized to provide students with the competences necessary to tackle the challenges of their semester project. Students are expected to highlight in their SER how they have used the disciplinary knowledge as well as the professional and academic skills they obtained in the courses to work on their semester project and personal learning goals.

The panel found that the concept of self-directed learning in combination with challenge-based learning is integral to the ATLAS programme, and fits the open and flexible structure of the curriculum well. It praises the continuous reflection on personal and academic development between students and teaching staff on an individual basis, which reflects the principles of small-scale and intensive education. The PDPs and the assessment thereof by the teaching staff ensures that the educational activities contribute to the final learning outcomes of the programme. According to the panel, self-directed learning is an innovative and challenging approach that has a great potential for students to work on their personal and academic development and goals under guidance of experts. At the same time, it also learnt during the site visit and from the student chapter that students can find self-directed learning overwhelming at times to the point where it can affect their mental well-being. They are in charge of their own learning process with so many opportunities but also uncertainties, in a time of their life with major personal growth. Careful mentoring and communication about setting realistic goals and ambitions are key according to students. They think that this is certainly present in the programme at the moment, but that coherence is sometimes lacking, as different teaching staff members can have different approaches to and feedback on what is expected of students in this regard. Meanwhile, older students and alumni stressed that the uncertainties and challenges are also an important part of the learning experience at ATLAS, and they wouldn't have wanted to miss it.

The panel endorses the importance of guidance communication. It thinks that self-directed learning should be nurtured as a key asset of the programme, but that the programme should work on further improving guidance and communication in this aspect. This is discussed below under 'Guidance and support'.

Due to the close interaction in the courses and the individual guidance central to self-direct learning, staff and students form a close learning community. This community is enhanced by the facilities of the programme. ATLAS has its own building (the Drienerburght) where students are housed and core teaching staff members have their offices. Students follow their core courses in the Drienerburght. The educational areas are characterized by open educational spaces where students and teachers can interact on a level playing field. This extends beyond courses to extracurricular activities in which staff and students can participate, such as social activities, external lectures, study trips and career events. These activities are often organized by student association Atlantis with support and involvement of the core teaching staff. If required for research and design activities, students can use workshops and labs in other faculty buildings. The campus on which the Drienerburght is located provides many facilities for activities such as sports and culture. The panel was a guest at the Drienerburgt during the site visit, and got a positive impression of the facilities. The building facilitates and promotes the learning community of ATLAS, and has sufficient room for student housing as well as educational and extracurricular activities.

Language of instruction
The language of instruction (as well as the programme name) is English. ATLAS considers its international character and diverse student population as a crucial aspect of its education. The new, interdisciplinary engineer that ATLAS envisions works on challenges across borders, taking diverse viewpoints into consideration. Through the international classroom, students encounter a diversity of perspectives as part of their education, and learn to discuss and address these. Furthermore, the programme aims for its graduates to be admitted to demanding and prestigious master's programmes, which are predominantly in English. English-language proficiency is part of the admission criteria for students, as well as the selection criteria for new teaching staff members. The panel supports the programme's choice for the use of English, and considers this to be in line with the vision and ambitions of the programme. It also concludes that there is sufficient attention to English-language proficiency for both staff and students.

Guidance and support
Due to the small-scale character and the self-directed learning approach, ATLAS heavily invests in student guidance and support. The programme has its own study advisor that focuses on student well-being, monitoring study progress, study-career advice, coaching of students and information provision to students regarding programme requirements and regulations. In the first year, students are also assigned a buddy: a higher-year student who serves as an easily accessible contact point for informal support at the start of the programme. The core teaching staff members serve as academic advisors who guide students throughout their personal and academic development. This fulfils the role of a mentor system: students can reach out to any of the core teaching staff members if they need counselling or guidance, for instance in developing plans for their PDP, or choosing elective courses. The programme adopted this mentor system instead of exclusive mentors per student, so that students can approach the staff member that best fits their request for guidance. All staff members have access to information on student progress and development through the student tracking system to accommodate this set-up. Students with a functional impairment can request extra facilities if this impairment constitutes a barrier to their academic progress. These requests are handled on an individual basis by the study advisor. They may lead to measures concerning access to infrastructure (buildings, classrooms and teaching facilities) and study materials, or to adjustments in the type of assessment, alternative learning pathways or a customized study plan.

After looking at the programme's guidance and support system and discussing it with staff and students, the panel concludes that the programme pays appropriate attention to student support, guidance and well-being. Students praise the role of the study advisor, who has a key role in information provision and the monitoring of student well-being, and is generally the to-go-person for students for any personal issues they encounter. The role of the student buddy is also appreciated by students.

