



VISION ON TEACHING & LEARNING

2024-2030

DRAFT 5 : 10-11-2023

INTRODUCTION

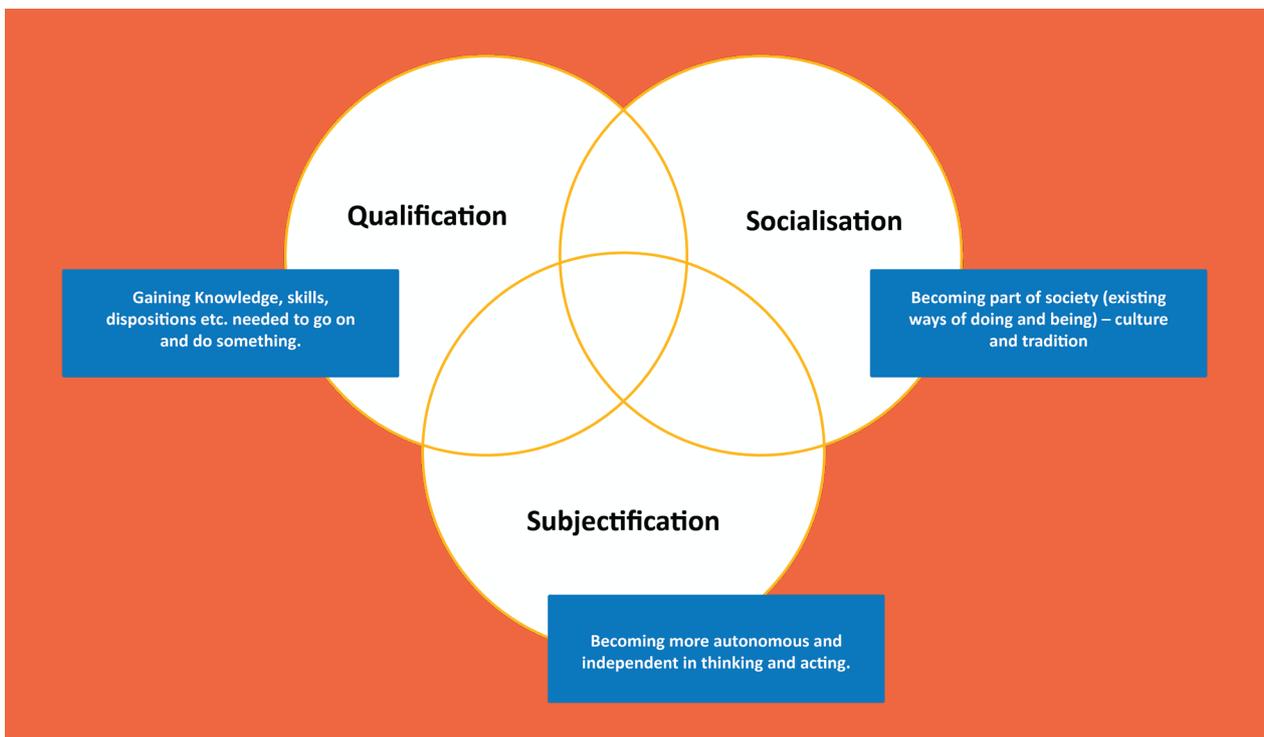
This vision on teaching and learning highlights the values we take as guidance towards the development of our didactics, our programmes, learning and assessment, policy, facilities, development of academic staff and educational support services. In alignment with the core values of the TU Delft code of conduct: Diversity, Integrity, Respect, Engagement, Courage and Trust (DIRECT), the vision serves as a source of inspiration to initiate action towards an inclusive university that focuses on growth and development for our students, lecturers, and support staff.

A participatory approach was chosen to develop this document, involving diverse voices in continuous updates and revisions, in order to promote inclusion, ownership and transparency, and to strive for more equitable, and adaptable education systems. The document is to be viewed as a dynamic blueprint enabling ongoing improvements, and ensuring the document's relevance and efficacy in shaping our education.

***Education is not
preparation for life;
education is life itself¹***

² 1. John Dewey, *Education Creed*. As quoted in: *Education for Social Efficiency: A Study in the Social Relations of Education* (D. Appleton, 1913), p. 138

The vision is informed by the Biesta Model that emphasizes the need to balance the three functions of education, Qualification, Socialization and Subjectification. According to Biesta, education cannot be reduced to a narrow focus on instrumental outcomes (qualification) but should also address the social and personal dimensions (socialization and subjectification). As a university we need to consider how these functions integrate and prioritize all three in an optimal balance to create meaningful educational experiences for our students, lecturers and support staff. Furthermore, by integrating these functions with educational theories such as social constructivism, critical pedagogy, and Dewey’s philosophy, engineering education can encompass not only the acquisition of technical knowledge and skills but also the development of students as socially responsible, critical thinkers who are equipped to adapt, contribute, and innovate in the field of engineering.

