Co-funded by the European Union

This Project has received funding from the European Commission ERASMUS+ Programme under grant agreement no. 101082928.

Deliverable 2.2

‘Training in KU Leuven’

Project Name: Students’ Personalised Learning Model, Based on the Virtual Learning Environment of Intellectual Tutoring "Learning with No Limits" – SMART-PL

Grant Agreement No.: 101082928

Call: ERASMUS-EDU-2022-CBHE

Topic: ERASMUS-EDU-2022-CBHE-STRAND-2

Type of action: ERASMUS Lump Sum Grants

Start date of the project: 1 January 2023

Duration of the project: 36 months

Co-funded by the European Union

This Project has received funding from the European Commission ERASMUS+ Programme under grant agreement no. 101082928.

Disclaimer

The SMART-PL consortium consists of the following partners:

No.	Role	Short Name	Legal Name	Country
1	COO	TalTech	TALLINNA TEHNIKAÜLIKOOL	EE
2	BEN	KU Leuven	KATHOLIEKE UNIVERSITEIT LEUVEN	BE
3	BEN	PWR	POLITECHNIKA WROCLAWSKA	PL
4	BEN	IFNUL	IVAN FRANKO NATIONAL UNIVERSITY OF LVIV	UA
5	BEN	KRNU	KRYVORIZKYJ NATIONALNYJ UNIVERSYTET	UA
6	BEN	KKNU	V. N. Karazin Kharkiv National University	UA
7	BEN	KHNU	KHMELNITSKY NATIONAL UNIVERSITY	UA
8	BEN	ONPU	ODESSA NATIONAL POLYTECHNIC UNIVERSITY	UA
9	BEN	IHE OF NAESU	INSTITUTE OF HIGHER EDUCATION OF THE NATIONAL ACADEMY OF EDUCATIONAL SCIENCES OF UKRAINE	UA
10	BEN	KSU	KHERSON STATE UNIVERSITY	UA
11	BEN	NAHEQA	NATIONAL AGENCY FOR HIGHER EDUCATION QUALITY ASSURANCE	UA
12	BEN	UKRSEITSOC	PUBLIC ORGANIZATION "UKRAINIAN SCIENTIFIC AND EDUCATIONAL IT SOCIETY"	UA
13	BEN	FFUTURE	Kryvyi Rih Foundation of the Future	UA

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Title	Training in KU Leuven
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v 0.02	31.07.2023	Final	R: Archil Chochia [TalTech]	Checks and revision
v 0.03	04.07.2024	Final	R: Geert de Lepeleer [KU Leuven]	Post review correction

[1]**Types.R:** Document, report (excluding the periodic and final reports); **DEM:** Demonstrator, pilot, prototype, plan designs; **DEC:** Websites, patents filing, press & media actions, videos, etc.; **OTHER:** Software, technical diagram, etc.

[2]**Dissemination levels:** Public — fully open (e.g. web); Sensitive — limited under the conditions of the Grant Agreement; EU classified — RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision 2015/444.

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Table of Contents

Table of Figures 5
1 Background 5
2 Introduction 5
3 Description of the activity 6
3.1 Scope 6
3.2 Training objective 6
3.3 Partners' presentations and delivered lectures 6
3.4 List of participants 8
3.5 Attendance list 9
3.6 Photos from the training 11
3.7 Meeting minutes 15
4 Conclusions 16
Annex 1. KU Leuven presentations 17

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Table of Figures

Figure 1 – Presentation by Peter Hanselaer;
Figure 2 – Presentation by Pauline Deltour;
Figure 3 – Participants of the training;
Figure 4 – Presentation by Pauline Deltour;
Figure 5 – Joint photo during the training session
Figure 6 – Joint photo at the end of the training session.

1 Background

SMART-PL is a 3-year project, focused on introducing a model of personalised learning, based on the virtual learning environment of Intellectual Tutoring "Learning with No Limits". Intellectual tutoring is a set of learning tools: SMART online platform for virtual personalised learning and formative student assessment; co-working centre with equipment for organising hybrid learning, which increases the educational process's efficiency and gives both teachers and students more opportunities. "Learning with No Limits" means that all students are welcomed - regardless of age, personality, socioeconomic status, or educational needs, regardless of the opportunity to be present in the audience or not. The project is divided into 7 WPs which are linked to promoting the cooperation of partners to implement the European experience of personalised learning; improving educational programs of universities; increasing transparency and comprehensibility of education and assessment for students (including the results of non-formal education), reducing students' anxiety as for their professional expertise and forming their confidence to achieve efficient results; to improve the quality of teaching materials; to facilitate students' mobility, including in virtual mode, on a university/country scale, inter-university/country levels); to create extra opportunities to get higher education for people with disabilities and specific academic needs through inclusive education and the implemented model of personalised learning and hybrid technologies.

The fundamental principle of the project is a personalised approach aimed at forming a highly qualified competitive specialist who can conduct innovative activities and has the skills of continuous professional development. The personalised approach is characterised by innovative teaching methods, designed to encourage collaboration between students and teachers, emphasising the central role of students in controlling their learning.

2 Introduction

The purpose of the document is to present all activities and results completed during the SMART-PL training session, held in Ghent at 19-20 June 2023, and summarize the decisions made by the team of project participants during the meeting.

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The document is intended for SMART-PL team members, Members of Board management, members of quality assurance team.

3 Description of the activity

3.1 Scope

The scope of the document is to provide an overview of the activities, presentations and decisions made during the training session in Ghent, Belgium for the team members of SMART-PL project. The document is structured as follows:

- Training objectives;
- Partners' presentations;
- List of participants;
- Attendance list;
- Photos from the training;
- Meeting's minutes.

3.2 Training objective

The objective of the training in KU Leuven (Campus Ghent) was to inform Ukrainian participants about the developments of KU Leuven in the aspect of personalized learning, formative assessment, acting lifelong learning practices, experience of inclusion of students with fewer opportunities an special educational needs and as well as study modern developments in the field of information and communication technologies in education. On a later stage Ukrainian participants will develop a common policy for personalized students' learning, which is based on the information in EU universities.

This training directly contributes to the SMARTPL specific objectives, namely:
1. Enhance student's motivation to learning through applying the by-the-learner approach and create conditions to meet students' individual needs associated with differentiation and personalization of academic trajectories.
4. Improve educational programs of universities by updating the process of formation of competencies and the distribution of program results of student learning between educational components; to improve the quality of teaching materials.

Bases on the identified objectives of the training visit, the agenda and content of the lectures were proposed by local team leader from KU Leuven.

3.3 Partners' presentations and delivered lectures

According to the report made by Peter Hanselaer, KU Leuven is a highly ranked university, known for its excellence in academic education, research, and

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distinguished service to society. It is a comprehensive university with three groups and 16 faculties, including the Faculty of Engineering Technology. The university boasts over 60,000 students, 12,680 staff, and 9,335 researchers, with a significant international presence.

The Faculty of Engineering Technology at KU Leuven (a unit which participates in SMARTPL project) operates across seven campuses in Flanders, Belgium, and offers a unique application-oriented academic engineering education programme. It has a strong local anchoring and application-oriented focus in collaboration with the industry. The faculty has a strong link with companies and is involved in various research activities across seven departments. The faculty's academic activities are of great importance for the whole KU Leuven university as they contribute to the development of innovative solutions and technologies, needed for training of future engineers and researchers.

The Faculty of Engineering Technology provides study support for first-year students, helping them transition into their new environment. This support includes guidance on how to study and plan, as well as assistance with subjects like mathematics, chemistry, and physics. The support is multilayered, offering an open door policy, individual questions with or without appointment, weekly appointments, group sessions, and workshops on study methods and time management. The presenter gives details how the faculty implements an adaptive learning path for mathematics, which is designed to stimulate self-regulated learning. This personalised learning path includes tests, reflection questions, and invitations for students to think about their learning process. It aims to optimize the learning experience for each student, allowing them to identify what goes well and what could be improved in their learning process.

The presentation made by Pauline Deltour discusses the importance of lifelong learning competencies in higher education, particularly in engineering. It emphasizes that these competencies are not always perfectly represented in learning outcomes and suggests the need for a strategic plan that takes into account the whole programme and input from lecturers and educational practitioners.

It also explores possible interventions to enhance lifelong learning competencies, such as student-centred teaching methods, focus on self-regulation, reflective journals, and use of peer and self-assessment. It further highlights the importance of a student-centred approach, competency development as a continuous process, and the need for longitudinal interventions starting from the first year.

Finally, the presentation provides insights into students' and lecturers' perceptions of lifelong learning competencies. It reveals that while lecturers recognize the importance of these competencies, they do not always consider them as primary teaching goals.

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On the other hand, students value the attitudinal and concrete aspects of lifelong learning more.

The presentation made by Prof. Wouter De Sutter outlines the individualized learning approach at KU Leuven. It highlights the role of academic advisers and tutorial services in providing subject-related guidance and study method guidance to students. The university also offers a range of student services (STUVO) including housing, food & transport, money matters & living costs, student counselling, welcome activities & meeting people, health & well-being, working, volunteering & career, and religion, inclusion & diversity. The presentation further details the support provided to students throughout their study career, including counselling, advice, and support for students with disabilities. It also mentions the role of the student career centre in providing study-related jobs, career coaching, and CV screening. Social services are also available to assist students with practical, legal, or financial issues related to their stay as a student.

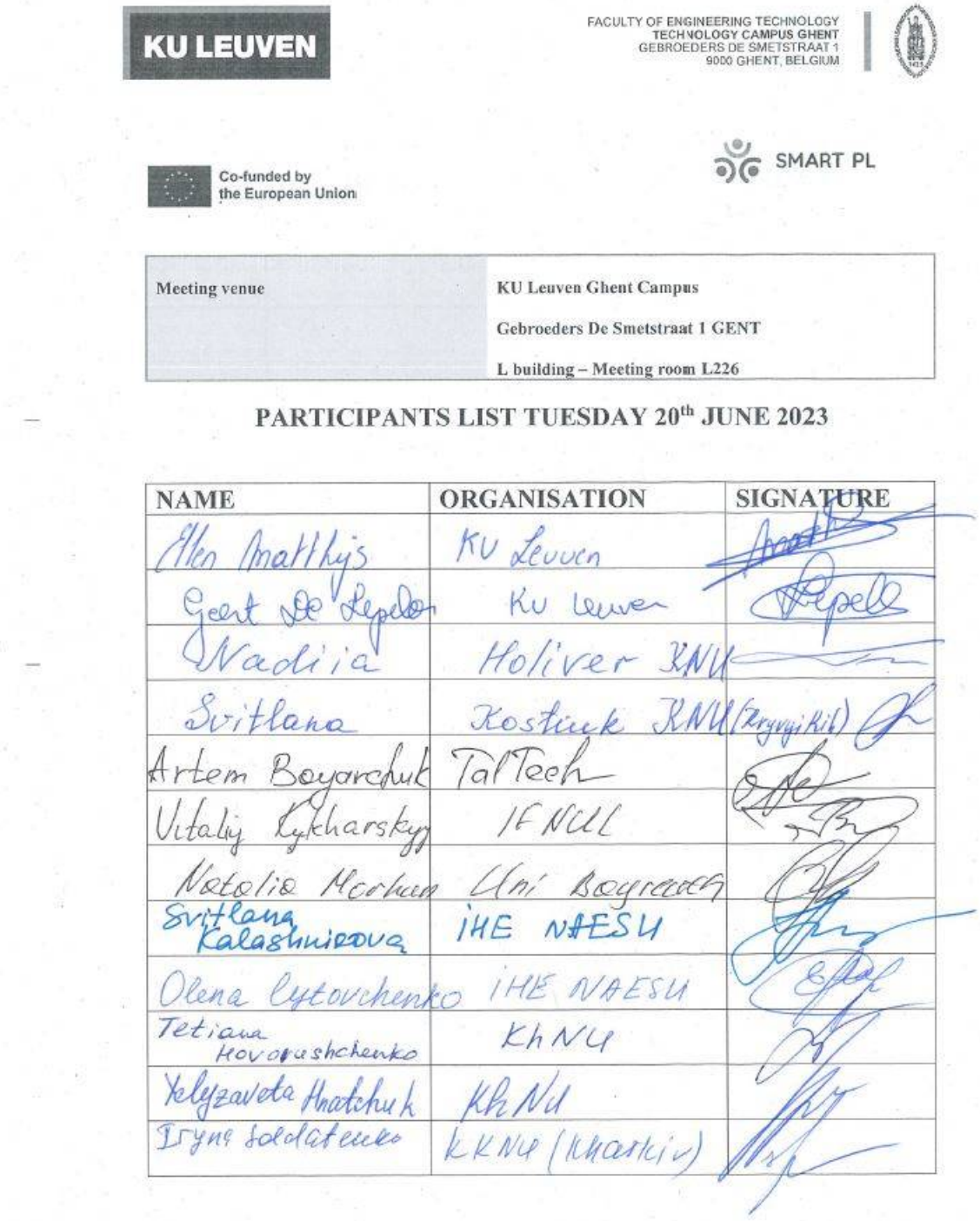
The individualized learning approach at KU Leuven can be adapted to other universities by implementing similar support structures. This includes academic advisers for personalized study guidance, comprehensive student services for overall well-being, and specialized support for students with disabilities. Additionally, career centres can be established to assist students in transitioning from academic life to the professional world. The key is to focus on the individual needs of each student, providing them with the resources and support they need to succeed.

All partners' presentations made by coordinating institution can be found in Annex 1.

3.4 List of participants

Artem Boyarchuk, post-doctoral researcher, member of SMART-PL management team of TalTech
Geert De Lepeleer - Katholieke Universiteit Leuven, Belgium
Ellen Mattris - Katholieke Universiteit Leuven, Belgium
Prof. Vitaliy Kukharskyy - Ivan Franko National University of Lviv
Prof. Natalia Morkun - Kryvyi Rih National University
Prof. Madiia Holiver - Kryvyi Rih National University
Dr. Svitlana Kostiuk - Kryvyi Rih National University
Prof. Tetiana Hovorushchenko - Khmelnytskyi National University
Dr. Yelysaveta Hnatchuk - Khmelnytskyi National University
Dr. Iryna Soldatenko – Karazin National University, Kharkiv
Prof. Svitlana Kalashnikova - Institute of Higher Education of the National Academy of Sciences of Ukraine
Olena Lytovchenko - Institute of Higher Education of the National Academy of Sciences of Ukraine

3.5 Attendance list



KU LEUVEN

FACULTY OF ENGINEERING TECHNOLOGY
TECHNOLOGY CAMPUS GHENT
GEBROEDERS DE SMETSTRAAT 1
9000 GHENT, BELGIUM

Co-funded by the European Union

SMART PL

Meeting venue	KU Leuven Ghent Campus Gebroeders De Smetstraat 1 GENT L building – Meeting room L226

PARTICIPANTS LIST TUESDAY 20th JUNE 2023

NAME	ORGANISATION	SIGNATURE
Ellen Matthijs	KU Leuven	
Geert De Lepeleer	KU Leuven	
Nadiia	Holiver KNU	
Svitlana	Kostiuk KNU (Zhytomyr Kyiv)	
Artem Boyarchuk	TalTech	
Vitaliy Lykharskyy	IF NULL	
Natalia Moskun	Uni Bogrodch	
Svitlana Kalashnikova	IHE NAESU	
Olena Lytovchenko	IHE NAESU	
Tetiana Hovorashchenko	KhNU	
Yelyzaveta Hnatchuk	KhNU	
Iryna Soldatenko	KNU (Kharkiv)	

KU LEUVEN

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TECHNOLOGY CAMPUS GHENT
GEBROEDERS DE SMETSTRAAT 1
9000 GHENT, BELGIUM

Co-funded by the European Union

SMART PL

Meeting venue	KU Leuven Ghent Campus Gebroeders De Smetstraat 1 GENT L building – Meeting room L226

PARTICIPANTS LIST MONDAY 19th JUNE 2023

NAME	ORGANISATION	SIGNATURE
Ellen Matthijs	KU Leuven	
Geert De Lepeleer	KU Leuven	
Nadiia Holiver	KNU	
Svitlana Rostiuk	KNU (Kryvyi Rih)	
Artem Boyarchuk	TalTech	
Vitaliy Lukhovskyy	IF NUL	
Natalia Norkus	Uni Bogreuth	
Svitlana Galashnikova	IHE NAESU	
Olena Lytovchenko	IHE NAESU	
Tetiana Hovorushchenko	KhNU	
Yelyzaveta Hnatchuk	KhNU	
Iryna Soldatenko	KNU (Kharkiv)	

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3.6 Photos from the training

Figure 1 – Presentation by Peter Hanselaer

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Figure 2 – Presentation by Pauline Deltour

This Project has received funding from the European Commission ERASMUS+ Programme under grant agreement no. 101082928.