Regarding the mentor system, experiences are mixed. Some students appreciate that they can approach all teaching staff members for guidance, and praise the extensive feedback they receive in the planning and reflection cycle as well as in informal discussions. Others would appreciate more structure and ownership built into the mentor system, and would rather have more proactive guidance from the programme in formulating their semester goals and finding suitable educational activities. In discussing this with the programme management, the panel found that the management is aware of this student feedback, and that the student tracking system was introduced to provide more structure to mentoring and guidance, in the sense that all teaching staff members as well as students themselves can now view the educational history and ambitions of students. Regarding further guidance, the programme thinks that uncertainties in finding your own way is inherent to self-directed learning, and it is hesitant to undercut this with too structured student guidance.

The panel fully understands the reasoning of the programme management and agrees that self-directed learning implies student ownership of the learning process. It also praises the introduction of the student tracking system, which it thinks is an important step towards providing more coherent guidance, and which addresses some of the differences in approach between individual teaching staff members. At the same time, it also understands the student request for more guidance and communication. Some students seem to struggle with the responsibility of formulating their own learning pathway and feel overwhelmed by the opportunities (see also the discussion under Learning environment). In this light, the panel thinks that it would be advisable to introduce some mandatory elements into the mentoring system, such as a number of fixed individual meetings focused on making curriculum choices, communicating and explaining the educational philosophy, suggesting potential coherent sets of electives, and setting realistic goals. This could shift some of the responsibility for seeking guidance back to the programme, without interfering too much with the self-directed learning experience.

Feasibility and success rates

The panel found that the semester approach of self-directed learning promotes nominal study progress, as all activities tie into each other. Students are therefore required to take a full semester at once, limiting study delay. Approximately half of the students who not drop out graduate within the nominal three years, and after four years nearly all students have graduated. The programme is not fully satisfied with the current success rates. Between 2018 and 2023, the number of students graduating within three years used to be close to two-thirds rather than half. According to the programme, the current success rates reflect the effects of the COVID pandemic between 2020 and 2022, when losing personal connections in the learning community took its toll. The abovementioned student tracking system is also aimed at getting the success rates back to the original, pre-COVID levels of higher than 50% nominal graduation levels.

Throughout the interviews, the panel learnt that delays are often the result of individual choices and circumstances, and were not reported by the programme or its students to be directly caused by curriculum-related issues. Even so, self-directed learning has the risk of over-ambitious semester goals that students set themselves. The programme counters this issue by explicitly addressing it in the planning and reflection cycle. A common issue is that students include more than the required 27 EC in their PDP for that semester. In such cases, students must always explain how they aim to realize the additional load without becoming

overburdened. This element is also included in the evaluation of the PDP to safeguard that the ambitious ATLAS students keep their individual learning activities feasible. The panel concludes that ATLAS has favourable success rates that befit from a small-scale and intensive programme, particularly the 4-year success rates which is comparable to other programmes with this special feature. Furthermore, the overall success rates are higher that of other UT bachelor's programmes. The panel supports the programme's efforts to raise the 3-year success rates, and points to its earlier suggestions on a more structured mentoring approach to complement these efforts.

Another issue that was discussed during the site visit was the relatively high drop-out rate: over one third of students drop out on average over the course of the programme. The programme, although not happy with the situation, attributes this to the ambitious curriculum set-up, that turns out to not fit all learning styles and educational preferences, causing students to leave the programme in favour of more traditional bachelor's programmes. The panel understands that self-directed learning in a small-scale and intensive context is not for everyone, but also urges ATLAS to keep this issue high on the agenda. Communicating expectations to students prior to enrolment and during the programme is important to ensure that students enter the programme with accurate expectations of what self-directed learning and an interdisciplinary curriculum encompasses.

Admission

ATLAS aims to admit students who are motivated to embark on an educational journey in a small-scale setting with self-directed learning. Students that apply to the programme are required to send a motivation letter and demonstrate that they satisfy the entry requirements. For Dutch students, this is a vwo diploma with a N&T or N&G-profile, with a minimum 7.5 grade point average, and a 7.5 score for mathematics and physics specifically. International students have to demonstrate the equivalent of these requirements in their local system. For both national and international students from non-English speaking countries, a demonstration of English language proficiency in the shape of a test result is required. The letter and grade lists are the starting points for an interview with the student, in which the extent to which the student is a good fit with the ATLAS programme is explored in terms of content, concept and community. Approximately half of the students that apply are ultimately admitted to the programme.

The panel found that the admission procedure and requirements are appropriate for a small-scale and intensive programme. They include elements of level as well as motivation, and an individual element in the form of an interview. The panel appreciates the recent change towards requiring a natural science background, which might also help in preventing drop-outs, as the engineering focus of ATLAS requires sufficient affinity with exact and natural sciences. As mentioned above, the panel thinks that the programme should also be very clear to incoming students about what self-directed learning entails, so that they are prepared for this.

Teaching staff

The programme is taught by a team of 16 core teachers directly associated with ATLAS. This core group assumes various roles within the programme. They develop and teach the curriculum, supervise semester projects, Personal Pursuits, and capstone projects, and are involved in individual guidance and counselling to students. Considering that the total student population of ATLAS is approximately 100 students, the programme has a teacher-student ratio of about 1 to 6. The core teaching team is supplemented with external experts from other educational programmes for several disciplinary courses and projects. The teachers are domain experts in a variety of fields relevant to the programme, and form the link for students to the various academic domains, which cover all five faculties of the UT. This means that the teaching staff also provides students with a network that spans the entire university.