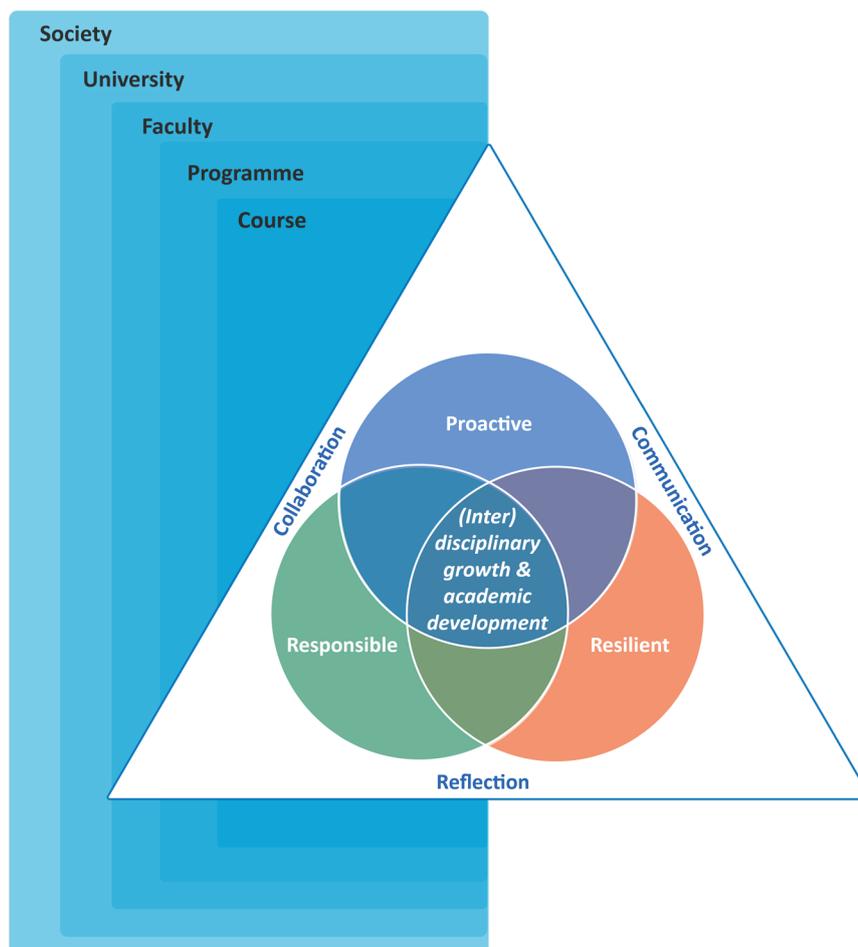


VISION STATEMENT

At TU Delft, we envision teaching and learning to be a transformative educational journey that fosters collective growth and development for our students, lecturers² and support staff.

Developed in alignment with the TU Delft Strategic Priorities Vision: “Delft University of Technology contributes to solving global challenges by educating new generations of socially responsible engineers and expanding the frontiers of the engineering sciences.”

We are committed to empowering individuals to contribute meaningfully to a better future, cultivating innovation and driving positive change on a global scale.



2. Lecturers meaning scientific staff with a teaching role, from PhD, full Professor to full-time Lecturer

Teaching and Learning at TU Delft is centred around (inter) disciplinary growth and academic development.

Our education is evidence-informed and research-driven, emphasizing collaboration to create engaging learning experiences, fuelled by educators' genuine interest and passion for their subjects. Our educational portfolio³ is focused on building knowledge and skills in the different fields of engineering, science and design which differs per programme. We engage in the pursuit of generating knowledge by addressing fundamental problems through technical applications and discovering unexplored realms where theoretical frameworks can be applied. Our education focuses on a systems approach, framing and addressing societal challenges not just as technological issues but also socio-political issues and showing crucial interactions among the different domains of what we teach. We acknowledge that our education is situated in a modern learning context that is continuously evolving, even rapidly at times, with new scientific and technological developments. We consider and proactively involve new technologies in our teaching and learning while being aware of the shortcomings and risks of employing them. Furthermore, we value the diversity of talent and student abilities, and aim to foster continuous learning in our future changers, creators and free thinkers.