Figure 3 – Participants of the training

This Project has received funding from the European Commission ERASMUS+ Programme under grant agreement no. 101082928.

Figure 4 – Presentation by Pauline Deltour

Figure 5 – Joint photo during the training session

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Figure 6 – Joint photo at the end of the training session

3.7 Meeting minutes

In addition to that, the partners agreed on the following:

- Taltech: to finalise transferring first instalments to partners (deadline 01 July 2023);
- Taltech: to validate tender documents and contracts for purchasing the equipment for Ukrainian partners (deadline 01 July 2023);
- TalTech: To schedule and run an online info session on finance management for Ukrainian partners (dedicated to travel costs reimbursement and reporting) (deadline 01 July 2023);
- TalTech: To update a schedule for e-mail reminders on deliverables for better tracking the partners' progress on deliverables and minimize a risk on late submission;
- LU Leuven and PWR: To develop reports on deliverables for the trainings held in KU Leuven and PWR (30 July 2023);
- TalTech: To update a project Google drive for reports on deliverables and internal documentation and share it with all partners.

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- All responsible partners: To start working on forthcoming deliverables schedule for the first half of 2024.

4 Conclusions

The report on Deliverable 2.2. describes the training session, held in Gent Campus of KU Leuven university for the group of Ukrainian participants. The objective of the training was to inform Ukrainian participants about the developments of KU Leuven in the aspect of personalized learning, formative assessment, acting lifelong learning practices, experience of inclusion of students with fewer opportunities a special educational needs and as well as study modern developments in the field of information and communication technologies in education.

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Annex 1. KU Leuven presentations

KU LEUVEN

SMART PL

101082928 — SMART-PL ERASMUS-EDU-2022-CBHE-STRAND-2

Welcome at KU Leuven

Welcome in Gent

19.06.2023

Peter Hanselaer
Academic Director/Campus Director

Co-funded by the European Union

Outline

1. KU Leuven
2. Group Science, Engineering&Technology
3. Faculty Engineering Technology
4. KU Leuven – Gent
5. This campus

KU LEUVEN

Inspiring the outstanding

A highly ranked university

#1

in the **Reuters** World Ranking of
Most Innovative Universities in Europe (2019)

#42

in the **Times Higher Education**
World University Ranking (2022)

#84

in the **QS** World University Ranking (2021)

#5 ranked university in the European Commission **Horizon 2020** programme (HEI only)

#17 ranked university in the **ERC** grants programme with over 110 projects (HEI only)

Latest update: June 2020

KU Leuven in numbers

STAFF

12 680
(KU LEUVEN)

9 335
(UNIVERSITY HOSPITALS)

RESEARCHERS

7 637

STUDENTS

60 057

INTERNATIONAL STUDENTS

12 421

ALUMNI

+250 000

SPIN-OFFS

135

Last update: June 2020

A comprehensive university, 3 groups, 16 faculties

HUMANITIES & SOCIAL SCIENCES

- Theology and Religious Studies
- Canon Law
- Institute of Philosophy
- Law
- Economics and Business
- Social Sciences
- Arts*
- Psychology and Educational Sciences

SCIENCE, ENGINEERING & TECHNOLOGY

- Science
- Architecture
- Engineering Science
- Bioscience Engineering
- Engineering Technology

BIOMEDICAL SCIENCES

- Medicine
- Pharmaceutical Sciences
- Movement and Rehabilitation Sciences

Member of acclaimed (inter-)national networks

KU LEUVEN

SCIENCE, ENGINEERING & TECHNOLOGY (SET) GROUP

SET Group

Mission

Excellence in academic **education**

5 Faculties

Excellence in **research**

14 Departments

Distinguished **service to society**
(innovation and valorisation)

SCIENCE, ENGINEERING & TECHNOLOGY (SET) GROUP

5 Faculties

- Science
- Engineering Science
- Bioscience Engineering
- Engineering Technology
- Architecture

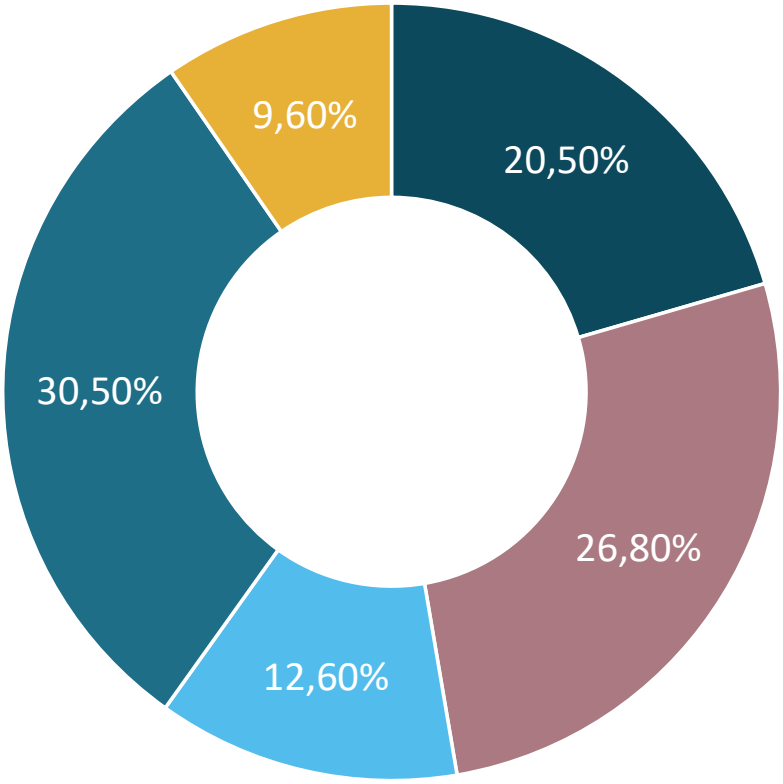
Arenberg Doctoral School

14 Research departments

- Architecture
- Biology
- Biosystems
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Science
- Earth and Environmental Sciences
- Electrical Engineering (ESAT)
- Mathematics
- Mechanical Engineering
- Materials Engineering
- Microbial and Molecular Systems
- Physics and Astronomy

SET Group in numbers

+20,000
students



KU LEUVEN

FACULTY OF ENGINEERING TECHNOLOGY

BRUGES | GHENT & AALST | SINT-KATELIJNE-WAVER DE NAYER | LEUVEN GROUP T | GEEL | DIEPENBEEK

Our mission

A unique application-oriented academic engineering education programme including research-based curricula and practice-based courses that stimulate initiative, creativity and entrepreneurship

Researchers with experience in valorising and implementing knowledge and technology in various companies and spin-offs

Strong local anchoring and application-oriented focus in collaboration with the industry

Faculty of Engineering Technology

Multicampus faculty

7 CAMPUSES IN FLANDERS, BELGIUM

+6000 STUDENTS

+14% INTERNATIONAL STUDENTS

+800 STAFF

+20% INTERNATIONAL STAFF

Faculty of Engineering Technology

Multicampus Faculty

Bruges
www.kuleuven.be/campusbrugge

Ghent
www.kuleuven.be/english/campuses/ghent-technology-campus

Aalst
www.kuleuven.be/english/campuses/aalst-campus

Sint-Katelijne-Waver De Nayer
www.kuleuven.be/campusdenayer

Leuven Group T
www.kuleuven.be/english/campuses/group-t-leuven-campus

Geel
www.kuleuven.be/campusgeel

Diepenbeek
in collaboration with UHasselt
https://www.kuleuven.be/english/campuses/diepenbeek-campus

KU LEUVEN GENT

KU LEUVEN GENT

KU Leuven - Gent

3 faculties

Faculty of Engineering Technology

FET, FIIW

KU LEUVEN GENT

Associated Faculty of Arts

Campus Rabot

Faculty of Architecture

FA

Campus Sint-Lucas

Campus Sint-Lucas Gent

KU Leuven - Gent

Educational programs

- **ABa, Ma en PhD Engineering Technology**
- **ABa, Ma en PhD Architecture**
- **ABa, Ma, PhD en pBA Arts (associated faculty)**
- **Postgraduates**
- **Educational Masters**

KU LEUVEN GENT

KU LEUVEN GENT

THIS CAMPUS:

KU LEUVEN GENT

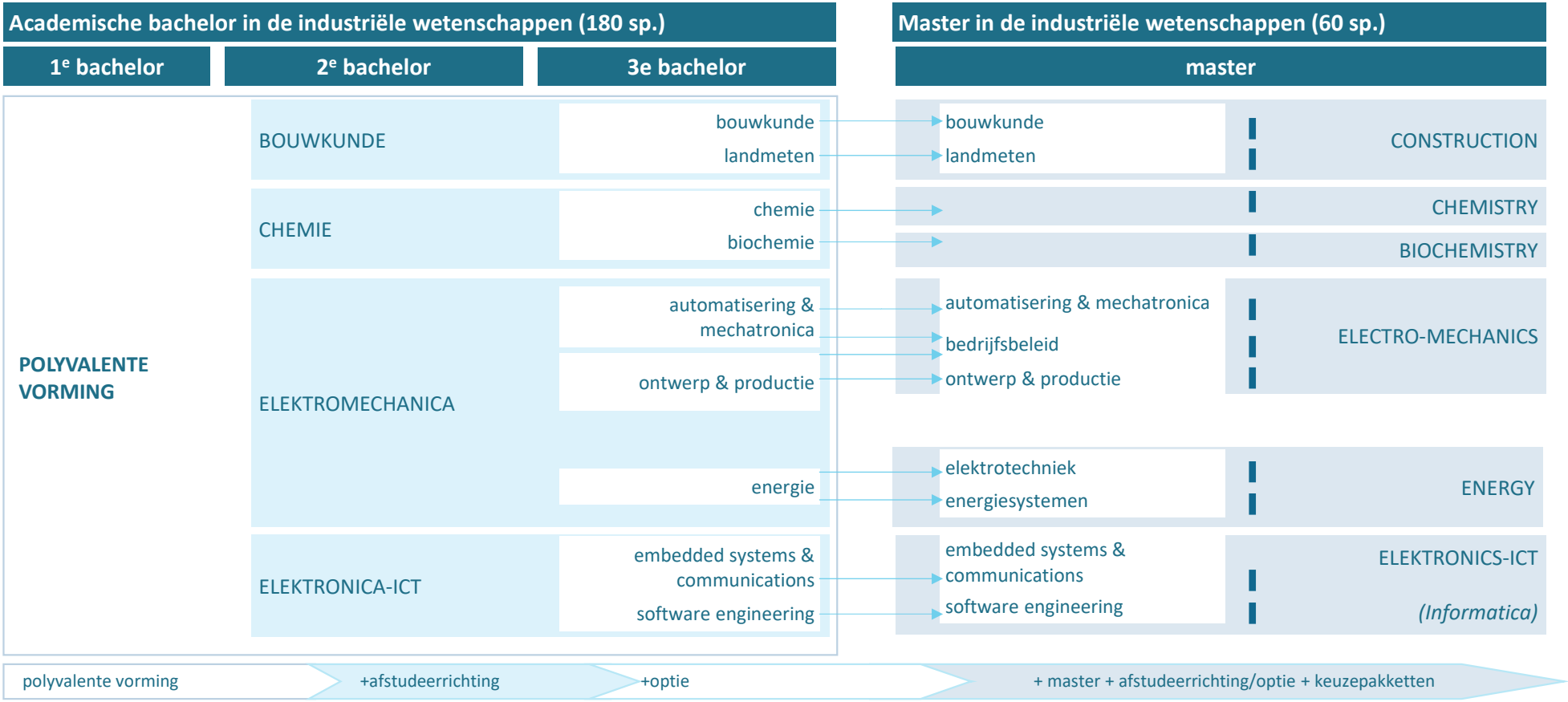
ENGINEERING TECHNOLOGY

Education

Student numbers

Campus Aalst & Campus Rabot		9/10/2022
Industriële Ingenieurswetenschappen	Academische Bachelor Aalst	18
	Academische Bachelor Gent	595
	Master (incl. EMM)	511
	Educatieve master Aalst	29
	Educatieve master Gent	46
	Voorbereidings- en schakelprogramma's	223
	Postgraduaat	2
	Doctoraatsstudenten	120
		1472

KU Leuven - Gent, Engineering Technology
6 Masters



KU Leuven - Ghent

and 3 international masterprograms

NEW ON GHENT TECHNOLOGY CAMPUS: ERASMUS MUNDUS MASTER IN IMAGING AND LIGHT EXTENDED REALITY

Ghent Technology Campus has a long tradition in Erasmus Mundus European master programmes. From September 2020 onwards, students can take a brand new programme that leads to an Erasmus Mundus Msc degree in Imaging And Light In Extended Reality.

The Faculty of Engineering Technology has joined forces with the University of Eastern Finland, the French Université Saint-Etienne and the Toyohashi University of Technology in Japan to set up an international study programme with a focus on the future technologies in photonics, imaging and lighting. The IMLEX master offers courses to the cutting edge of new technologies in these fields.

The IMLEX programme did not appear unexpectedly. The research group in light and lighting technology at the Ghent Technology Campus, led by prof. Peter Hanselaer, has focused for more than 20 years on research in different aspects of lighting technology. The research group hosts the "Groen Licht Vlaanderen vzw" and works together with a well-developed network of companies active in the sector of light, lighting and energy.

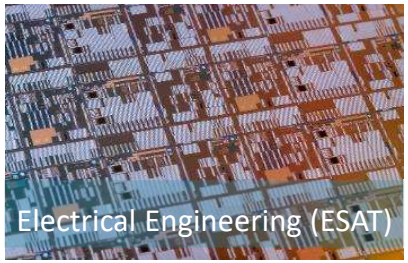
By creating a curriculum linked to these research topics, Peter Hanselaer wants to attract excellent students and PhD researchers to apply the research in practice. The IMLEX study programme is a two-year master's programme where students take a mobility track from Finland, to Ghent and Saint-Etienne and then Toyohashi, each for one semester. In the first semester students meet with all basic aspects of imaging and lighting, as well as photonics and optics. They continue their study in either Saint-Etienne for the imaging specialization or our Faculty of Engineering Technology for the lighting specialisation. These specialisation courses are elaborated in-depth in semester three in Toyohashi University of Technology. The "technological engineering" profile is guaranteed by a company internship and several cases in collaboration with industry. Semester four is devoted to a master thesis, which can be taken at any of the partner institutions or selected research institutes or companies.

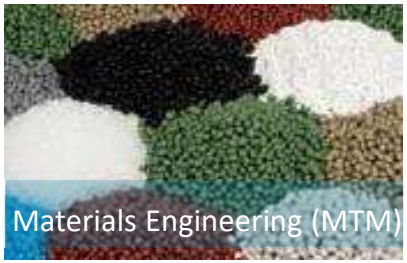
The curriculum organised at KU Leuven includes five course modules on lighting science, lighting technology, lighting metrology, lighting design and lighting business. Because engineering students also need to prepare for a study period in Japan, a course in Japanese language and culture is included, as well as a course unit on academic writing. Here lies another innovative aspect of the IMLEX master's course: not only the international and multidisciplinary approach is typical, the semester on lighting is also an "inter-faculty semester". The Faculty of Architecture is collaborating with the research group in lighting to cover the aspects of lighting design in the study programme. Prof. Bruno Depré will teach the course on lighting design.

IMLEX responds to a realistic demand from industry, as is proven by the large number of associate members, most of them companies (e.g. Trilux, Etap, Engie...). The graduates of this study programme will contribute to the next industrial revolution of Industry 4.0, where augmented reality will play a dominant role. The massive interest in this field is demonstrated in the first application round for the academic year 2020-2021: 116 candidates have submitted an application to date.