All core teaching staff members hold a PhD, and have obtained (or are working on) a University Teaching Qualification (UTQ) or an equivalent international teaching qualification. Two staff members also hold a Senior UTQ. New teaching staff members are mentored by senior staff to make them familiar with the concept and way of working within ATLAS. The teaching staff is also active in educational research to improve education. To this end, ATLAS has recently launched a teaching innovation programme, in which it invites teachers from other UT programmes to collaborate on teaching innovation on a specific topic.

The panel found that the teaching staff is a strong asset of ATLAS. The team has a balanced mix of expertise relevant to the ATLAS profile and curriculum and has a diverse composition in terms of background, gender and disciplines. The staff is closely involved with students, both within and outside the courses. This is facilitated by the educational facilities that provide a common place for staff and students to meet outside of courses. Students appreciated the informal contact between staff and students, and mentioned that they experience no hierarchy and feel that their teachers really get to know them on a personal level. The core teaching staff team is very dedicated to the ATLAS programme and its students, and has a sufficient size to ensure small-scale and intensive education as well as individual counselling. The staff hold relevant teaching qualifications and have ample opportunities to further professionalize through educational research and collaborations on teaching innovation with other UT staff members. Following up on the discussions on the educational vision in standard 1 and on self-directed learning in this standard, the panel suggests to supplement the teacher professionalization with further developing a shared approach on self-directed learning in order to ensure that all teaching staff members use the same approach. According to the panel, this shared approach should be further developed from evidence-based elements, using the core values of the programme as starting point.

Considerations

The panel appreciates the open, flexible and individual set-up of the ATLAS curriculum, where students determine their own study programme to a large extent through self-directed learning. Next to a mandatory core containing the common body of interdisciplinary knowledge and skills as well as the challenge-based semester projects, the curriculum has a large amount of free space that students can use to formulate their individual path towards the realization of the ATLAS final learning outcomes, including electives, personalized learning activities (Personal Pursuit), an optional internship and the thesis capstone project. Alignment with the programme learning outcomes is safeguarded through an individual planning and reflection cycle in which students discuss their plans and their realization with teaching staff members. This results in a tightly knit learning community of staff and students, that is further promoted by the programme-specific facilities where staff and students can meet and interact, and engage in extracurricular activities.

The panel supports the programme's choice for the use of English in education and in the programme name, and believes this to be in line with the vision and ambitions of the programme. The admissions procedure and requirements are aimed at selecting motivated and talented students, and after admission to the programme, students are supported by a student buddy as well as the study advisor and the core teaching team. The members of this team also fulfil the role of mentors in the programme. Sufficient facilities are provided for students with functional impairments. The panel concludes that the curriculum is feasible, and that the success rates are appropriate for a small-scale and intensive programme. The curriculum structure focusing on semesters as single educational units promotes timely completion. The four-year success rates in particular of the programme are favourable. The panel supports efforts by the programme, such as the student tracking system, to improve the three-year success rates, lower the number of drop-outs and increase coherence of mentoring. The ATLAS teaching staff is well-qualified and able to deliver small-scale

and intensive education. They are praised by students for their engagement with students and informal approachability.

A point of further improvement according to the panel is student guidance and support regarding self-directed learning. Although in the end most students and alumni appreciate the learning process they went through, students at times can feel overwhelmed with the expectations and possibilities of shaping their own learning trajectory. The panel recommends introducing some mandatory elements to the mentoring system to shift some of the responsibility of seeking guidance back towards the programme, and use this, as well as other opportunities, to communicate and explain the educational philosophy, and give students additional help in setting realistic goals. This communication should already start very explicitly with prospective students, in the light of the relatively high number of drop-outs in the programme.

Conclusion

The panel concludes that the programme meets standard 2 of the NVAO framework.

The panel concludes that the programme meets standards B, C, D, E and F of the framework for the Distinctive Feature “Small-scale and Intensive Education”.

Standard 3. Student assessment

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

Findings

System of assessment

Assessment within ATLAS is organized in line with the self-directed learning approach of the programme. The semester goals (see standard 2) are the basis of student assessment. These goals contain the mandatory learning outcomes based on the FLOs as well as the personal goals described in each student’s personal development plan. For every semester, the personal development plan is approved beforehand on an individual basis by at least two teaching staff members. This ensures that the learning activities in the semester align with all relevant learning outcomes. Learning activities such as courses and projects have several formative and summative assessments, such as exams, presentations and written papers. These are graded on a ten-point scale and provided with feedback. In the case of group work, such as in the semester projects, the programme usually combines this with individual assignments to be able to distinguish between the individual group members in the assessment, and to allow students to work on their personal learning goals. Group assignments lead to two grades for each student: one for the group as a whole and one for each member individually.