“Critical” pedagogy helps the learner become aware of the forces that have hitherto ruled their lives and especially shaped their consciousness⁴

3. We strive to offer a comprehensive portfolio of bachelor, master, doctoral and professional courses and programmes in the fields of science, design and engineering that are internationally acknowledged as world class. (TU Delft Vision on Education, 2017)

4. Critical pedagogy is a philosophy of education based on the work of, amongst others, Paulo Freire. Quote is from Stanley Aronowitz (2009), “Forward,” in Sheila L. Macrine (ed.), *Critical Pedagogy in Uncertain Times: Hope and Possibilities*. New York: Palgrave MacMillan, p. ix.

Teaching and Learning at TU Delft cultivates proactive, responsible and resilient engineers.



PROACTIVE

Our education empowers students and lecturers to become **proactive learners** that build **autonomy** and ownership of their education, engaging in **critical thinking** to solve complex problems and nurturing **curiosity and creativity** to explore new frontiers of building knowledge. They learn to demonstrate **awareness**, staying attuned to their learning process and fostering a **can-do mentality** that instils a proactive approach to **continuous learning**.

As educators, we engage with students' goals and motivations and stimulate them to take charge of their own learning. At the same time, our role is to challenge these goals and motivations, and to confront students with ideas, values, and practices other than their own. Growth – of both students and lecturers – happens through open-ended interaction. Education at TU Delft cultivates proactive learning by being flexible and leaving room for student agency in courses and programmes.



RESPONSIBLE

TU Delft students are known for their proactive and can-do mentality and such self-direction should be augmented by **humility** and **respect**. A **socially aware** and **responsible** engineer goes beyond technical proficiency. They have a comprehensive understanding of the consequences of their solutions and are aware of the limitations of their methods and knowledge. We want to educate reflective and capable engineers, but also **ethical**, responsible citizens.

Our education ensures that the focus on solving problems is always combined with critical investigation of the framing of those problems. To build a truly better future, engineers must develop a critical awareness of the role that engineering has historically played and is currently playing in society and of its contribution to the power structures in which technology is embedded. We actively engage students in real-world engineering problems, allowing them to learn through direct experiences and experimentation. To give students a more holistic understanding of these problems we connect theory with practice and integrate concepts from various fields, emphasizing the inter connectedness of different disciplines.



RESILIENT

We envision learning from all situations to be crucial for the development and **wellbeing** of our students and lecturers. Our students and lecturers learn to **adapt** in academically challenging environments and grow from setbacks. They are supported to approach learning with a **growth mindset** and to see and appreciate progress in themselves and in others. As we navigate the ever-changing landscape of today's most complex problems, we cannot always have a single right answer to show. Rather we learn to **satisfice and optimize** to these challenges. **Resilience**⁵ is being capable of leading transformative change and takes us toward **pioneering capabilities**.

Our education views classrooms as a means to bring people together. Students and lecturers learn to ask for help, to reflect, and – build relationships on understanding and trust for one another. We help equip our students with underlying meta-cognitive tools and techniques that move us through moments of chaos. As educators we guide and motivate students, vulnerability fore fronted. Showing that we can transform together with empathic qualities.

Becoming a proactive, responsible and resilient engineer is easier said than done. How would we do that without reflection⁶, collaboration and communication?

We acknowledge that reflection is a broad concept, so we use guidelines and models as sources of inspiration and we shape reflection to its specific context, rather than applying the same script to all situations. We aim for meaningful reflection in education, where students and lecturers learn to relate their inner perspective to other perspectives, other people, the environment, external incentives and goals. Reflection is not just a thought experiment, it is applied in practice. It needs to be trained, by being confronted with (situated) examples and offering the space and support to be guided through them.

In our education, teamwork is crucial. By assigning projects that require teamwork, discussion, and knowledge sharing, students can learn not only technical skills but also effective communication and collaboration—skills vital for engineering practice. Engineering often involves complex problem-solving with a multitude of diverse stakeholders. Educators can encourage students to construct their understanding of engineering principles by presenting open-ended problems, engaging in group discussions, and collaborating to find solutions. This systematic approach to collaboration not only enriches the learning experience but also forges connections essential for the development of both students and lecturers in the field of engineering.

