Think Tank

4TU. Centre for Engineering Education
In the case of engineers, fast...Yet we can be slow to respond to our...in the coming decades? - who knows what else awaits us. Driverless cars, economies are shaped by digital information. Or should we now emphasise content mastery over content...depth knowledge and human capabilities that are no longer critical in the new world... The question is: are our institutes of higher engineering...modules tailored to help students acquire the specific skills and specialist knowledge necessary to excel in their chosen sector...they should have well...they are educating?...PUTTING all these thoughts together, the Think Tank came up with the following key questions:

What sort of student should TU Delft be educating?
- What will be the major changes facing students in 2030?
- What “added value” can TU Delft deliver in terms of educational content?
- What learning processes are needed to prepare the future engineer?

Possible future worlds

Nobody knows what’s going to happen in the future but we can imagine. Some possible worlds that we can imagine are a number of possible scenarios. If we then consider the many skills and abilities that are required to thrive in those situations, we can also help prepare the future engineer to face the needs of each potential future.

The next phase of the Think Tank’s process was to focus on current trends and their implications. In the current world, we can see a number of possible developments. It could also inspire and

Conclusion

In our world has changed enormously

Evolution of engineering education

“Today we attempt to educate 21st-century engineers with a 20th-century mindset and curriculum, based on a 19th-century institutional structure and organisational context” (Kamp and De Wit, 2015)

“the world of today is very different to the world of yesterday...we are no longer just engineers but also business managers, entrepreneurs, and...think tanks, DRIVER, Energy Transition and Smart Data, Robotisation and the Internet...possible future worlds...In the coming decades...”

Core competencies

Working on solutions to many of our problems today, engineers need to be equipped with a wide variety of competences and thus to broaden the specialist's more human...Doing so requires not only an understanding of the technical aspects...broaden the specialist's more human...professional and societal aspects, and the ethical implications of their work. In addition, they will have to be able to communicate effectively. As a result, the programme should ensure that students will be able to understand each other and work together more effectively.

Design Thinking

A “New Spirits Think Tank” was set up using Design Thinking, a methodological approach to stimulate out-of-the-box ideas about ways of working, the Think Tank has explored current trends in engineering, science and society...Developed ideas based on possible future worlds.

The results helped identify a number of important points:
- A definition of a career path should start early in the higher education phase, either at the point of admission or during the last year of study programmes. The reason is that the educational institutions should ask to what extent students can work in teams without conflict, how they work on interdisciplinary projects, how they work on multidisciplinary projects,...and how they work together in those situations. We can do so by looking at what is happening around us; the society we live in, the culture we are part of, the way we live, the way we communicate, the way we face problems, the way we face difficulties.
- Preparing for innovation would be world-class reputation of TU Delft, already strong in producing engineering graduates, and the innovation...Engineering...and the ethical aspects of engineering. As with the Specialist, the Front...to integrate that knowledge into system and...organic and societal context; the Earth system, the Economy, the Society, the Regulation and the Environment. These new insights helped identify three new challenges.

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The ‘Free Spirits’ Think Tank expects that TU Delft’s students will face many changes in 2030. During their education, they will be challenged to go out into the world and bring back real-life problems that need to be solved. The added value of research universities such as TU Delft remains the thorough foundation in engineering fundamentals but in order to face the future, mono-disciplinary projects on specialist subject matter should be complemented by flexible and diverse inter-disciplinary research and engineering projects, in collaboration with third parties from industry, R&D and other areas and sectors within society.

In today’s world, it’s no longer enough just to know stuff; we need to know how to use what we know appropriately and in which context. In the future ‘that’ knowledge will only become more important.

“Many of the societal and engineering challenges are so complex and multidimensional that they cannot be unlocked with the old-fashioned key of sciences and technology alone, but also need socio-economic capabilities….

Solving complex systems requires a solid foundation in mathematics and the natural sciences, and an understanding of human nature.”

Kamp, A. (2014)
Think Tank participants

- Danielle Ceulemans MSc (Valorisation Centre) • Dr. Els van Daalen (Technology, Policy and Management) • Jeroen Delfos BSc (student Central Student Council) • Prof. Anke van Hall (Architecture and the Built Environment) • Dr. Peter Hamersma (Applied Sciences) • Prof. Timo Heimovaara (Civil Engineering and Geosciences) • Dr. Alexandru Iosup (Electrical Engineering, Mathematics and Computer Sciences) • Aldert Kamp MSc (Aerospace Engineering and 4TU.Centre for Engineering Education) • Bram Mulder MSc (Master student Aerospace Engineering) • Dr. Frido Smulders (Industrial Design Engineering) • Dr. Gabrielle Tuijthoff (Mechanical, Maritime and Materials Engineering) • Boukje Vastbinder BSc (Valorisation Centre) • Linda Verbeek MSc (Education and Student Affairs) • Prof. Sybrand van der Zwaag (Aerospace Engineering) • and facilitators Dr. Renate Klaassen (Centre of Expertise on Education FOCUS and 4TU.Centre for Engineering Education) and Alexia Luising MSc (Centre of Expertise on Education FOCUS) •

For more information about 4TU.CEE check our website: www.4TU.nl/cee