Grades and feedback are used to demonstrate the realization of the semester goals in the self-evaluation and reflection assignment that students compose per semester as a part of the PDP. Only activities with a sufficient grade or positive feedback can be included as evidence. The final verdict on the semester is made by a panel of teaching staff members based on the student’s reflection and the discussion thereof with the teacher panel. This verdict can be either ‘Pass with Excellence’, ‘Pass’, ‘Pass with condition’ or ‘Fail’. In the case of a ‘Fail’, students have to redo the entire semester in the next academic year. A ‘Pass with condition’ is given when a student has minor deficiencies. The student is then provided with the exact requirements for obtaining a ‘Pass’ and a deadline to meet these, and is given a ‘Pass’ if the requirements are fulfilled, and a ‘Fail’ if they are not. After the semester, the coordinator of that semester and the ATLAS educational coordinator check all written assessments of the verdicts to ensure that they are valid before finalizing them.

The Personal Pursuits are not included in the PDPs, but are assessed separately based on learning goals proposed by the student beforehand and discussed and approved of by the academic supervisor that the student chose. The internship in S5 is assessed in line with other educational activities in the programme. Students formulate their own learning goals and, after approval from an ATLAS supervisor, engage in the internship. Students evaluate at the end of the semester whether they realized their learning goals and provide evidence. This evidence includes a rubric completed by the internship host as well as feedback from the ATLAS supervisor. If an Internship is combined with a Capstone Project, a distinction between both activities is made, and they are assessed separately.

The panel concludes that the assessment system in place is transparent, valid and reliable. Each semester has a variety of assessment methods, such as group assignments with a presentation, written papers or project assignments. Checks and balances such as the use of multiple examiners at key assessment moments in the curriculum validate the assessment outcome. The system in place ensures the link between the learning goals of the programme and the outcome, as they are embedded in the PDP. In the PDP, students have to justify why their plan will ensure that they achieve the learning goals through the different educational activities and their assessment. The PDP has to be approved of by an ATLAS core teacher. Students have a lot of freedom in creating their own curriculum and subsequently their exam programme, while the validity is safe-guarded by the PDP-cycle. The assessment of the optional internship is part of the PDP assessment, and as such, it aligns well with the programme goals.

The panel found that the system of assessment in place is in line with the self-directed character of the programme, as the assessment system is based on the semester goals, which include both the FLOs and the personal goals of the individual student. The panel appreciated that assessment does not only check whether students meet these semester goals, but also includes an oral discussion of the student's personal development. The panel found the feedback-based grading on a pass/fail-basis at the end of the semester to be of added value for the learning process of the student.

Due to the highly individualized nature of the assessment process, students have a great deal of agency in shaping their own assessment trajectories. The panel found that the cyclical PDP system encourages students to not only focus on examination but to also practice self-evaluation and adaptation. The panel praises the sophisticated and tailored system, which fits the programme goals and is suitable for a small-scale and intensive programme.

Assessment of the capstone project
The Capstone Project is assessed by a supervisory/examination committee comprising the daily (disciplinary) supervisor, an ATLAS co-supervisor and optionally a third supervisor. Each project should at least contain an exploration of the broader academic and societal context of its results. In the case of a project conducted outside the UT, the daily supervisor should always be a qualified examiner appointed by an Examination Board of a university. External experts, for instance from organizations, can be involved in a project, but never in assessment. A third supervisor is usually appointed when the daily supervisor is a more junior researcher.

Students defend their thesis in a defence session that comprises a public presentation and a private discussion with the assessment committee. After the defence, the committee provides its feedback on a standard evaluation form. The three criteria are Quality of the Work, Quality of the Process and Communication. Until recently, the final verdict was given based on a non-numerical score in the range excellent – very good – good – sufficient – insufficient. Recently, the programme shifted to grading on a ten-point scale per request of its students, who often needed grade point averages for admission to selective

master's programmes. Supervisors are provided with a Capstone Project Manual that details the requirements and procedures for assessment to safeguard that students are assessed using the same criteria.

The panel studied the thesis assessment procedures as well as a sample of evaluation forms for the Capstone Project, and discussed these with staff and the Board of Examiners during the site visit. It found the thesis assessment process to be insightful and transparent. The staff manual and the evaluation form ensure that the process is reliable and that projects are graded in a transparent and valid manner. Assessment by a committee consisting of (at least) two staff members of staff and optionally a third external examiner validates the process. The panel found that in general ample written personal feedback was provided to the student on the process, as well as on the final product of the project. The panel commends the programme for this. It finds that the programme has responded well to the advice of the previous accreditation panel to ensure an equal level of written feedback given by each assessor. In some cases, the panel would have welcomed additional substantiation on the assessment form of the final grade of the Capstone Project. The panel advises continued attention to this aspect.