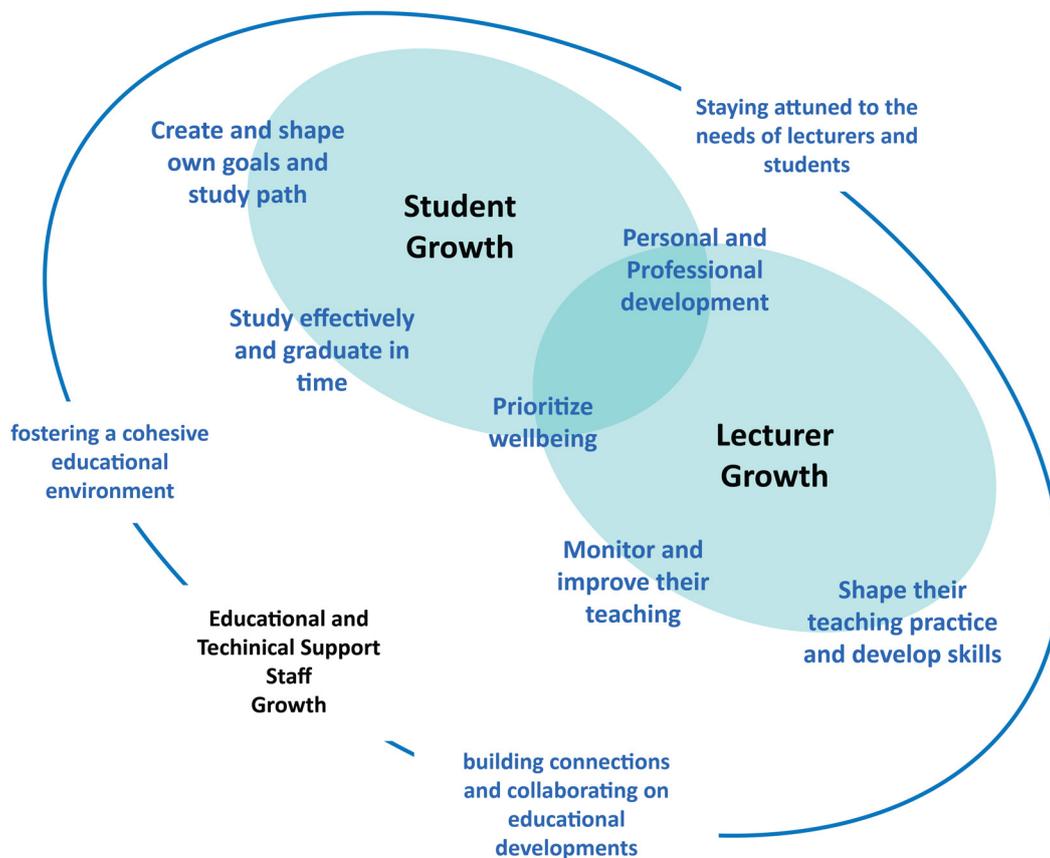
5. Price, R.A., & Bijl Brouwer, M.v.d. (2023) *The Resilient Designer's Handbook*. Self-Pub. ISBN: 978-94-6366-743-2. URL: <https://resilientdesigners.com/>

6. Hermsen, P. E. A., van Dommelen, S., Espinosa, P. H., & van den Bogaard, M. E. D. (2023). *The Power of Perspective Dialogue: Unlocking Transformative Reflection in Engineering Education (Practice)*.

GROWTH JOURNEYS AT TU DELFT

Good education is reciprocal and responsive. It is a relationship, not a transaction. Therefore, education cannot be fully pre-planned or programmed. There must be room for true interaction, where both lecturers and students shape the courses in response to each other – in cooperation with each other.

Student growth⁷ means that students learn to proactively create and take ownership of their goals and study path, such that they can study effectively, graduate in time and personally and professionally develop themselves and their well-being. We facilitate students to discover the full spectrum of competencies (knowledge, skills, attitudes, insights) and mindsets they need to become proactive, resilient, and responsible TU Delft engineers.