Research

7 Departments on campus





Research

Engineering Technology – 13 Research groups

Bio-engineering technology:

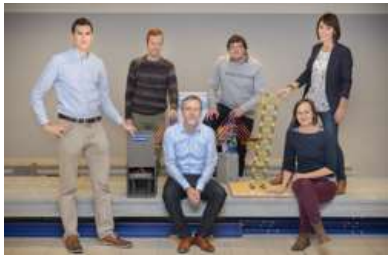
- Laboratory of Enzym, Fermentation and Brewing Technology
- Meat Technology and Science of Protein-rich Foods

Materials Engineering:

- MEtaL PerfOrmance InnOvatIon (ELOOI)

Sustainable Chemical Process Technology

- Chemical and Biochemical Process Technology and Control



Civil engineering:

- Building Physics and Sustainable Design
- Structural Mechanics, Materials and constructions
- Geomatics

Creative Machine Design and Automation:

- Innovative Technology for Logistics

Electrical Engineering:

- Light and Lighting Technology
- ELECTA (Electrical Energy Technology and Industrial Automation)
- DRAMCO (Design and Research of Aerial eMbedded devices and Cool Other stuff)

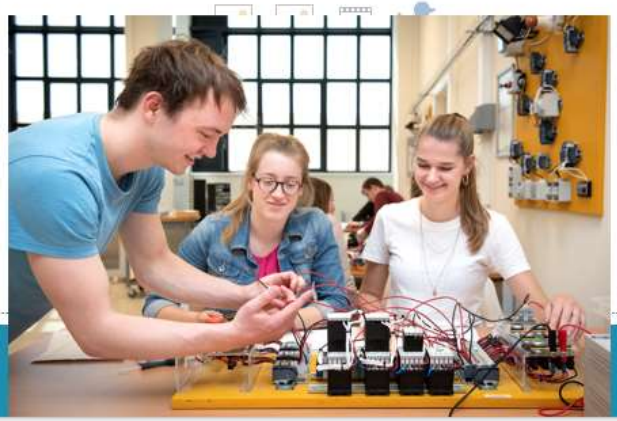
Computer Science:

- CODES (Combinatoral Optimization and Decision Support)
- DistriNet@Gent (Security Critical Systems)


Research
Strong link wit
bast
architects | engineers
Vlaamse
Confederatie Bouw
Bouw, energie & milieu
BESIX
Ventibel
BELTHERM
LUCHTBEHANDELING
SIG AIR HANDLING
studiebureau boydens
techniek en energie
BOENGI
RENSON
Creating healthy spaces
systemair
Lindab
VLAAMSE MILIEUMAATSCHAPPIJ
ingenium
DUCO
Ventilation & Sun Control
RECTICEL
insulation
GRADA
SiVi
samen vooruit
ISOVER
SAINT-GOBAIN
MONUMENT
DOMUS MUNDI
OVED
Atic
for HVAC professionals
remmers
VOLVO
orbit
GEOSPATIAL TECHNOLOGIES
HaLO
Heart Link Online
istema
INGENIEURSBUREAU
TROX TECHNIK
The art of handling air
WEERWERK
STERK IN MAATWERK
sto
wtcb.be
ALPAS
climavent
menerga
The energy savers
SVK
CENERGIE
INTEGRALE ENERGIE AANPAK
cantillana
SAMENLEVINGSOPBOUW
Nexilis
DERBIGUM
MAKING BUILDINGS SMART
durabriklife
Beneens
AnSem
Innovation on chip
VAN DE WIELE
Van de Poel K. & Zn nv
Nationaal & Internationaal Transport
VALLEY
ENERGY SAVING
colruyt
VERHAERT
Bubble Post
smart warehousing

Research

Infrastructure



KU Leuven - Gent

Connecting faculties of Arts, Architecture and Engineering Technology

1. Two interdisciplinary PhD projects “City in Transition”

2. A new concept: “*Creatieve makers voor de toekomst*”

   - Curricula: from STEM to STEAM; electives
   - Exchange of professors, interdisciplinary student teams
   - Digitale makerspace (AR, VR)
   - Informal contacts between students en professors

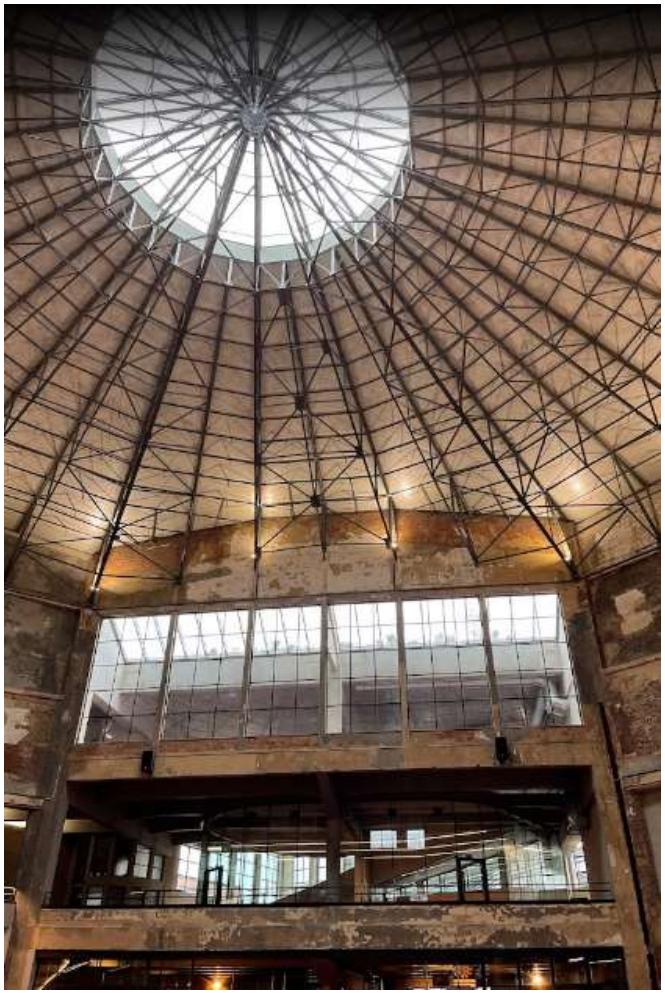
3. Ghent Festival of Light

KU LEUVEN GENT

KU Leuven - Gent

Connecting ARTS, Architecture and Engineering Technology

4. Wintercircus (outreach)



5. New building “Bargiekaai”

Auditoria, student accommodation

101082928 — SMART-PL ERASMUS-EDU-2022-CBHE-STRAND-2

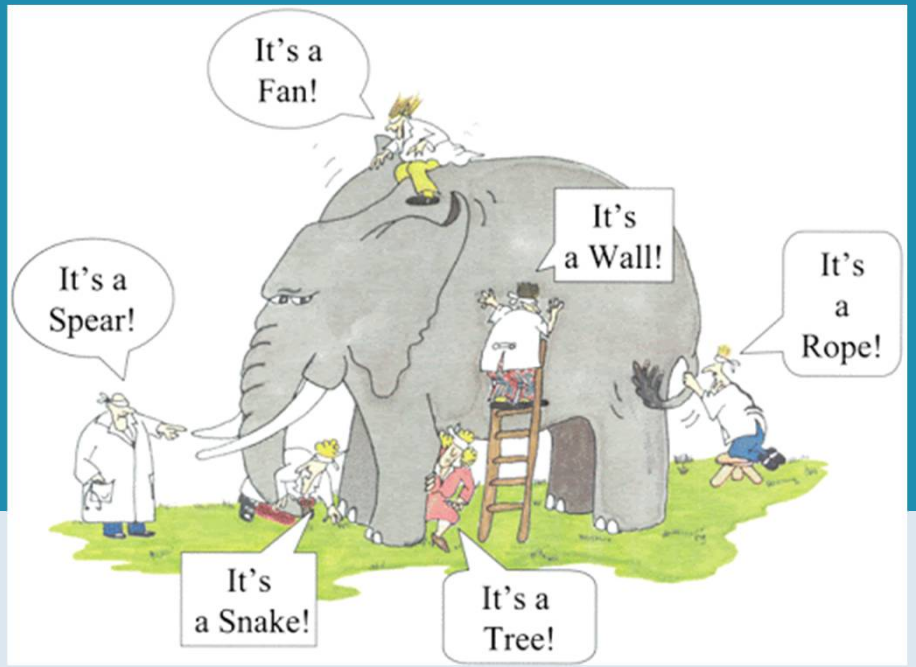
SMART PL

Co-funded by
the European Union

KU LEUVEN

Quality Assurance in Flanders and at KU Leuven

COBRA



Julie Vermeersch,
Quality assurance coordinator FET

Overview

- A brief overview of quality assurance (QA) in Flanders
- 1st generation QA: strengths and weaknesses
- 2nd generation QA: new approaches
  - Internal: COBRA
  - External: Institutional Review +
- The present & future
- Lessons learned

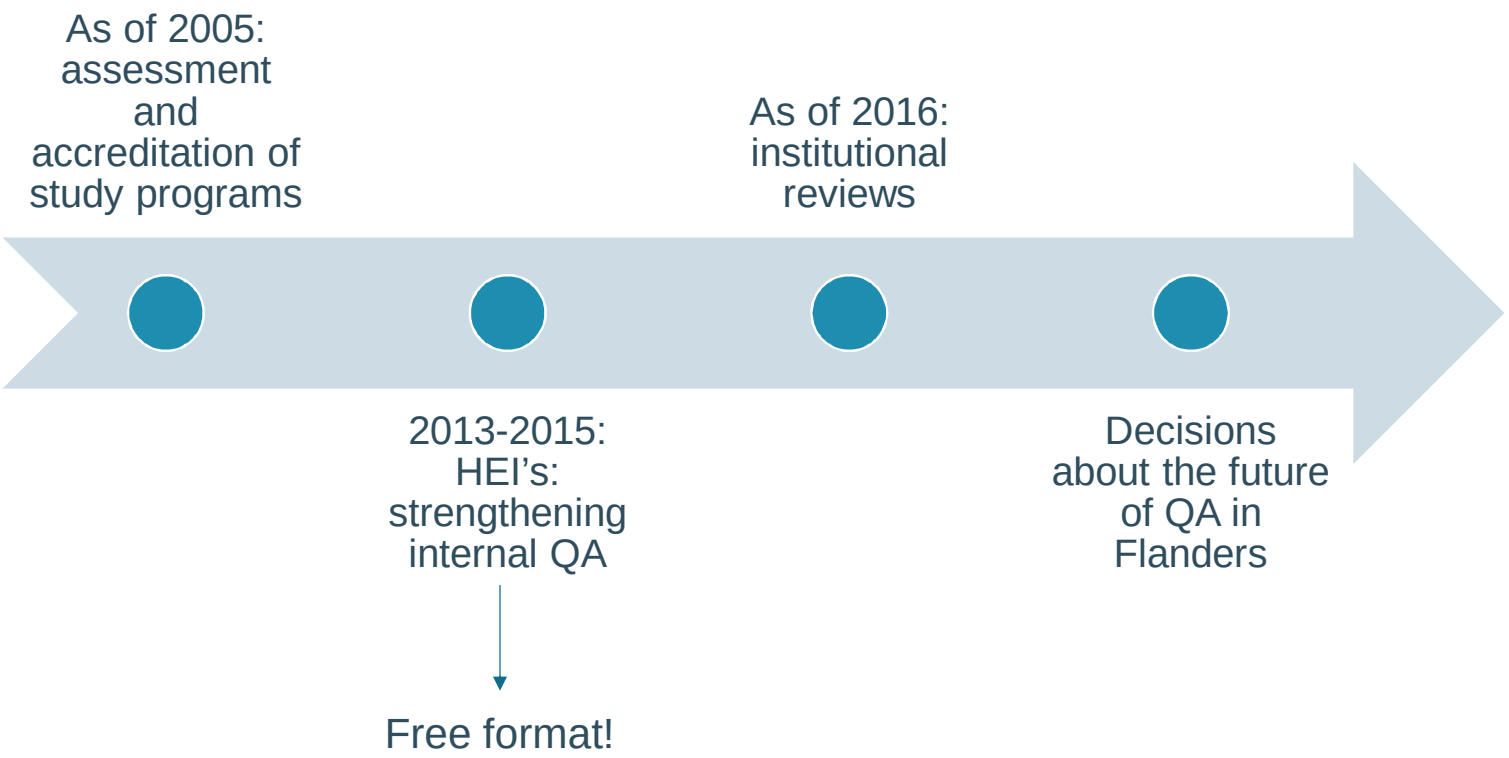
A brief overview of QA in Flanders

QA in Flanders

External quality assessments:

- Accreditation Organisation of the Netherlands and Flanders (NVAO)
- Vlaamse Universiteiten en Hogescholen Raad (VLUHR)

QA in Flanders



The importance of internationalisation in QA

- Criterium for “good education”
  - Learning outcomes meet international requirements with respect to content, level and orientation
  - Student mobility
  - Teacher mobility
  - Internationalisation@home
  - International programs
- Criterium for “good QA”
  - Outsider’s perspective
  - Advice

1st generation QA

Strengths and weaknesses

Assessment and accreditation of study programs

- Self-assessment report about specific study program
- Assessment by independent commission, based on:
  - Report by HEI
  - Conversations with staff, students, alumni
  - Examination of study materials
  - Site visit of campus premises and infrastructure

Internationalisation:

- Criterium for study program
- Part of QA procedure (international commission member)

Assessment and accreditation of study programs

STRENGHTS

- Stimulates reflection
- Opportunity for major change
- Detailed feedback with recommendations
- External commission combining different perspectives
- Many stakeholders involved
- Same procedure and criteria for all HEIs: comparable results
- Publicly available reports
- …

WEAKNESSES

- Time-consuming and expensive (every program independently)
- No continuous process due to long cycles (6-8 years)
- Low stakeholder involvement
- Subjective external perspectives
- High stakes, high pressure, lots of window dressing
- Shortcuts: employing expert report writers instead of extensive reflection
- Detrimental side effects: reforms put on hold
- …

2nd generation QA

New approaches for internal QA

Evolving towards “free format internal QA”

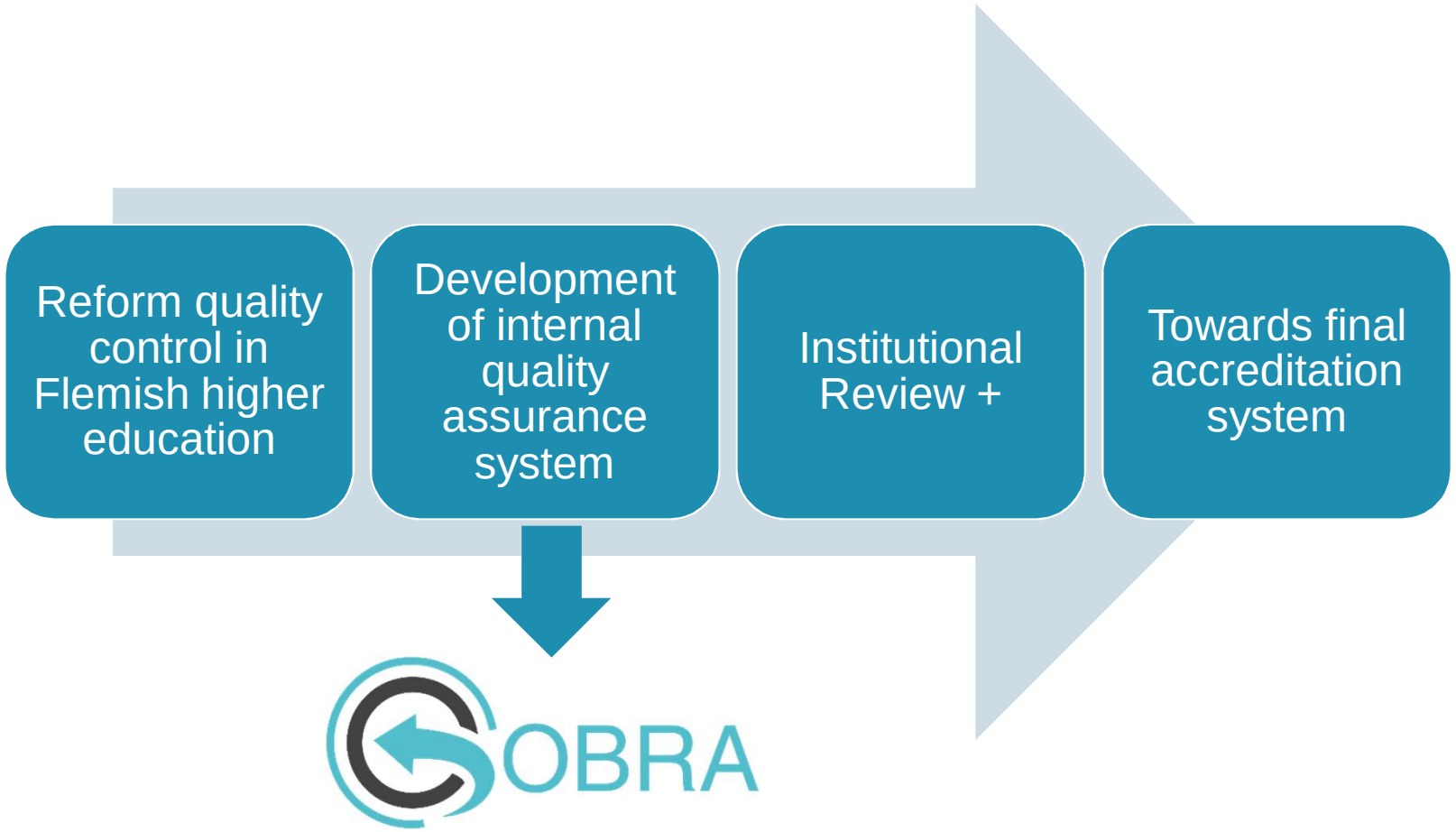
Internal QA: observations

Typical components of 2nd generation internal QA systems:

- Self-assessment reports
- Hierarchical reporting
- Periodic assessment by an independent commission and/or external experts

Spot any similarities to 1st generation QA?