Board of Examiners

ATLAS has a dedicated Board of Examiners consisting of two core teaching staff members from the programme and three external members. Next to the regular duties such as appointing examiners and handling student requests and complaints, the Board monitors the quality of assessment through taking samples of assessment products, manuals and procedures. These include course assessments as well as PDPs, final SERs and Capstone Projects. The Board checks whether learning goals are adequately covered in the PDPs and SERs, and whether sufficient evidence is provided for their attainment. The Capstone Project check involves an evaluation of quality as well as validity and transparency of the assessment. The panel interviewed the Board of Examiners and studied documentation of its processes and activities. It considers that the Board performs its tasks convincingly. The panel is positive about having multiple external members on the Board, adding to the external perspective of the Board. The panel concludes to its satisfaction that the Board functions very well and has its checks and balance in place.

Considerations

The panel concludes that the programme has a valid, reliable and sophisticated system of assessment in place. It acknowledges that the assessment system is in accordance with the self-directed learning character of the programme. It concludes that students are supported in their learning process by the assessment system. The assessment system is based on the semester goals that students formulate in their PDP, which includes both mandatory FLOs and personal goals. This framework gives the student a great deal of agency regarding their own exam programme. The assessment of the Capstone Projects is organized in an insightful and transparent way, with ample written feedback. The Board of Examiners is performing its legal duties well. The Board oversees the quality of the assessment process through taking samples from different products in the PDP-system, as well as the Capstone Projects. With these checks and balances, the quality of the assessment system is ensured within the programme.

Conclusion

The panel concludes that the programme meets standard 3 of the NVAO framework.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Quality of the capstone theses
As part of its preparation for the site visit, the panel studied 15 capstone theses of ATLAS graduates. The panel was impressed by the high level of the theses. The theses covered a broad range of topics that all clearly integrated engineering issues into a societal context, which aligns very well with the interdisciplinary profile and intended learning outcomes of the programme. The panel therefore concludes that the theses demonstrate that students realize the intended learning outcomes of the programme, and achieve the high level and broadening required for programmes with small-scale and intensive education.

Graduate performance
The programme keeps in touch with its alumni through the ATLAS Alumni Association. Information from the association shows that almost all graduates pursue opportunities in either the academic or the professional world. 91% obtain a master's degree after graduation, usually at prestigious universities worldwide. Fields of study are very diverse, and include philosophy, physics and neuroscience. Based on the career paths of alumni, as well as discussions with alumni during the site visit, the panel concludes that the programme prepares students well for a wide variety of relevant and demanding master's programmes. Students often use the elective space in the programme to prepare for a master's programme of their choice, and as a result they are usually admitted without issues.

Considerations

The capstone theses demonstrate that students realize the intended learning outcomes of the programme, and show that students are capable of engaging in interdisciplinary work with a clear societal focus. Graduates of the programme are admitted to a broad range of relevant and demanding master's programmes. Combined with the positive assessment of the programme's success rates, which is discussed under 'Learning environment' in standard 2, the panel concludes that ATLAS demonstrates the achieved learning outcomes that befits a programme with small-scale and intensive education.

Conclusion

The panel concludes that the programme meets standard 4 of the NVAO framework.

The panel concludes that the programme meets standard G of the framework for the Distinctive Feature "Small-scale and Intensive Education".

General conclusion NVAO Framework

The panel establishes that the bachelor's programme Technology and Liberal Arts & Sciences meets all four NVAO standards under consideration: intended learning outcomes, teaching-learning environment, assessment, and achieved learning outcomes.

As a result, the panel's overall assessment of the quality of the bachelor programme Technology and Liberal Arts & Sciences is positive.

General conclusion Distinctive Feature Small-scale and Intensive Education

The bachelor's programme Technology and Liberal Arts & Sciences obtained the distinctive feature Small-Scale and Intensive Education in 2012. Four years later, the panel performing the practice-based assessment considered that further progress had been made, both in terms of the evaluation criteria and with regard to the points of attention raised by the initial review team. Another six years later, in 2024, the bachelor programme and its distinctive feature are up for re-accreditation. The current assessment panel looked at whether the programme still meets the conditions for granting the distinctive feature. In line with the NVAO Guidelines, the panel checked whether small-scale and intensive education has evolved into a quintessential feature of the bachelor programme. In the core part of this report, the panel has taken into account the criteria of the distinctive feature when assessing the quality of the bachelor's programme. In this section, the panel brings together its specific findings and considerations on these criteria and indicates whether an extension of the 'Small-scale and intensive education' distinctive feature is justified.

A. Intended learning outcomes
The ATLAS final learning outcomes clearly demonstrate an above-average level and broadening of skills and attitudes required of programmes delivering small-scale and intensive education. The open formulation of learning outcomes allows students to formulate their own path towards the realization of the learning outcomes through self-directed learning, with a strong emphasis on interdisciplinarity and personal development.

B. Curriculum: contents
The individual educational activities tied to the semester goals provide students with the opportunity to work on the broadening of their skills and on their personal development related to the programme's learning outcomes. The Personal Pursuits are an innovative concept to inextricably bind extracurricular activities to the curriculum. These complement the regular extracurricular activities organized by student association Atlantis with support and involvement of the core teaching staff.