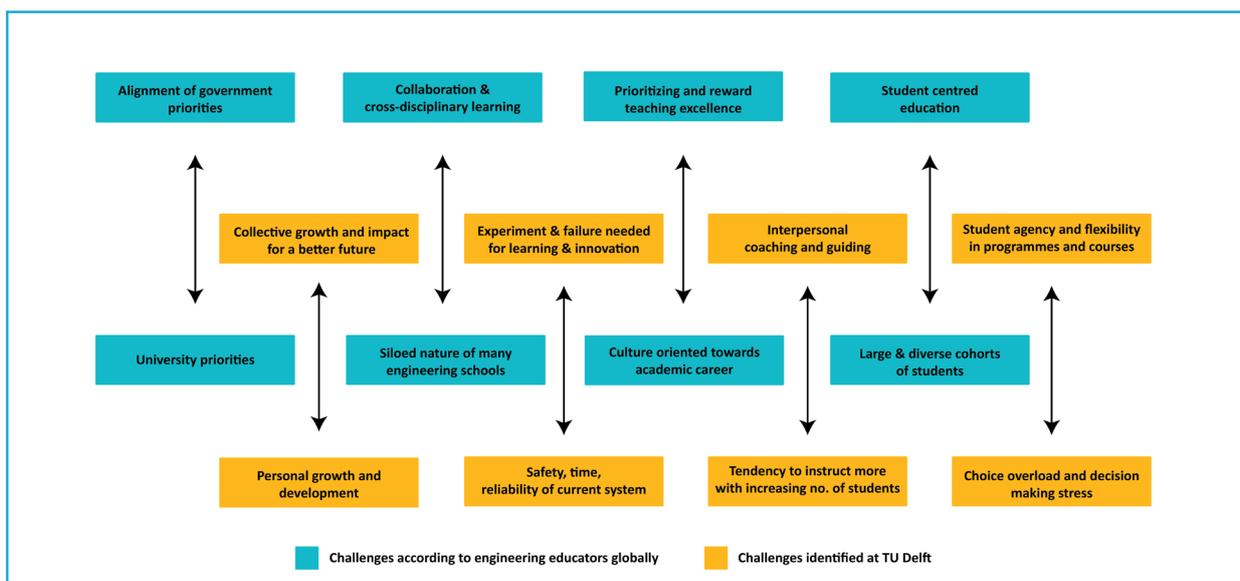
8 ⁷ Based on the definition of Student Success (De Minister van Onderwijs, Cultuur en Wetenschap, I.K. van Engelshoven in een brief aan de Tweede Kamer, 13 September 2019.): “Every student needs something different to be successful and not every student starts from the same position. Student success not only means being able to graduate within a reasonable period of time, but also room for personal development, with attention to student well-being and being able to take control of one’s own learning.”

Lecturer growth means that lecturers are professionals who are capable of monitoring and improving the quality, effectiveness, and efficiency of their teaching such that it is satisfying for both them and their students. Their role is multi-fold and integral to the process of teaching and learning. They choose and shape their teaching practice and develop skills based on their interest and expertise, their strengths, weaknesses, the needs of students, and society, while aligning with the final attainment levels and the didactic concept of the study programme. We facilitate lecturers to explore and experiment with education and continue to develop in their career as proactive, resilient, and responsible lecturers.

Educational and Technical support staff play a crucial role in fostering a cohesive educational environment. Beyond their advisory function, they act as a vital connection that unites students, teachers, departments, and management towards shared goals. Growth for support staff includes staying attuned to the needs of lecturers and students and building strong relationships and establishing a positive rapport with education management. This allows support staff to provide valuable insights and collaborate on faculty-wide developments, promoting a unified approach across teaching departments and educators.

CHALLENGES

It is important to recognize that various tensions naturally arise against this vision due to the complex and multifaceted nature of the educational landscape. We must identify and acknowledge these tensions as opportunities for growth and development rather than viewing them solely as obstacles.



Some challenges faced by the global engineering sector⁸ encompass the need for alignment between government and university priorities, the delivery of high-quality, student-centred education to diverse cohorts, and the impediment posed by siloed structures within many engineering institutions, hindering collaboration and cross-disciplinary learning. Faculty appointment, promotion, and tenure systems are identified as factors reinforcing an academic culture that insufficiently values and rewards teaching excellence.

Additionally, various tensions that we face at TU Delft include the contrast between aspiring to achieve collective growth and impact for a better future and recognizing the importance of personal growth and development at the individual level. Also challenging is finding a balance between fostering experimentation and learning through failure and maintaining the stability and reliability of the current system, considering time and financial constraints and overall risks. The university also grapples with the tension between the necessity for interpersonal coaching and guidance for students and the inclination to rely more on instructing large cohorts of students. Furthermore, there is a delicate balance between providing students with agency and flexibility in courses and programs and the risk of overwhelming them with choices and decision-making stress. These tensions underscore the intricate landscape of educational priorities and practices at TU Delft.