QA in KU Leuven



A method for Quality Development

Back to the core of higher education

COBRA

COOPERATION
REFLECTION
ACTION

CHECKS
BALANCES

COBRA's basic principles

Vision on education

Trust and subsidiarity

Disciplinary identity

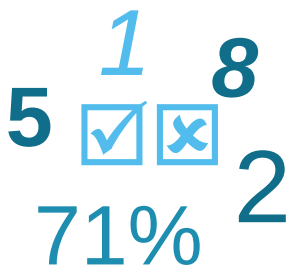
Continuous cycle

QA monitoring tools

Different types of feedback

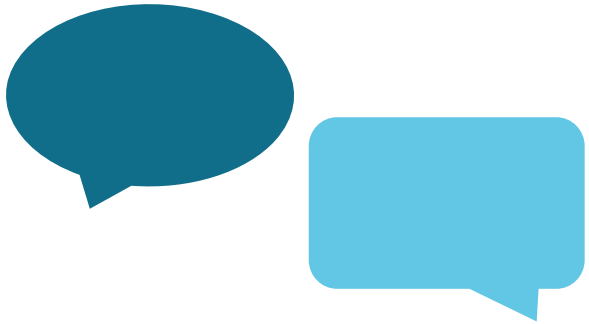
Quantitative

- Surveys, current students
  - Programme level
  - Course unit and teacher level
  - Study time measurements
  - …
- Surveys, other stakeholders
  - Drop-out
  - Alumni
  - …
- Dashboards

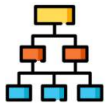


Qualitative

- Focus group conversations
  - Students
  - Teaching staff
- Feedback from professional field
- …



QA instruments


Input through OC-POC-FPOC


Dashboards


Trend report


Examination statistics


Educational indicators

…


Ombuds report

Available by default


Student evaluation of teaching


(Self-)moderated conversation
(= COBRA-conversation)


Docenten-teamdag (teacher team day)


Programme evaluation survey


Drop-out survey


Study choice survey


Alumni survey

…


Staff satisfaction survey

Organised periodically


Brainstorm


Study time measure-ment


SWOT


Barometer


Benchmark


Additional survey


Workgroup


Focus group conversation

…


Gamestorm

Ad hoc initiatives

Example 1

Student evaluation of teaching

Context

- Universitywide standardized survey
- Support QA by lecturers and programmes

Methodology

- App in online personal study file KU Loket
- After examination period
- Selected courses; each course at least 1x every 3 years
- Feedback for each lecturer per course unit
- Faculty chooses questions, selected from validated set
- Invitation by email + reminder emails

Follow-up

- Lecturer: personal report in KU Loket
- Commission awards ‘global appreciation’ to be transferred to staff records
- Faculty decides global appreciation criteria

Example 1

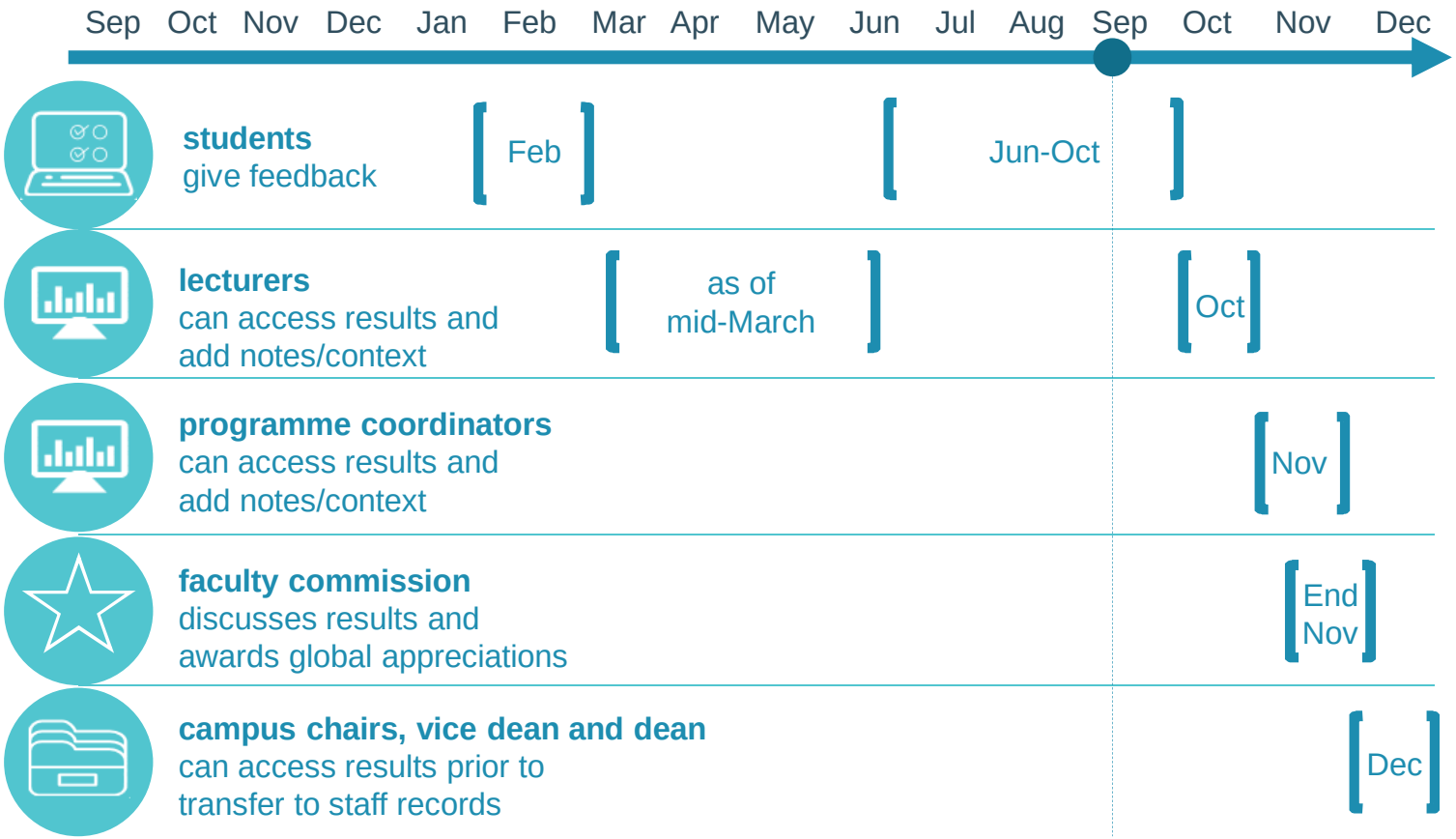
Student evaluation of teaching

Aspects in questionnaire

1. Comprehensible teaching style
2. Lecturer’s approachability
3. Level of difficulty
4. Evaluation form
5. Course unit relevance (*)
6. Course unit importance
7. Clear goals
8. Practical arrangements
9. Logical sequence
10. Study materials
11. Opportunity for additional explanation
12. Infrastructure (*)
13. Formative feedback
14. General satisfaction
15. Study load
16. Approach in COVID-19 circumstances

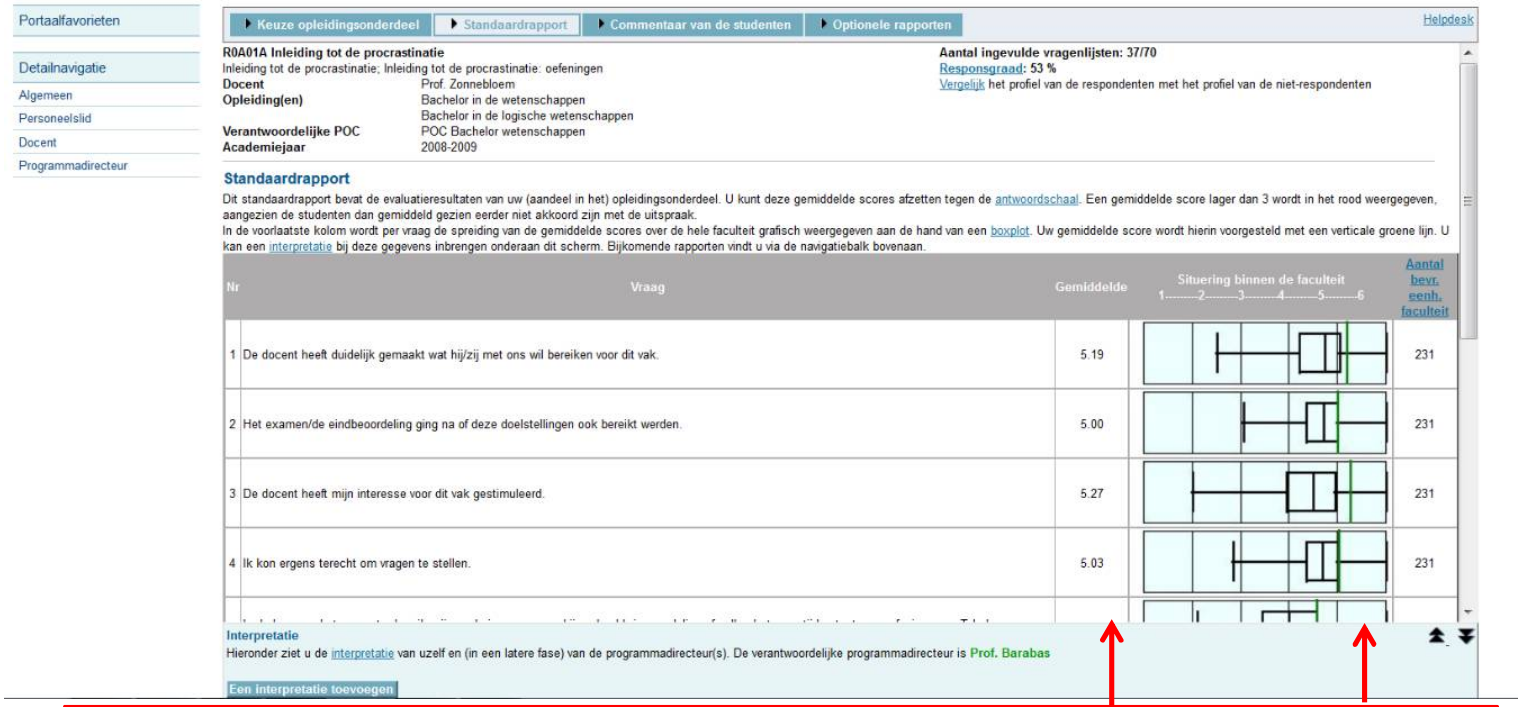
Example 1

Student evaluation of teaching: timing



Example 1

Student evaluation of teaching: report



Standard report: average score per question
scale 1 “strongly disagree” – 6 “strongly agree”
+ comparison to average scores within faculty (boxplot)

Example 1

Student evaluation of teaching: report

Optional reports

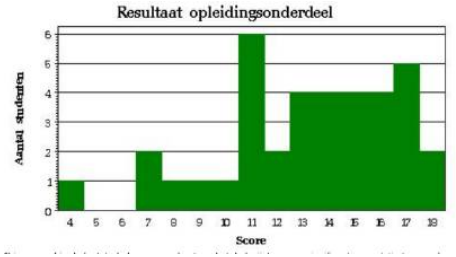
Position results to own campus

Compare students from different programmes

Respondents vs. non-respondents

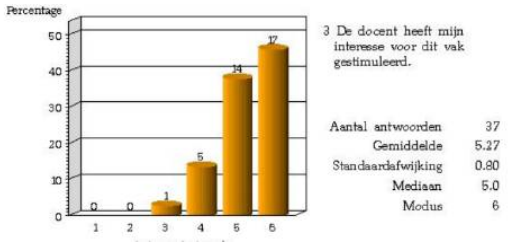
Correlation with study results

…



Nr	Vraag	Alle studenten (37/70) Gemiddelde	Students from BA wetenschappen (25/48) Gemiddelde	Students from BA logische wetenschappen (11/20) Gemiddelde
1	De docent heeft duidelijk gemaakt wat hij/zij met ons wil bereiken voor dit vak.	5.19	5.27	5.20
2	Het examen/de eindbeoordeling ging na of deze doelstellingen ook bereikt werden.	5.00	5.27	4.92
3	De docent heeft mijn interesse voor dit vak gestimuleerd.	5.27	4.91	5.48
4	Ik kon ergens terecht om vragen te stellen.	5.03	4.64	5.20
5	In de loop van het semester kon ik mijn vorderingen nagaan bijvoorbeeld via mondelinge feedback, tussentijdse toetsen, oefeningen op Toledo, gecorrigeerde opdrachten, etc.	4.57	4.82	4.48
6	De docent heeft de praktische afspraken goed gecommuniceerd.	5.03	5.36	4.92
7	Het aangeboden studiemateriaal was goed.	4.81	4.82	4.76
8	De activiteiten die de docent van mij verwachtte zowel tijdens de contactmomenten als daarbuiten, waren een goede voorbereiding op het examen/de eindbeoordeling.	4.84	5.09	4.76
	goed. Met werkvormen bedoelen we o.a. hoorcolleges, practica, oefenzittingen, excursies,	4.95	5.00	4.92
	ee na te denken.	4.97	5.55	4.76
	unten die aan dit vak zijn toegekend.	4.97	5.18	4.92

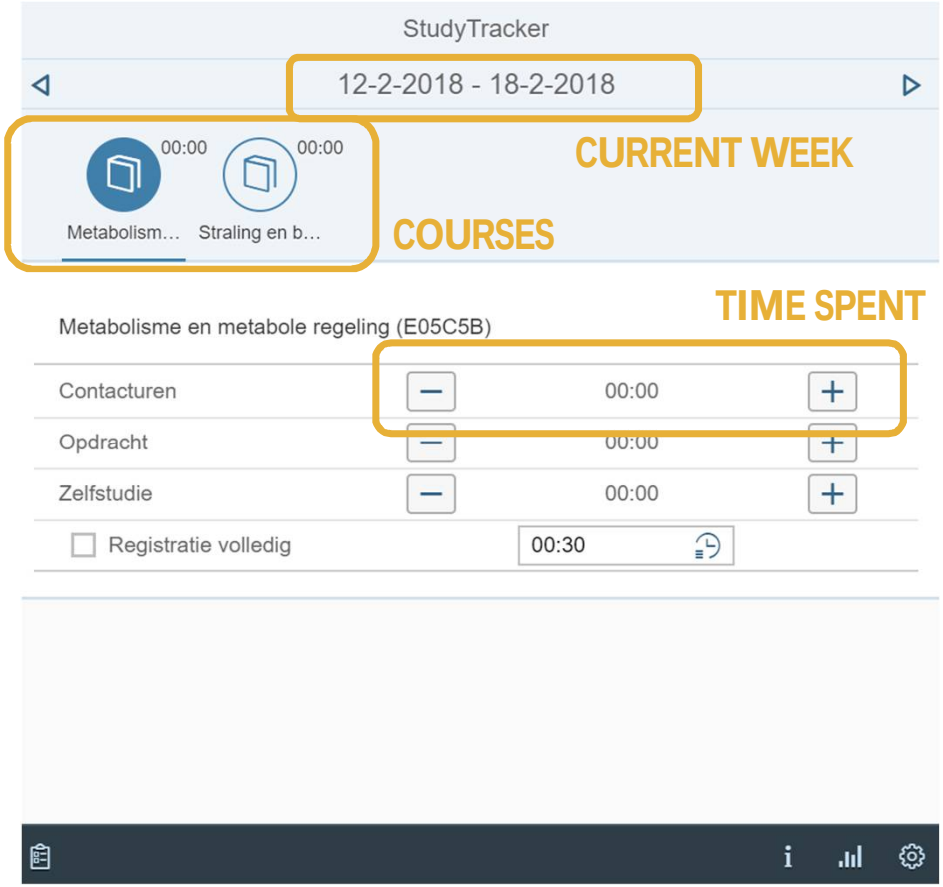
Nr	Vraag	Gemiddelde score	Situering binnen de opleiding 1—2—3—4—5—6	Aantal bevr. eenh. opleiding
1	De docent heeft duidelijk gemaakt wat hij/zij met ons wil bereiken voor dit vak.	5.27		33
2	Het examen/de eindbeoordeling ging na of deze doelstellingen ook bereikt werden.	5.27		33
3	De docent heeft mijn interesse voor dit vak gestimuleerd.	4.91		33
4	Ik kon ergens terecht om vragen te stellen.	4.64		33