C. Curriculum: learning environment
The programme uses the concept of self-directed learning, in which students work individually under guidance of experts. The continuous one-on-one reflection by students and teaching staff on students' personal and academic development reflects the principles of small-scale and intensive education and provides a challenging learning environment. Active preparation and participation of students is central to educational activities. Due to the close interaction in the courses and the individual guidance central to self-direct learning, staff and students form a close learning community. The semester approach of self-directed learning promotes nominal study progress, as all activities tie into each other.

D. Intake
The admission procedure and requirements are appropriate for a small-scale and intensive programme. They include elements of level as well as motivation for the learning concept including self-directed learning, small-scale and intensive education, and extracurricular activities. They also include an individual element in the shape of an interview. Communication to prospective students includes attention to self-directed learning, although the programme might investigate whether this needs strengthening in view of the relatively high drop-out rates.

E. Staff
The ATLAS teaching staff is well-qualified for providing small-scale and intensive education in terms of academic background and teaching qualifications. Staff members are closely involved with students, both

within and outside the courses. The core teaching staff team has a sufficient size to ensure small-scale and intensive education as well as individual counselling. The panel suggests expanding teacher professionalization with an element that further develops the shared approach to self-directed learning.

F. Facilities
The programme has appropriate facilities to support small-scale and intensive education. This includes ATLAS's own building, which facilitates and promotes the learning community, and which offers sufficient room for student housing as well as educational and extracurricular activities.

G. Achieved learning outcomes
The capstone theses demonstrate that students realize the programme's intended learning outcomes, and show that students are capable of engaging in interdisciplinary work with a clear societal focus. Graduates are admitted to a broad range of relevant and demanding master's programmes. ATLAS has favourable success rates that are higher than other UT bachelor's programmes, befitting small-scale and intensive programme. Particularly the 4-year success rates are on par with other small-scale and intensive programmes. The panel supports the programme's efforts to raise the 3-year success rates, and recommends keeping the reduction of the drop-out rates high on the agenda. A very clear and explicit communication of the interdisciplinary character of the curriculum and the concept and requirements of self-directed learning in a small-scale and intensive environment might be instrumental to this, as well as a more structured mentoring system.

The panel establishes that the bachelor's programme Technology and Liberal Arts & Sciences meets all seven criteria of the distinctive feature Small-Scale and Intensive Education: intended learning outcomes, programme content, learning environment, intake, staff, material facilities, and achieved learning outcomes. It considers that small-scale and intensive education is an integral part of the bachelor's programme.

As a result, the panel's overall assessment of the distinctive feature Small-Scale and Intensive Education in the bachelor's programme Technology and Liberal Arts & Sciences is positive.