AMBITIONS

The following ambitions have been developed from the vision. They cover the different aspects of how we want to continue to transform teaching and learning at TU Delft and are meant for discussion and to inspire ideas on how to achieve them.



8. Graham, R. (2018). *The global state-of-the-art in engineering education. MIT New Engineering Education Transformation* retrieved via <https://rhgraham.org/resources/Global-state-of-the-art-in-engineering-education---March-2018.pdf>

Ownership of learning

We enable students to take ownership of their learning and development as an engineer. It should be seen in the context of different phases of development, where first year bachelor students may need more guidance, and in the later phases' education programmes should be designed to give students more autonomy. We further develop students' own ability to learn'. Our teaching encourages students to engage with content (active learning) and motivates them to think critically.

Failing forward

Embracing a non-binary perspective on failure, we aim to transform the narrative around it, emphasizing the concept of "failing forward" as a means of learning. The university recognizes the challenges linked to failure, including high stakes such as negative Binding Study Advice, study delays, and tuition costs, as well as self-induced pressure from students driven by the pursuit of academic excellence. These challenges underscore the need to manage student expectations and address the pressure that impedes the acceptance of failure as an integral step toward progress, with the goal of normalizing risk-taking and fostering innovation within the learning process.

Transdisciplinary mindset

We offer chances for collaboration, fostering mutual understanding and appreciation among stakeholders. This involves cultivating openness to diverse viewpoints, embracing learning and development from alternative perspectives, accepting change, and pushing boundaries. The approach encourages participants to view each other as knowledge makers with unique strengths and approaches.

Lecturer development

We stimulate academic staff to learn, continue to improve their teaching skills and reflect on the ever-changing contexts of their profession. We offer the training, space and support for it. We encourage learning from each other and provide opportunities for sharing knowledge and expertise in order to continually develop education.

Evidence informed didactics

Didactics are chosen through an evidence informed way which includes using empirical educational science as a foundation, learning from experiences of peers, monitoring, and assessing, evaluating, and improving teaching based upon different data sources, such as formative and summative assessments, student evaluations, interviews, and focus groups. Incremental development of education should be encouraged to ensure quality improvements.

Transferable skills training

Skills training is integrated within TU Delft programmes and courses (skills like, project leading, effective communication and working in a group). They are addressed in the final attainment levels and reflected in the learning objectives.

Assessment and Feedback

The assessments at TU Delft should be fair, meaningful, and feasible. We continue to improve on methods of assessing and providing feedback such that it further enhances the learning and development of students.

Programme Alignment

The programme directors ensure course and assessment alignment within the programme, familiarizes lecturers with programme learning goals, and guides lecturers on the placement and significance of their course within the programme such that they contribute towards the end terms.

Participatory approaches and co-creation

We systematically involve lecturers and students in quality assurance and decision-making processes that affect teaching and learning at the university. We have open dialogue on educational topics i.e., facilities (infrastructural and technological), design of programmes, support and services and the culture at the university. We create solutions for, by and with lecturers and students that improve our education, that we can use ourselves, and share with others.

Inclusive and safe learning environment

We foster and build an inclusive and safe environment that empowers students and lecturers to learn (i.e., social safety, supported in the work environment). We celebrate diversity and strive for inclusion – acknowledging, and promoting the strength in differences.

Learning community

We strengthen the TUD learning community and boost social cohesion within our university and outside. We involve students and lecturers in joint activities and knowledge exchange across the various programmes, service departments with other universities and society. We facilitate interdisciplinary and cross faculty engagement for lecturers and students, encouraging collaboration and learning together.

Campus university

We provide an open campus experience that stimulates student and staff development. We create opportunities for social engagement, a sense of belonging, peer learning and developing a thriving network for students and lecturers; within the university campus. We leverage the potential of blended learning and hybrid teaching and collectively determine appropriate use cases that will improve teaching and learning at the university while also considering accessibility of education.

Integrating wellbeing

We determine how we can facilitate the strengthening of resilience for both students and lecturers. We take into consideration both student and lecturer wellbeing when determining programmes/curricula, work/study load and support requirements.

NEXT STEPS

The next steps in advancing TU Delft's vision on teaching and learning involve leveraging the strength of diversity within our engineering education programmes. Emphasizing the university's capacity for incremental change, the focus will be on maintaining a reputation for academic excellence while actively embracing educational development. The key to facilitating this incremental change is the continuation of cross-campus consultation and consensus-building and providing ample support and resources for students, lecturers, support staff, programmes and faculties.