Online FAQ:
https://admin.kuleuven.be/mykuleuven/en/channel/51267666/quality-assurance/online-teaching-evaluation/faq

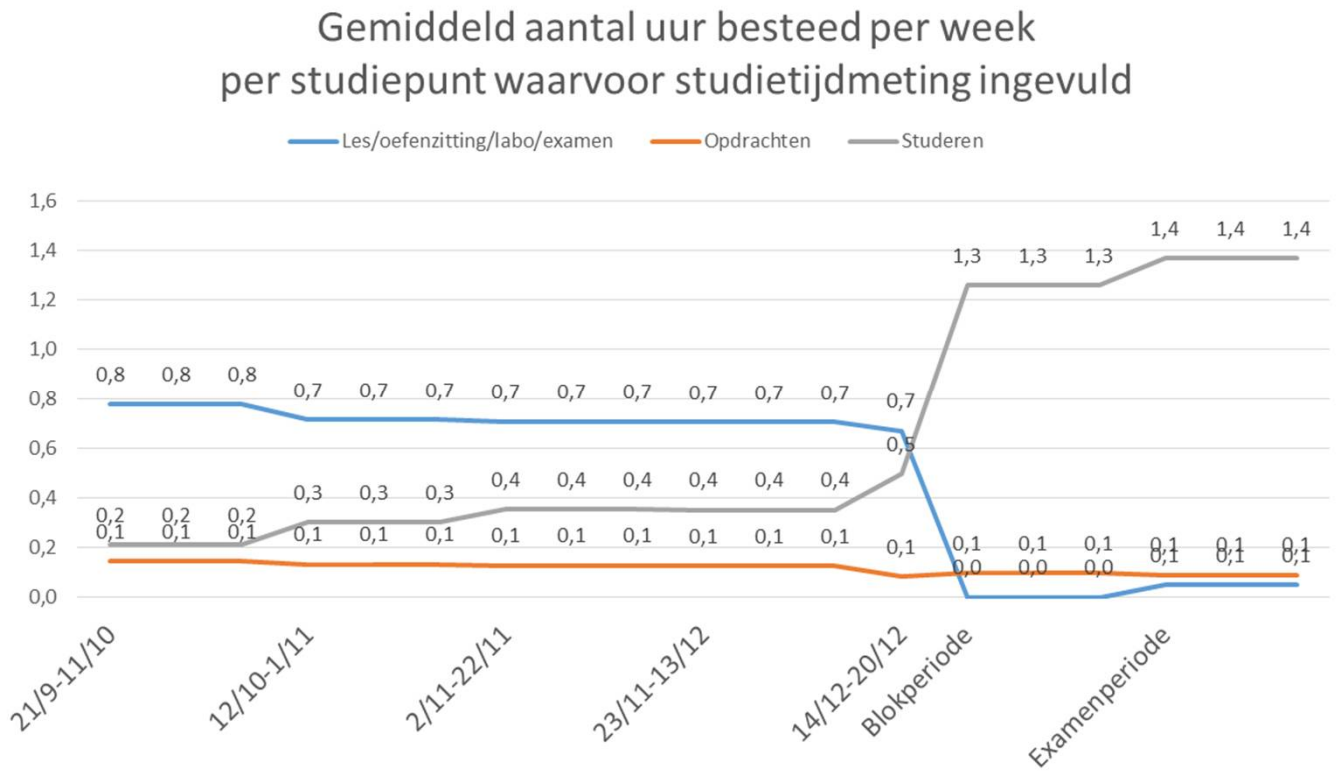
Example 2

Study time measurement



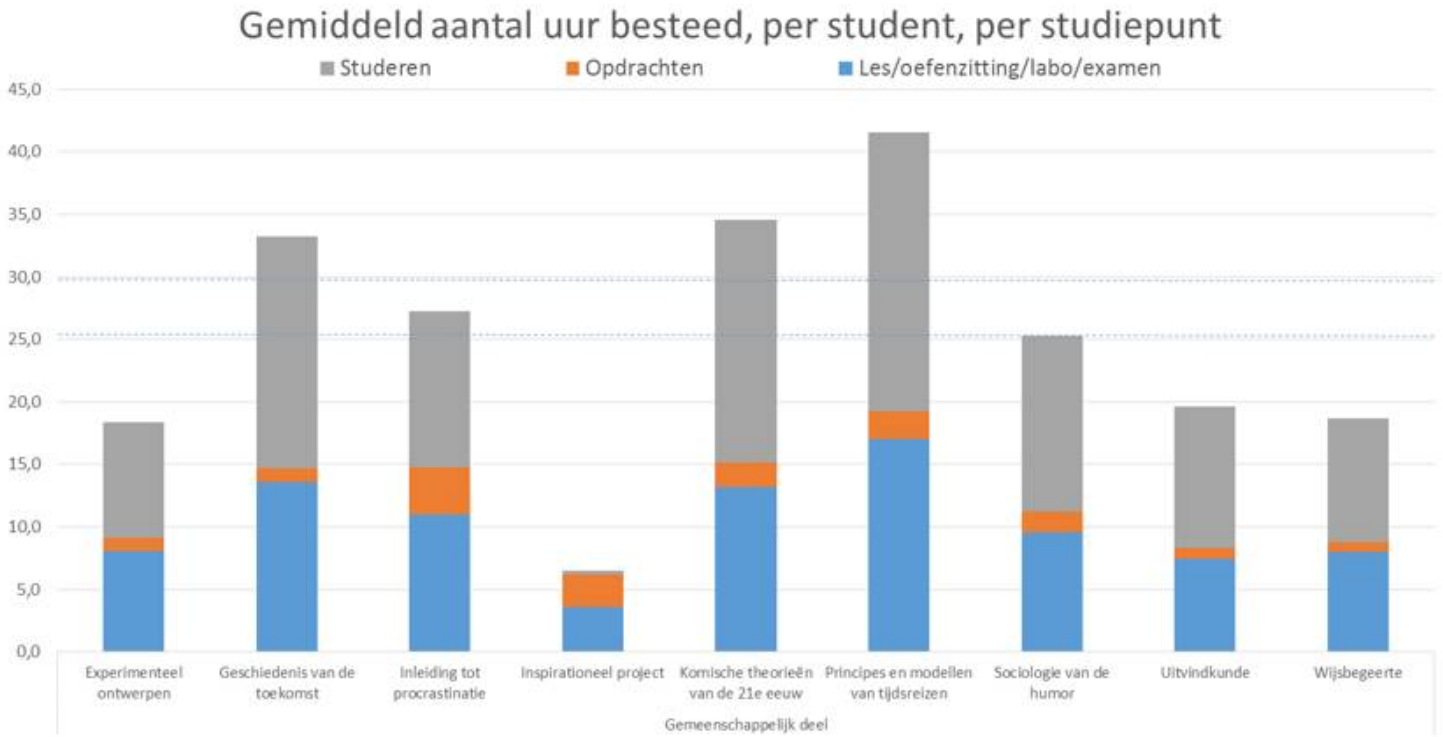
Example 2

Study time measurement



Example 2

Study time measurement



	Experimenteel ontwerpen	Geschiedenis van de toekomst	Inleiding tot procrastinatie	Inspirationeel project	Komische theorieën van de 21e eeuw	Principes en modellen van tijdsreizen	Sociologie van de humor	Uitvindkunde	Wijsbegeerte
# periodes ingevuld (max=7)	7	7	6	7	7	7	5	7	7
# studenten periodes ingevuld	19-31	5-25	12-17	15-29	12-27	21-34	2-26	8-27	15-30

KU LEUVEN

Example 3

(Self-)moderated conversations

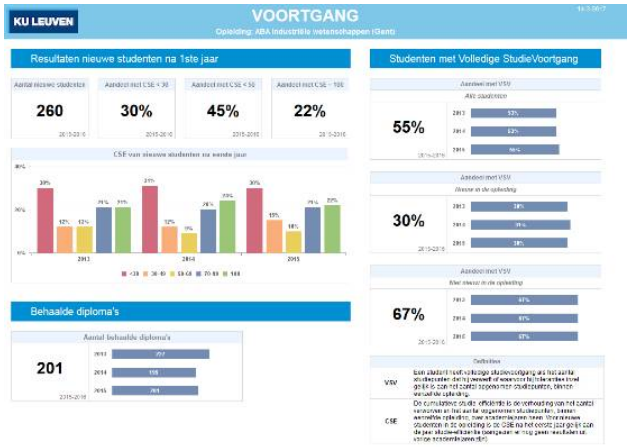
For each (cluster of) study program(s)

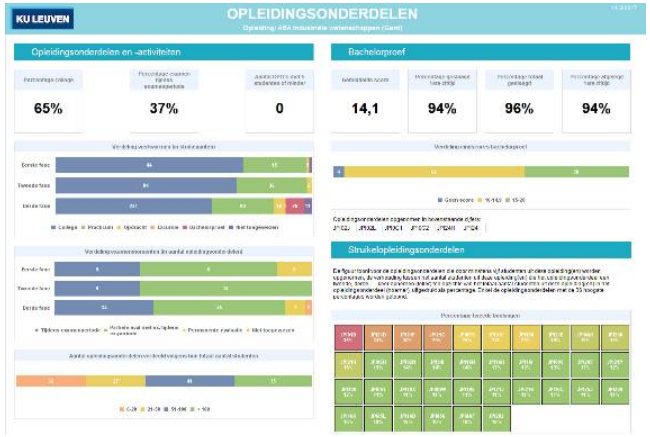
1. Moderated focus group conversation among students
2. Self-moderated group conversation among teaching staff

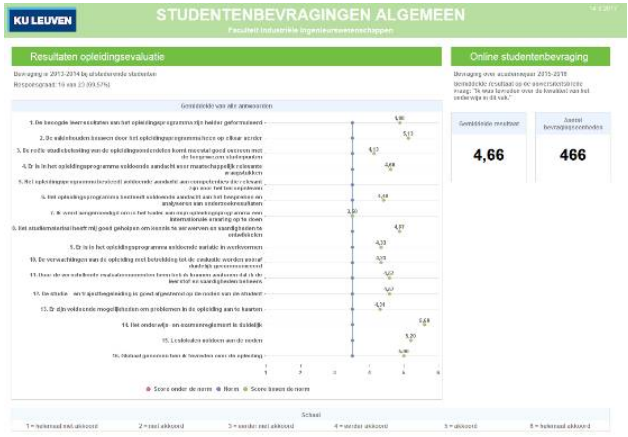
- Output: report
- Methodology:
  - Participants are selected at random
  - 5 to 12 participants per group
  - 2 hours
  - On campus or online
  - Student groups: moderated by QA coordinator @FET (exception to the university-wide guidelines)
  - Based on brief manual and prespecified questions, chosen by the programme management

Example 4

Dashboards







Example 5

QA barometer

Context

- Faculty survey
- Internal process optimization + external accountability

Methodology

- Online survey in Qualtrics
- Every 4 years
- Questionnaire based on suggestions by colleagues, publications on QA, Working Group QA and Faculty Programme Committee
- Invitation by email + reminder emails

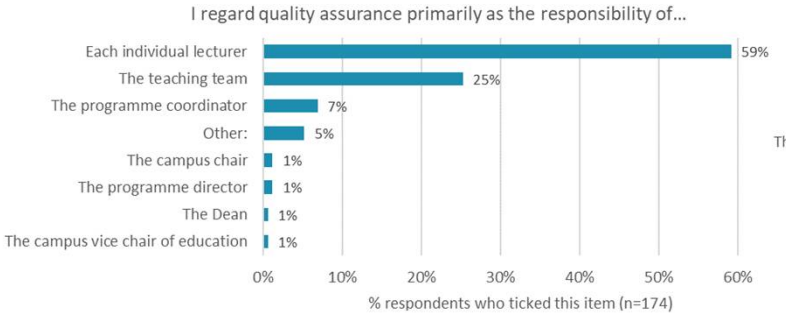
Follow-up

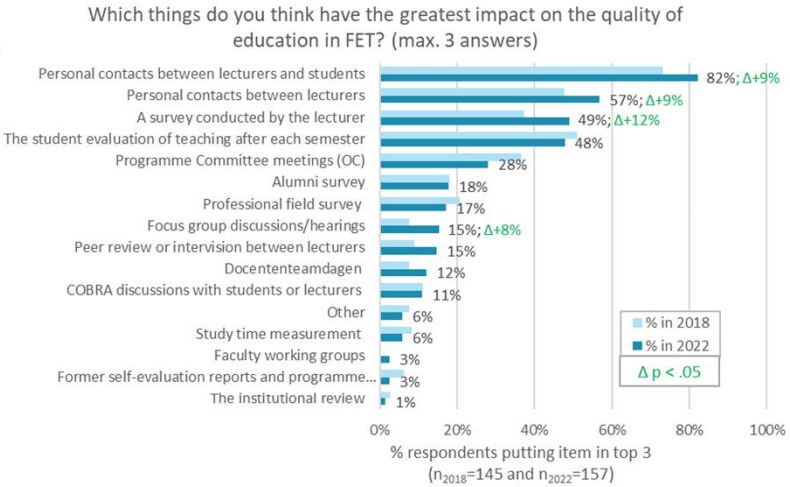
- Report + presented at Faculty Board/Faculty Council

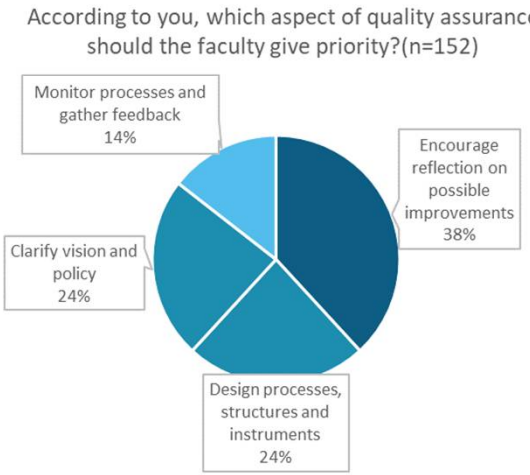
Example 5

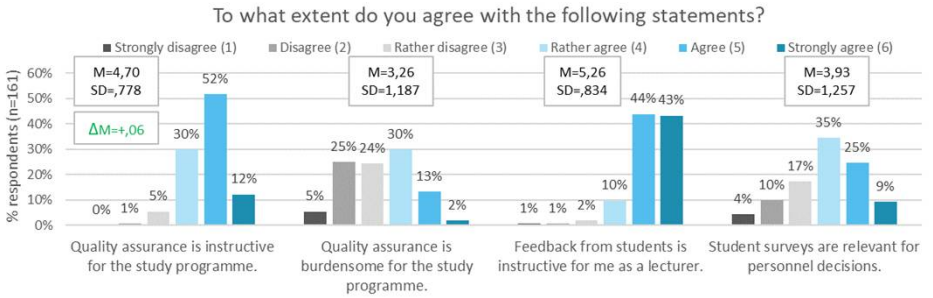
QA barometer

Response ca. n=200, provides useful insights on internal quality culture









Intermezzo

How do you monitor the quality of your programmes?

- Similarities?
- Available data?
- Measurements?
- Method? Frequency?
- What would you like to change in the future?