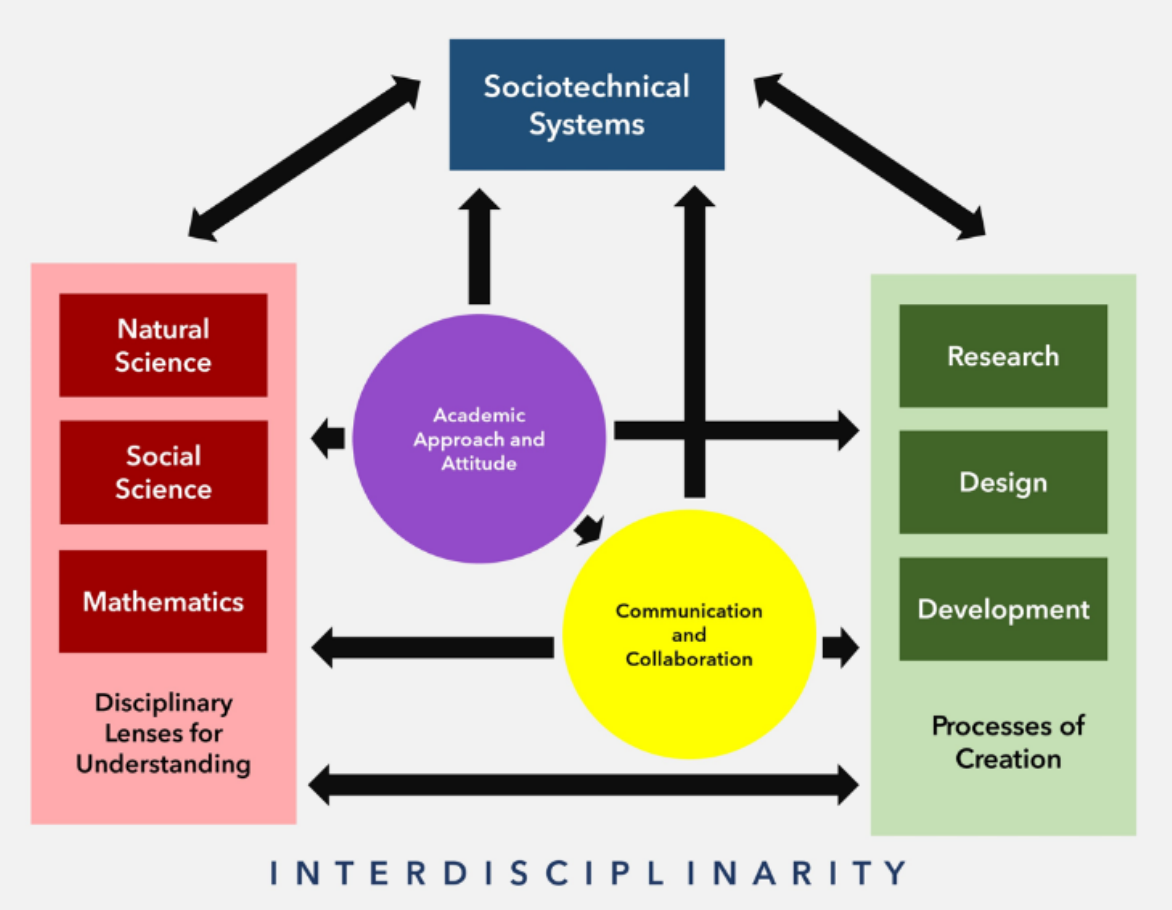
Recommendations

1. Further develop student guidance and support on self-directed learning. This includes:
    a. introducing mandatory elements and structure in the mentoring system, focused on communicating and explaining the educational philosophy and setting realistic goals.
    b. elaborating on the educational vision on self-directed learning, and align with the teaching staff on a coherent mentoring and guidance approach

2. Keep paying attention to improving the three-year success rates, and reducing the number of drop-outs. For the latter, setting expectations of prospective students on self-directed learning in a small-scale and intensive environment, as well as the interdisciplinary character of the curriculum might be helpful.

Appendix 1. Intended learning outcomes

The overarching aim of the UCT-ATLAS programme is to educate New Engineers who can analyse sociotechnical systems, identify challenges within those systems, and develop appropriate solutions with respect to the context in an interdisciplinary way. A New Engineer understands that any technical solution implies a social choice, and vice versa. The competencies these New Engineers require are clustered into four Learning Lines, namely *Disciplinary Lenses for Understanding, Processes of Creation, Communication and Collaboration*, and *Academic Approach and Attitude*.



Disciplinary Lenses for Understanding

An ATLAS graduate is competent in the Disciplinary Lenses from mathematics, natural science, and social science for Understanding:

1. Understands the knowledge base and the concepts, laws, principles, and models in mathematics, natural science, and social science.
2. Has the knowledge of how theories and models emerge and evolve and how they can be used to understand phenomena in relevant fields.

Processes of Creation

An ATLAS graduate is competent in the Processes of Creation

1. Is able to create solutions for socio-technical challenges based on systematic approaches involving research, design and development
2. Is able to apply, justify, and integrate theories and models from the natural sciences, social sciences, and mathematics and use them adequately in creating solutions for sociotechnical challenges.

Communication and Collaboration

An ATLAS graduate is competent in Communication and Collaboration

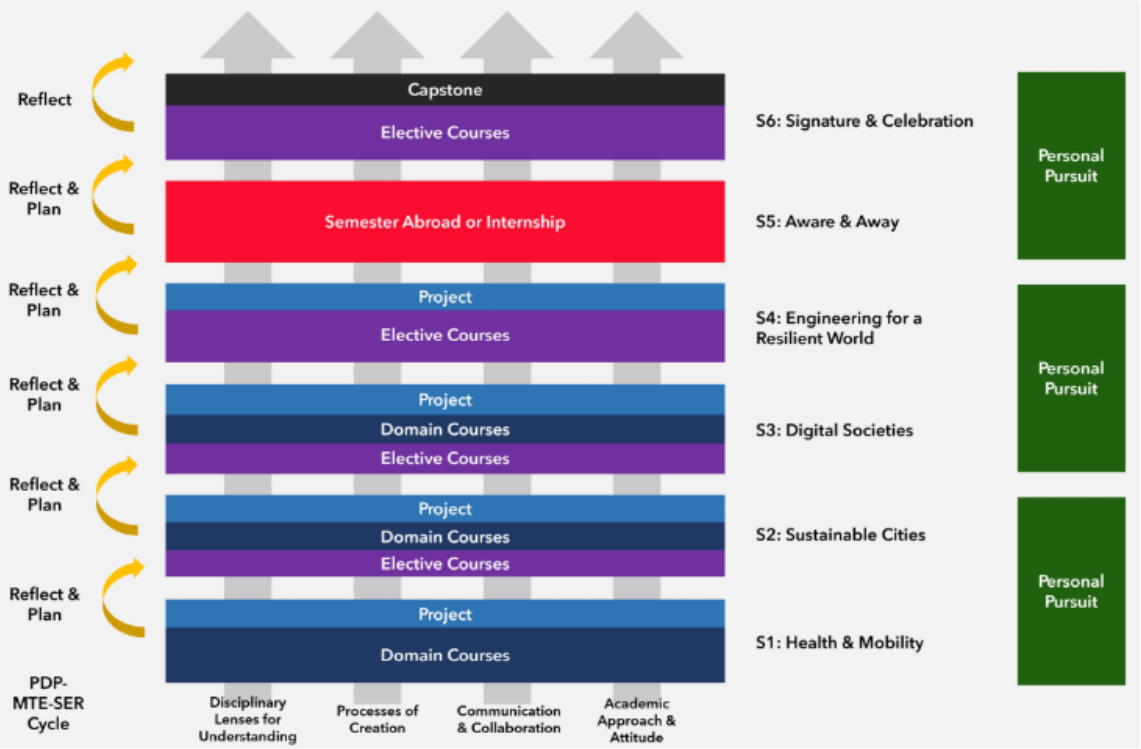
1. Is able to professionally, responsibly, and respectfully collaborate with peers and other professionals with different social and academic backgrounds and in different settings to attain specific goals and objectives.
2. Is able to appropriately communicate information, insights, standpoints, and new knowledge in various ways to different types of audience.
3. Is able to engage in both academic and non-academic discussions on information, insights, standpoints, and new knowledge with various group and individuals in socially and culturally sensitive manner.

Academic Approach and Attitude

An ATLAS graduate has an Academic Approach and Attitude

1. Has the self-awareness to make well-informed decisions concerning their academic and personal growth by identifying appropriate strategies to continuously develop their competences and skills, and to evaluate and reflect on their learning processes and gains.
2. Acts in a socially responsible manner and is able to reflect on the societal and ethical implications of research, design, and development.
3. Is inquisitive and can ask relevant and critical questions and find answers to those questions in an academically sound manner.

Appendix 2. Programme curriculum



SEMESTER 1 – HUMANS & MOVEMENT	
Project Humans & Movement	5EC
Linear Algebra & Differential Equations	6EC
Newtonian Mechanics	6EC
Behavioural Science & Technology	6EC
Introduction to Design	4EC
Personal Pursuit	3EC

SEMESTER 2 – SUSTAINABLE CITIES	
Project Sustainable Transportations	9EC
Programming	3EC
Heat and Thermodynamics	3EC
Social Perspectives on Sustainable Systems	3EC
Electives	9EC
Personal Pursuit	3EC

SEMESTER 3 – DIGITAL SOCIETY	
Project Research and Develop Impact of Artificial Intelligence in Society	9EC
Data Sciences	3EC
Electronics	3EC
Ethics & Governance	3EC
Electives	9EC
Personal Pursuit	3EC

SEMESTER 4 – RESILIENT WORLD	
Project Real-world challenges in complex spatio-temporal systems	9EC
Electives	18EC
Personal Pursuit	3EC

SEMESTER 5 – AWAY & AWARE	
Options: Exchange in the Netherlands Exchange / study abroad Internship Minor	
Electives	
Personal Pursuit (optional)	(3EC)

SEMESTER 6 – SIGNATURE & CELEBRATION	
Capstone project or Internship	15-20EC 10-15EC
Electives	
Personal Pursuit (optional)	(3EC)

Appendix 3. Programme of the site visit

Day 1: 22 april 2024

13.30	13.45	**Arrival & welcome**
13.45	14.15	Preliminary consultation panel (intern)
14.15	15.00	**Meeting program management**
15.00	15.15	Break
15.15	16.00	**Meeting students (incl. alumni and members program committee)**
16.00	16.15	Break
16.15	17.00	**Meeting teachers (incl. Members program committee)**
17.00	17.15	Break
17.15	17.45	**Meeting examination board**

Day 2: 23 april 2024

09.00	11.00	**Theme session: long term evolution of a University College from different perspectives: internationalisation, teacher professionalisation, student professionalisation, embedding in society** Each member of the panel is part of a discussion group of teachers and students. Each perspective will have a statement to stimulate the discussions
11.00	11.15	Break
11.15	12.00	**Wrap up of all discussions with presentations of each item**
12.00	12.15	**Presentation of the learning lines in the Program Development Document**
12.15	14.00	Lunch preparation final meeting
14.00	14.45	**Final meeting program management**
14.45	15.45	Draw up findings (panel intern)
15.45	16.00	**Oral meeting about the findings**

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses of the bachelor's programme Technology and Liberal Arts & Sciences. Information on the theses is available from Academion upon request.

The panel also studied other materials, which included:

- NVAO accreditation report 2019
- Draft concept-based learning lines
- Curriculum structure
- Syllabi semester S1 t/m S6
- Capstone Project Manual
- Internship learning goals
- Internship self-evaluation template
- Internship Host Supervisor Evaluation Form
- Overview ATLAS teachers
- Education and Exam Regulations
- Evaluation report University College Twente, 18 February 2022