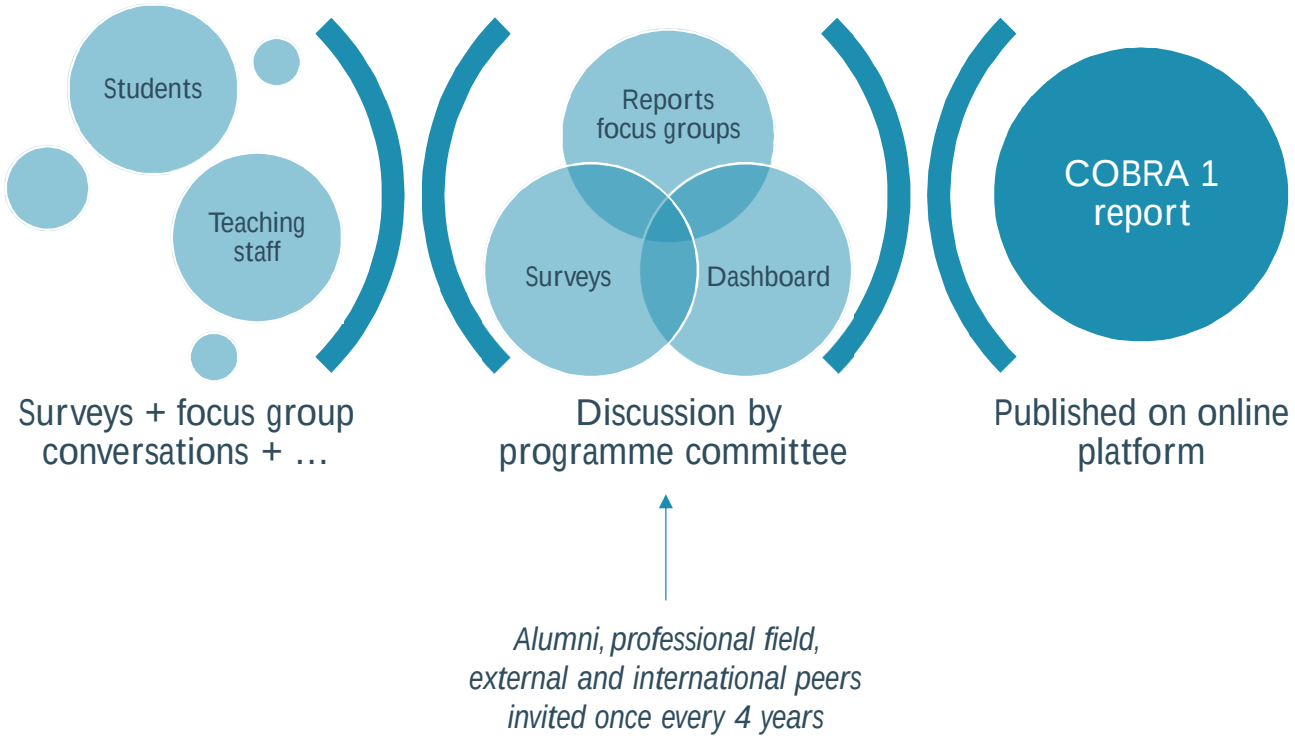
What do you do with the results?

- Who do you report to?
- Who is involved in the follow-up?

Planning for improvement

COBRA 1,
COBRA 2,
COBRA 3,
and back

COBRA 1: programme level



COBRA 1: programme level

Reflection by programme committee, based on

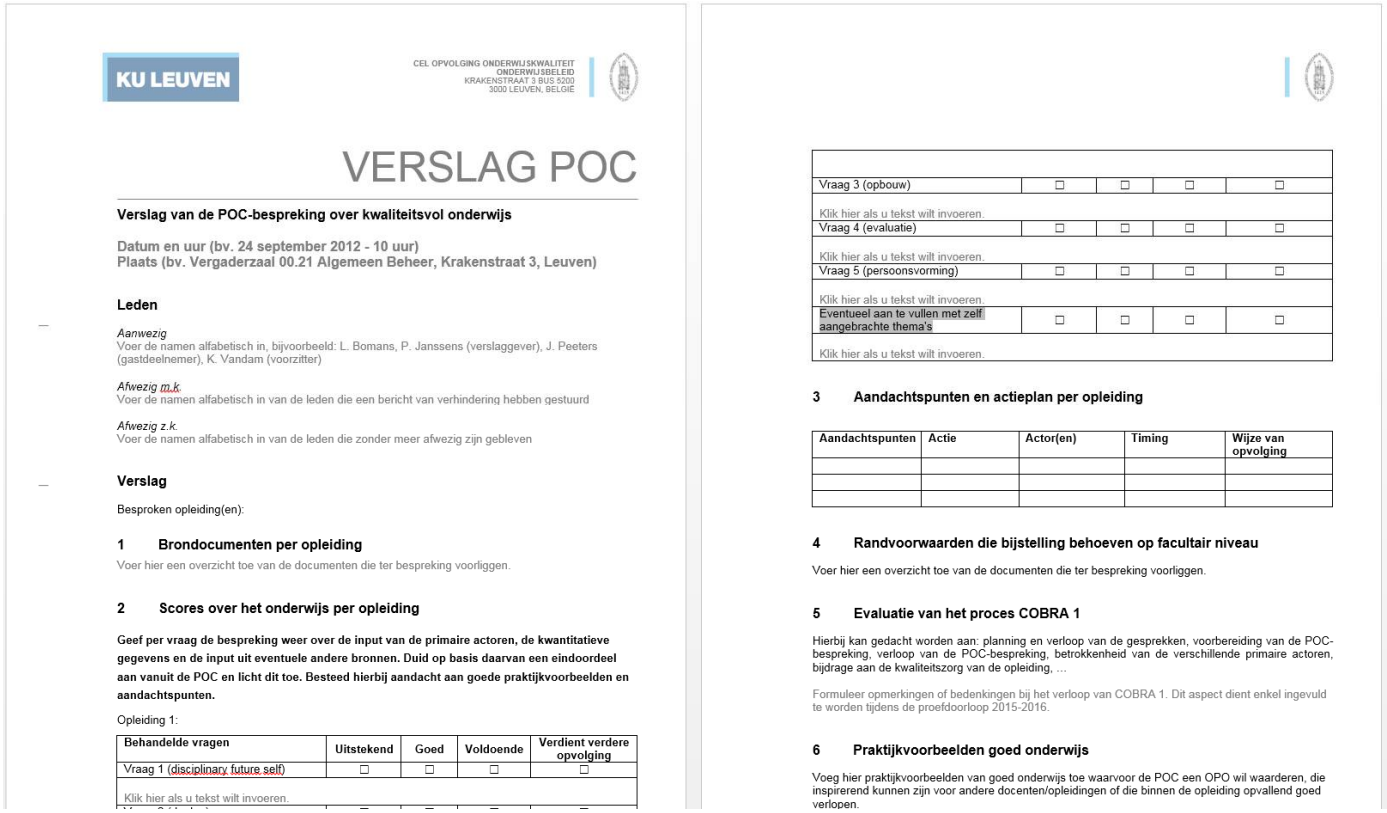
- Reports of self-moderated conversations, survey results, benchmark, …
- Dashboard: student enrolment, study progress statistics, …

Goals:

- Reflect on educational vision
- Build awareness about good practices
- Take care of problems: drafting an action plan
- Determine problems to be dealt with at a higher level

Report: publicly available within the university

First cyclus: templates for reporting
<> Later on: free format



KU LEUVEN

CEL OPVOLGING ONDERWIJSKWALITEIT
ONDERWIJSBELEID
KRAKENSTRAAT 3 BUS 5200
3000 LEUVEN, BELGIË

VERSLAG POC

Verslag van de POC-bespreking over kwaliteitsvol onderwijs

Datum en uur (bv. 24 september 2012 - 10 uur)
Plaats (bv. Vergaderzaal 00.21 Algemeen Beheer, Krakenstraat 3, Leuven)

Leden

Aanwezig
Voer de namen alfabetisch in, bijvoorbeeld: L. Bomans, P. Janssens (verslaggever), J. Peeters (gastdeelnemer), K. Vandam (voorzitter)

Afwezig m.k.
Voer de namen alfabetisch in van de leden die een bericht van verhindering hebben gestuurd

Afwezig z.k.
Voer de namen alfabetisch in van de leden die zonder meer afwezig zijn gebleven

Verslag

Besproken opleiding(en):

1 Brondocumenten per opleiding

Voer hier een overzicht toe van de documenten die ter bespreking voorliggen.

2 Scores over het onderwijs per opleiding

Geef per vraag de bespreking weer over de input van de primaire actoren, de kwantitatieve gegevens en de input uit eventuele andere bronnen. Duid op basis daarvan een eindoordeel aan vanuit de POC en licht dit toe. Besteed hierbij aandacht aan goede praktijkvoorbeelden en aandachtspunten.

Opleiding 1:

Behandelde vragen	Uitstekend	Goed	Voldoende	Verdient verdere opvolging
Vraag 1 (disciplinary future self)	☐	☐	☐	☐
Klik hier als u tekst wilt invoeren.				
Vraag 3 (opbouw)	☐	☐	☐	☐
Klik hier als u tekst wilt invoeren.				
Vraag 4 (evaluatie)	☐	☐	☐	☐
Klik hier als u tekst wilt invoeren.				
Vraag 5 (persoonsvorming)	☐	☐	☐	☐
Klik hier als u tekst wilt invoeren.				
Eventueel aan te vullen met zelf aangebrachte thema's	☐	☐	☐	☐
Klik hier als u tekst wilt invoeren.				

3 Aandachtspunten en actieplan per opleiding

Aandachtspunten	Actie	Actor(en)	Timing	Wijze van opvolging

4 Randvoorwaarden die bijstelling behoeven op facultair niveau

Voer hier een overzicht toe van de documenten die ter bespreking voorliggen.

5 Evaluatie van het proces COBRA 1

Hierbij kan gedacht worden aan: planning en verloop van de gesprekken, voorbereiding van de POC-bespreking, verloop van de POC-bespreking, betrokkenheid van de verschillende primaire actoren, bijdrage aan de kwaliteitszorg van de opleiding, …

Formuleer opmerkingen of bedenkingen bij het verloop van COBRA 1. Dit aspect dient enkel ingevuld te worden tijdens de proefdoorloop 2015-2016.

6 Praktijkvoorbeelden goed onderwijs

Voeg hier praktijkvoorbeelden van goed onderwijs toe waarvoor de POC een OPO wil waarderen, die inspirerend kunnen zijn voor andere docenten/opleidingen of die binnen de opleiding opvallend goed verlopen.

COBRA 2: faculty level

Reflection about study programmes

Reflection about framework conditions

COBRA 2: faculty level

Reflection by faculty committee and faculty board, based on

- Reports by programme committees
- Additional info: survey results, benchmark reports, …
- Dashboard: student enrolment, study progress statistics, …

Goals:

- Reflect on educational vision
- Build awareness about good practices
- Take care of problems: drafting an action plan
- Determine problems to be dealt with at a higher level

Report: publicly available within the university

COBRA 2 output: report + action plan

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KRAKENSTRAAT 3 BUS 5200
3000 LEUVEN, BELGIE

VERSLAG FACULTEIT

Verslag van de bespreking over kwaliteitsvol onderwijs door (het bestuur van) de faculteit
fPOC 21 januari 2016 – 9u30 – Technologiecampus Diepenbeek
Goedgekeurd door het Faculteitsbestuur op 18 februari 2016.

Leden

Aanwezig
Isabelle Blanckaert, Dorine Bruneel, Jeroen Buijs, Elise Haemers, Kathleen Heyens, Greet Langie (voorzitter), André Lauwers, Karel Van den Steen, Ann Van Gysel, Geert Van Ham, Julie Vermeersch (verslaggever)

Verontschuldigd
Johan Baeten, Gorik De Samblanx, Stef Maelstaf, Bert Parmentier, Jari Rooman, Bart Van Riet, Jonas Vermeulen, Kris Willems

Verslag

1 Overzicht van de acties m.b.t. de randvoorwaarden en actieplan

De POC's en de visitatiecommissie van de BA IW/IS hebben noden voor bijstelling op facultair niveau gesignaleerd. De fPOC heeft hun suggesties besproken en adviseert onderstaand actieplan.

1.1 Samenvatting aandachtspunten, aangevuld met acties voorgesteld door de fPOC

Aanbevelingen vanuit de POC's (**vet = door POC gesignaleerd als randvoorwaarde die facultair zou moeten worden aangepakt**; *cursief = aandachtspunt in verslag van de POC zelf*):

- Personeelsomkadering voor onderwijs veiligstellen/uitbreiden (POC EICT, POC EM-KV, POC EN, POC PGO)
  - → Een facultair beleid uitwerken over de (toekomstige) taak en invulling van de onderwijsopdracht van de verschillende statuten (ZAP, OP3, OP1, OP2, ABAP), met oog voor de specifieke noden van ons profiel
  - → Bij aanstellingen en bevorderingen steeds voldoende aandacht hebben voor het profiel van de industrieel ingenieur
  - → De opleidingsprogramma's herbekijken vanuit de visie op de Ingenieur 2020
- Professionalisering realiseren rond evalueren (POC CH-BCH-BW, POC EM-KV, *POC BK, POC EN, POC PB*)
  - → Een facultair toetsbeleid uitwerken
- Polyvalente basisvorming bespreken (POC PB, POC BK, POC CH-BCH-BW)
  - → Discussie opstarten over de inhoud en omvang van de polyvalente basisvorming
  - → De invulling van de polyvalente basisvorming bespreken met betrekking tot de gebruikte softwarepakketten en de disciplinespecifieke topics
- Investeren in labo-infrastructuur voor onderwijs (POC PB, POC EN)

CONTACT:
onderwijs@kuleuven.be
www.kuleuven.be/onderwijscobra

COBRA

Facultair onderwijsbeleidsplan FIIW

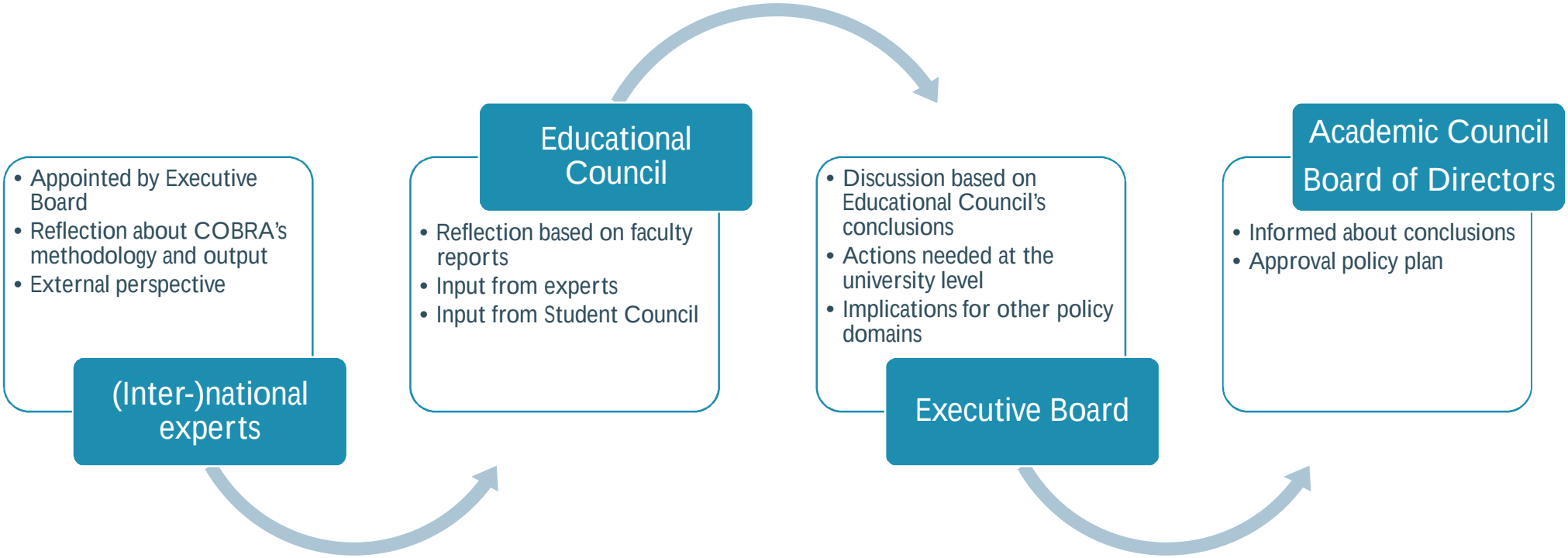
Status 7/7/2016

Visieteksten onderwijs: http://iw.kuleuven.be/overfiiw/missie-en-onderwijsvisie

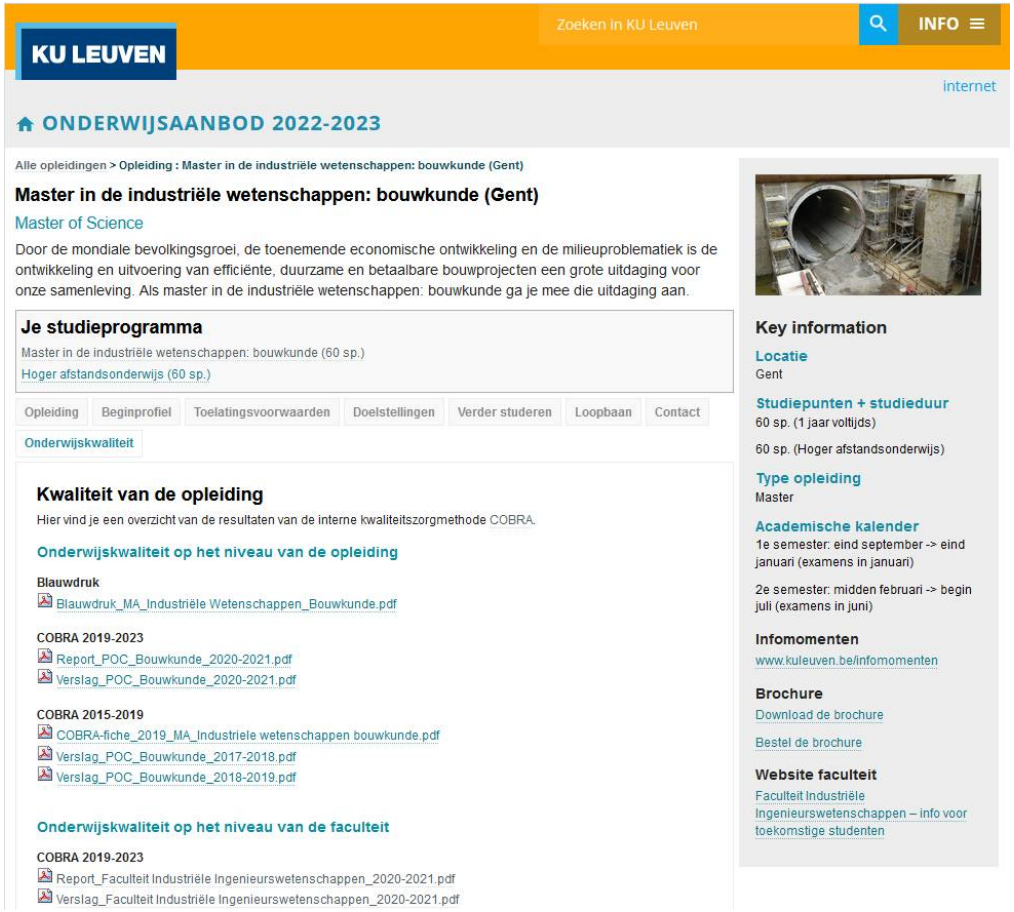
Nog niet gestart/niet voor dit AJ
Opgestart
Afgerond/wordt structureel
Niet langer relevant
Niet gerealiseerd, herplannen

Actiepunt	Relevante OD in beleid KU Leuven	Relevante visieteksten FIIW	Owner: Bureau Faculteitsbestuur of campusvoorzitters	Owner: fPOC of programmaverantwoordelijkheden	Owner: Decanaat	Owner: Expertisegroep EQ of werkgroep (WG)	Owner: Anders	Timing: 2015-2016	Timing: 2016-2017	Timing: 2017-2018	Wijze van opvolging	Status/ opmerkingen
Personeelsbeleid												
Een facultair beleid uitwerken over de (toekomstige) taak en invulling van de onderwijsopdracht van de verschillende statuten, met oog voor de specifieke noden van ons profiel	19	Profiel van de industrieel ingenieur			Voorbereid door decaan				Eerste draft in 2016-2017		Bespreking op FB	
Onderwijsondersteuners definiëren binnen het nieuwe kader van de OFD			Campus-voorzitters						Start AJ 2016-2017		Realiseren binnen OFD	
Bij aanstellingen en bevorderingen steeds voldoende aandacht hebben voor het profiel van de industrieel ingenieur door profieleigen KPI's te hanteren	22	Profiel van de industrieel ingenieur					Beco's	Continu proces				
Structuur & werking van de faculteit												
De werking van docententeams verder uitbouwen (samenstellen, inhoudelijk aansturen, administratieve ondersteuning)	6, 11	Multicampusonderwijs, toetsing, werk- en onderwijsvormen	BFB + POC's					Eind AJ 2015-2016				
Campusoverschrijdend overleg tussen onderwijsondersteuners organiseren	6	Flexibiliteit & studietrajectbegeleiding					Op te richten dienst (via OFD)	ASAP			Realiseren binnen OFD	
Infosessies over de facultaire werking organiseren voor nieuwe docenten en studentenvertegenwoordigers					Decanaat				Begin AJ 2016-2017			
De studentenvertegenwoordiging verder uitbouwen	48			POC's			BR	Continu proces				
Infrastructuur												
Noden voor investering in labo-infrastructuur voor onderwijs inventariseren	36	Werk- en onderwijsvormen, integratie onderwijs & onderzoek	Campus-voorzitters					Jaarlijks agenderen			Bespreking op BFB	
Een langetermijnvisie ontwikkelen op het structureel investeren in (labo-)onderwijsinfrastructuur, in overleg met departementen en via de SLA's	36	Werk- en onderwijsvormen	BFB					Jaarlijks agenderen			Overleg met departementen en aanpassing SLA's	
Curriculumontwikkeling												
De masterproef stroomlijnen	10	Bachelor- & masterproef				WG Masterproef		Eind AJ 2015-2016			Bespreking op fPOC-POC's-oOC's	
De bachelorproef stroomlijnen	10	Bachelor- & masterproef				WG Bachelorproef			Eind AJ 2016-2017		Bespreking op fPOC-POC's-oOC's	
De invulling van de polyvalente basisvorming bespreken met betrekking tot de gebruikte softwarepakketten en de disciplinespecifieke topics	10	Multidisciplinariteit		fPOC					Eind 2016		Programmawijziging indien nodig	
De schakelprogramma's inhoudelijk herbekijken	10, 39	Profiel van de industrieel ingenieur				WG Schakel-programma's			Eind 2016		Bespreking op fPOC-POC's-oOC's	
De opleidingsprogramma's herbekijken vanuit de visie op de ingenieur 2020	10	Profiel van de industrieel ingenieur, uitstroom		fPOC		WG Implement. Ingenieur2020			Eind AJ 2017-2018		Curriculumhervorming	
De inbedding van de algemeen vormende leerlijnen in de programma's uitwerken	10	Integratie onderwijs & onderzoek, verantwoordelijkheidszin, ondernemerschap				WG Algemeen vormende leerlijnen			Eind AJ 2017-2018		Bespreking op fPOC-POC's-oOC's	
Discussie opstarten over de inhoud en omvang van de polyvalente basisvorming	10	Multidisciplinariteit		fPOC					Eind AJ 2017-2018		Programmawijziging indien nodig	
Kwaliteitszorg												
Facultaire visie en beleid rond plagiaat uitwerken	38	Verantwoordelijkheidszin				WG Plagiaat-beleid		Eind AJ 2015-2016			Bespreking op fPOC	
Afstemmen over de manier waarop met deelcijfers wordt omgegaan	11, 38	Toetsing		fPOC		WG OER		Eind 2016			Terugkoppeling naar POC's-oOC's	
Een facultaire visie op toetsing en toetsbeleid uitwerken	5, 11	Toetsing				EG Kwaliteitszorg		Eind AJ 2016-2017			Bespreking op fPOC, implementatie via POC's-oOC's-oOB's	
Communicatie & internationalisering												
De campussen t.o.v. elkaar profileren en FIIW t.o.v. andere instellingen profileren, o.b.v. volgend stappenplan: 1) Visienota Ingenieur 2020; 2) Extern profileren; 3) Intern profileren	10, 31	Profiel van de industrieel ingenieur, uitstroom, multicampusonderwijs				WG Optimali-satie + WG Implement. Ingenieur2020	Clusterraad		Eind AJ 2017-2018		Goedkeuring door FB	
De profielen helder communiceren	31	Profiel van de industrieel ingenieur, multicampusonderwijs				EG Communicatie				Vanaf AJ 2017-2018	Goedkeuring door FB	
Contacten met secundaire scholen versterken om hen te sensibiliseren over realistische studietrajecten, slaagkansen en het profiel van de industrieel ingenieur	33	Profiel van de industrieel ingenieur, flexibiliteit & studietrajectbegeleiding		Campus-voorzitters		EG Communicatie + WG Communicatie		Continu proces				
Expertise uitwisselen over internationalisering en good practices implementeren in de opleidingen		Internationalisering				EG Internatio-nalisering		Continu proces			Bespreking op fPOC	

COBRA 3: university level



Documentation published online



Program committee report

Faculty report

University report

Vision statement

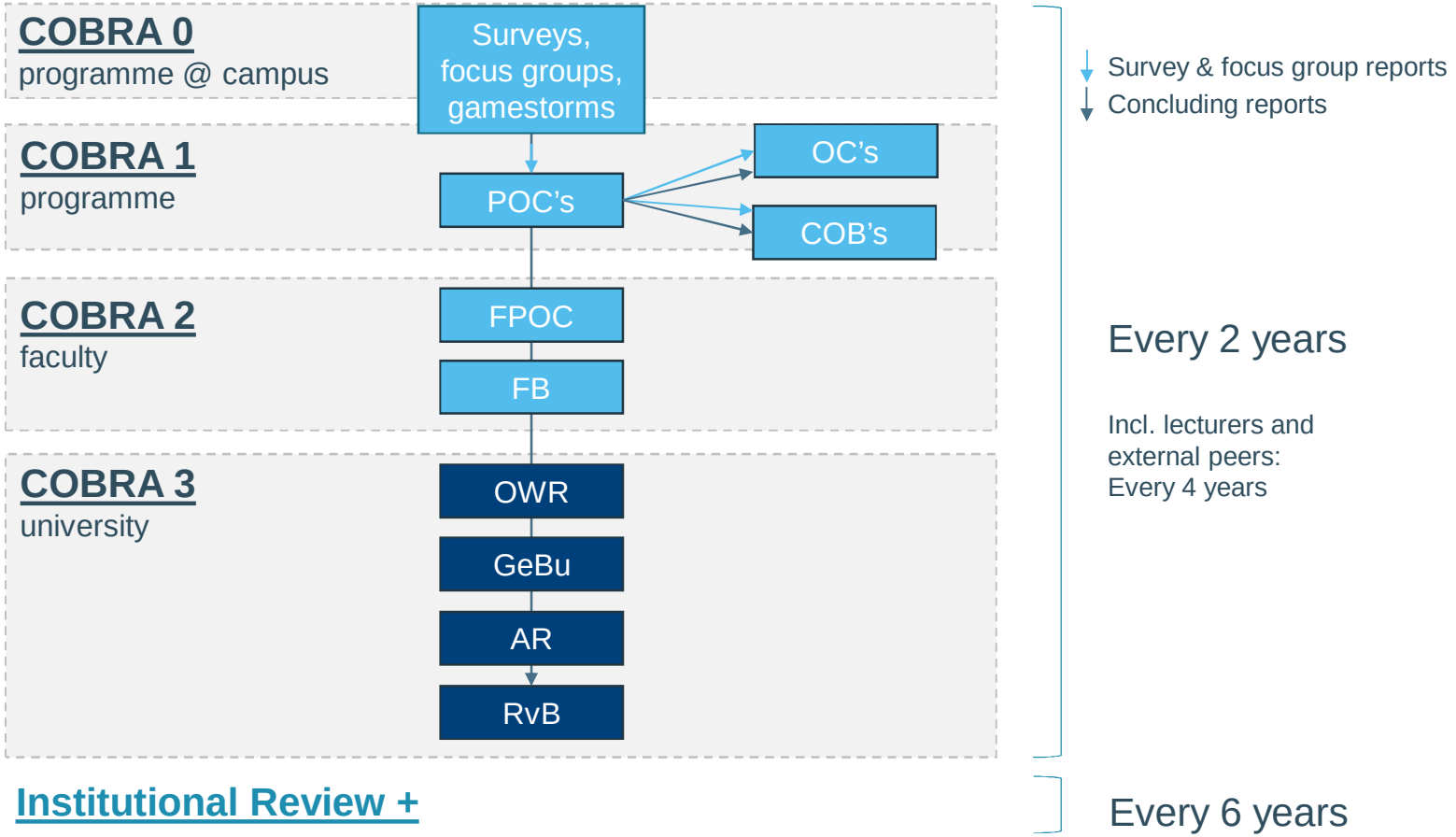
Dashboards

Programme descriptions

…

Not: focus group reports!

Flow diagram FET

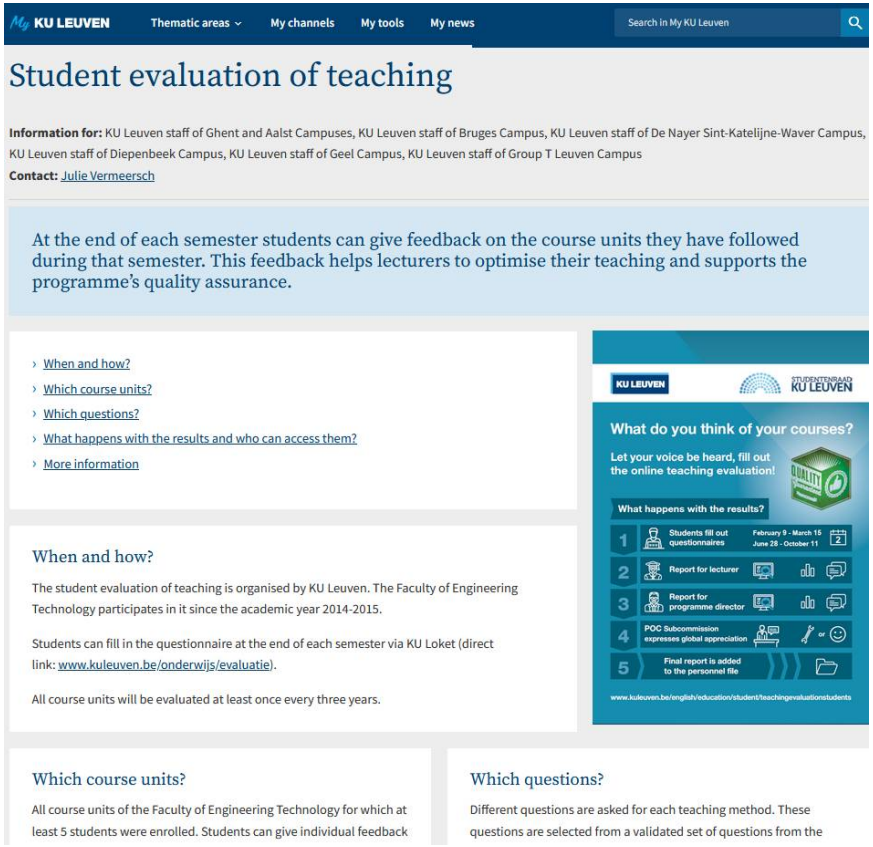


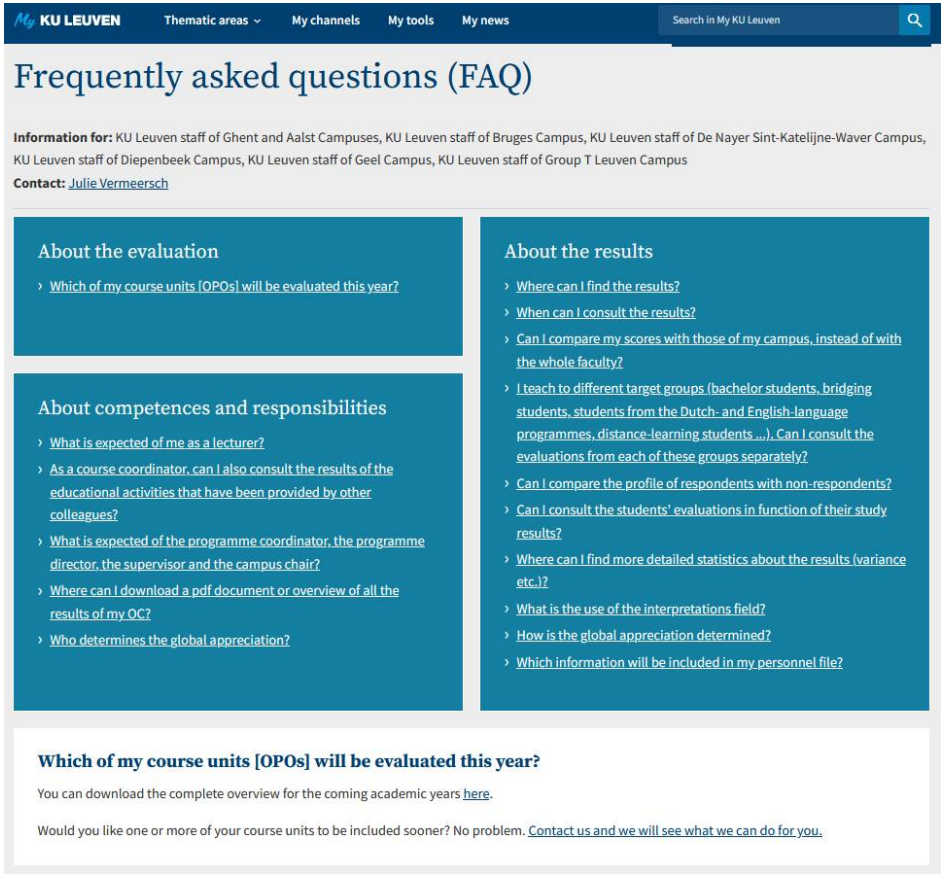
Follow-up

Follow-up

- Shared responsibility
- Programme committees
  - Continuous follow-up and quality monitoring
  - Define own ambitions and priorities on a yearly basis, as a way to stimulate a positive perspective on QA
- Work groups focused on specific topics
  - Eg. Master's thesis
- Expertise group QA and QA coordinator
  - Policy advise + QA methodology revisions
- Custom interventions
  - Eg. Study time measurements

Transparant procedures





Communication

KU LEUVEN Science, Engineering & Technology News

ENGLISH VERSION | 25 SEPTEMBER 2017

EDUCATION

ReadySTEMgo - Infographics support incoming students

In order to support new students in their study choice process, infographics have been developed within the readySTEMgo project. This gives new students a clear and visually attractive way of gaining information about the importance of their pre-education and skills for study success in the various science, engineering and technology courses. In collaboration with the Study Advice Service, a trial period was launched in which the infographics are used 1-on-1 interaction during conversations between new students and the study career counselors. If the reception is positive, a wider rollout will be prepared through training days in the autumn of 2017 at the various courses.

Check out one of the infographics

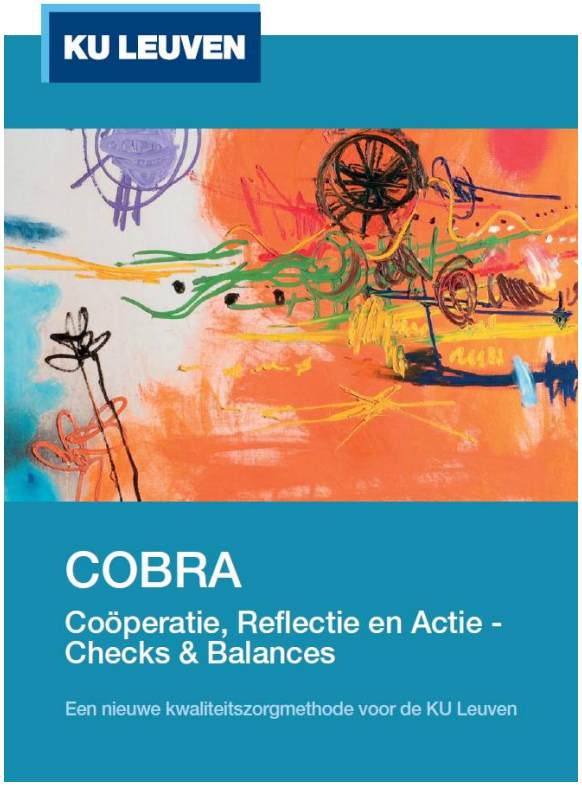
RESEARCH

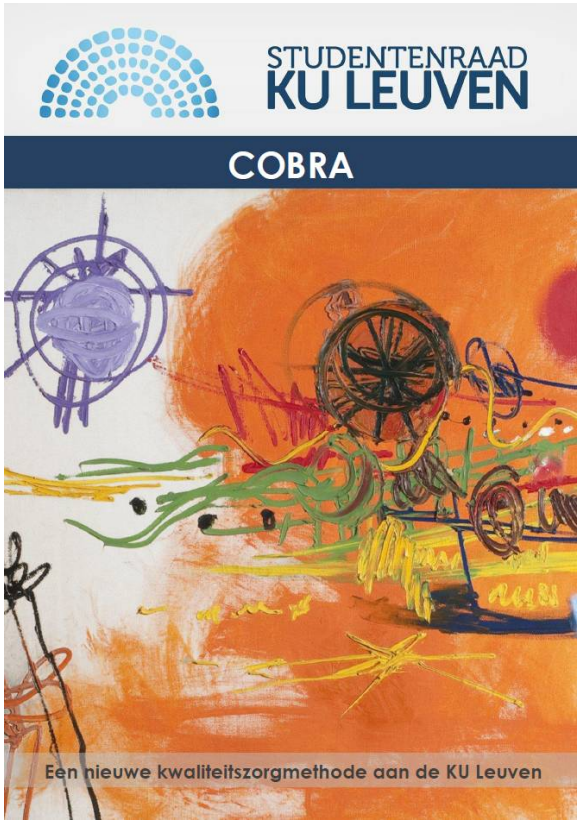
Get to know our new faculty and their research

Young and new talent is essential for a learning, searching and innovating organisation like KU Leuven that aims to excel at international level. Annually many Belgian and international professors start their career at our university. The Arenberg brochure offers new professors and young faculty members of the Science, Engineering and Technology Group of the KU Leuven the opportunity to present themselves and their research areas to their colleagues and to the broader academic community.

Read the brochure

Brochures


KU LEUVEN
COBRA
Coöperatie, Reflectie en Actie -
Checks & Balances
Een nieuwe kwaliteitszorgmethode voor de KU Leuven


STUDENTENRAAD
KU LEUVEN
COBRA
Een nieuwe kwaliteitszorgmethode aan de KU Leuven

Professionalisation

(Teacher team day January 2017)

Checks & balances

Next round

- Report on achievements
- Draft a revised/new action plan

2nd generation QA

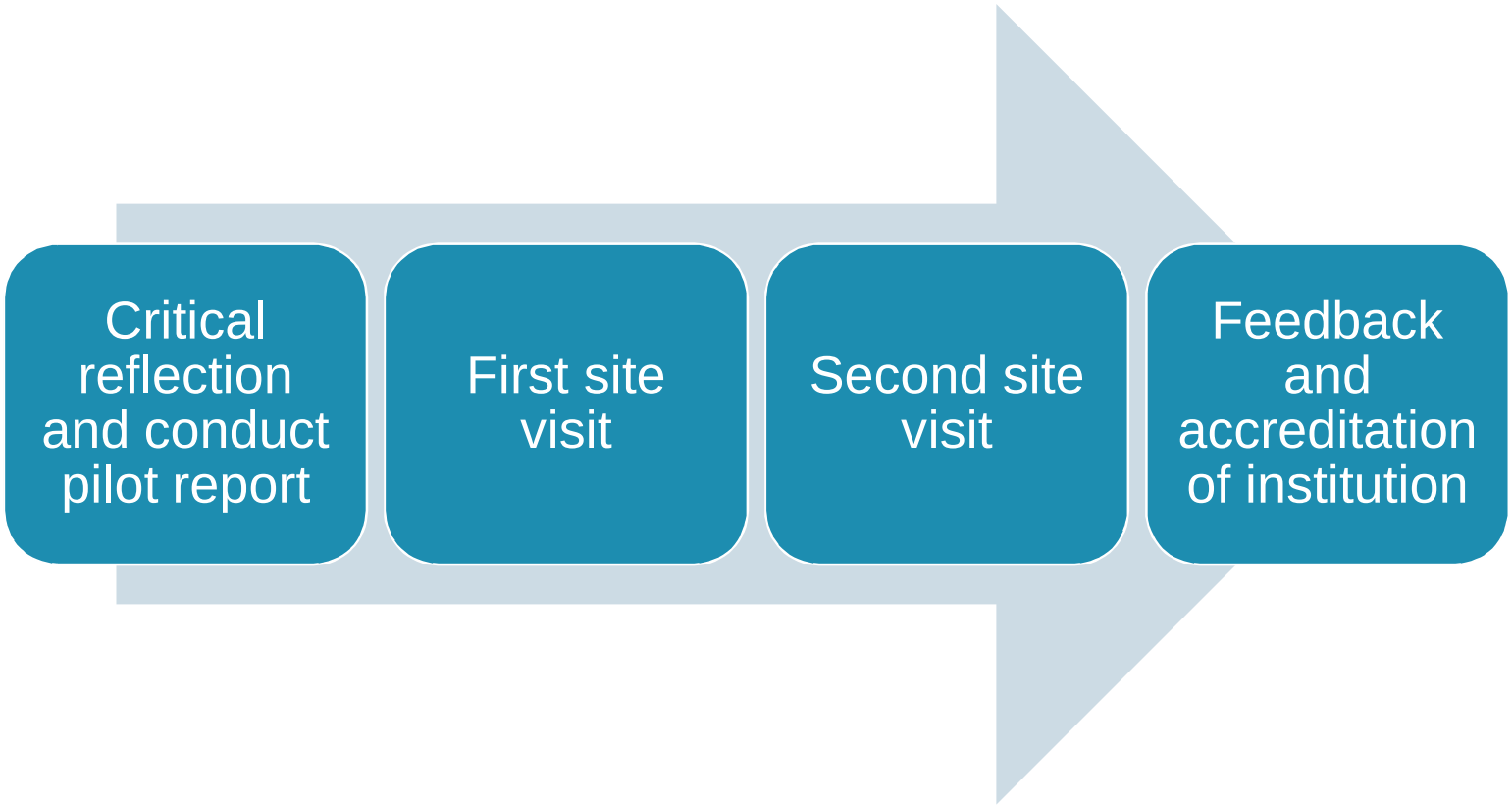
Institutional Review +

Institutional Review+

Scrutiny of management procedures instead of individual programmes!

Are the HEI's
educational policies and
quality assurance processes
able to guarantee
the educational quality?

Methodology Institutional Review+



Institutional Review+
Appreciative approach

Traditional	Appreciative
Does the institution have a good model?	Does the institution's model work?
Compliance	Own model/story
Discussion	Conversation Dialogue

Institutional review @ KU Leuven

Institutional review @ KU Leuven

KU LEUVEN

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KU LEUVEN NEWS

RESEARCH NEWS | PUBLIC DEBATE | ON CAMPUS

Home > Content > 2017 > External experts positive about educational policy and quality assurance at KU Leuven

External experts positive about educational policy and quality assurance at KU Leuven

13 Sep 2017

KU Leuven has received a favourable report after undergoing its first institutional review. This new system replaces the programme-specific reviews of the past. The institutional review panel examined whether the University pursues an effective educational policy and whether it is capable of evaluating the programmes it offers.

"We should definitely be proud," Rector Luc Sels begins. "Former Vice Rector Didier Pollefeyt and the Institutional Review Steering Committee have worked day and night on this and the result is impressive."

Rector Luc Sels is pleased with the positive outcome.

The Rector is visibly pleased with the positive outcome of the institutional review, which replaces the programme-specific reviews conducted by the Accreditation Organisation of the Netherlands and Flanders (NVAO). It is the responsibility of the NVAO to assess the quality of the programmes offered by the Flemish and Dutch institutions of higher education. Depending on the findings, higher education programmes get accreditation. This used to be done on the basis of programme-specific reviews, which were performed every eight years for each programme. "Back then, review panels examined whether each individual programme met specific criteria. Today, the tendency is to look at the bigger picture. The institutional review has examined whether we're properly managing our programmes," Sels explains.

Former Vice Rector Didier Pollefeyt and the Institutional Review

ABC of the institutional review

What is the institutional review?

The institutional review replaces the programme-specific reviews conducted by the Accreditation Organisation of the Netherlands and Flanders (NVAO). The institutional review panel examines whether the University pursues an effective educational policy and whether it is capable of evaluating the programmes it offers. On the basis of the institutional review, study programmes get accreditation.

What is the NVAO?

The NVAO is the Accreditation Organisation of the Netherlands and Flanders. It is the responsibility of the NVAO to assess the quality of the programmes offered by the Flemish and Dutch institutions of higher education. Depending on the findings, the programmes get accreditation. This used to be based on the programme-specific reviews, now on the institutional review.

https://nieuws.kuleuven.be/en/content/2017/institutional_review

Luc Sels
@LucSels

Follow

Na een erg mooi rapport voor @KU_Leuven nu ook een mooi ingekaderd besluit Instellingsreview

7:11 AM - 11 Sep 2017

7 Retweets 25 Likes

KU LEUVEN

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EN

On Campus | Research News | Public Debate | Media Resources | Staff Resources

Home > Content > 2022 > KU Leuven commended for educational approach and quality culture in institutional review

KU Leuven commended for educational approach and quality culture in institutional review

08 Jul 2022

All universities and university colleges in Flanders are assessed on the quality of their education by an independent committee every six years. KU Leuven has received a very positive report from the Accreditation Organisation of the Netherlands and Flanders (NVAO), the organisation responsible for institutional reviews. In its final report, the internationally composed committee praises KU Leuven's strong focus on education, pointing out that it is remarkable for a university that also invests so heavily in research.

"This positive report is a compliment to the entire university. The committee praises our approach that focuses on both high-quality education and solid research. I would, therefore, like to thank all of our colleagues who give their best every day to achieve this," said Rector Luc Sels.

The committee notes that subsidiarity, autonomy and accountability are not hollow concepts in KU Leuven's educational approach.

"Quality is in our DNA," clarifies Vice Rector Tine Baelmans. "We give the programmes the responsibility to develop the quality culture and simultaneously develop frameworks to coordinate everything and support educational innovation. The open, group-dynamic approach within the programmes and throughout the university is clearly fruitful."

The committee at work

The institutional review also confirms that KU

Search in News

Search

KU Leuven on Twitter

Tweets from @KU_Leuven

KU Leuven Retweeted

ROBtv
@rob_televisie · 1h

KU Leuven-campus houdt 75% meer water vast dankzij slimme pompen: "Eén van de maatregelen om droogteproblematiek op te lossen" #robnieuws #robtv

robtv.be
KU Leuven-campus houdt 75% meer water vast dankzij slimme pompen: "E...

4

KU Leuven Retweeted

Luc Sels
@LucSels · 6h

Vernieuwde @KU_Leuven-campus in het "Rabot" in Gent krijgt groen licht: aula's, 90 studentenkamers en een park op komst

https://nieuws.kuleuven.be/en/content/2022/Institutional-Review-2022-a-positive-outcome

Assessment and accreditation of institutions

STRENGHTS

- Allows more freedom for IQA
- High stakes but lower pressure on study programmes
- Stimulates reflection
- External commission combining different perspectives
- Less time-consuming and expensive
- Publicly available reports
- …

WEAKNESSES

- No impetus for major change?
- Different QA systems: results not comparable
- Relies completely on own responsibility
- Low stakeholder involvement
- Subjective external perspectives
- No detailed feedback for study programmes
- Shortcuts: employing expert report writers, no more reflection
- …

The present & the future

Challenges

- Response rate surveys / turnout focus groups
- Quality culture in which all actors feel involved
- Involving external actors
  - Evaluation of quality versus assessment of method
  - External evaluation versus assessment in dialogue
- Structure and design of quality assurance portal
- Balance between comparability of results (providing fixed instructions) and freedom to address current issues (appreciation of own cultures)

COBRA 2.0

More emphasis on POC	• Flexible questionnaire • Blueprints and education plans
Cyclicity	• 2x2 cycle • More options for clustering
External perspective	• In COBRA 1 and COBRA 3 • Education program ‘picture’ (every four years)
Communication	• Motivation and recruitment of primary actors • Quality Assurance Portal • More information in English

Blueprints

KU LEUVEN

FACULTEIT INDUSTRIËLE INGENIEURSWETENSCHAPPEN
W. De Croylaan 6 bus 2600
3001 HEVERLEE, BELGIË

Opleidingsblauwdruk bachelor in de industriële wetenschappen, afstudeerrichting chemie

Deel 1: Het profiel en de visie van de opleiding

1A Doelstellingen

De bachelor in de industriële wetenschappen (IW) met afstudeerrichting chemie is een **academische opleiding** met in eerste instantie een **doorstroomfinaliteit** naar de masteropleidingen IW: chemie en IW: biochemie. De bachelor IW vormt m.a.w. een multidisciplinaire basisopleiding waarop de masteropleidingen verder bouwen. De bacheloropleiding wordt gekenmerkt door een brede wetenschappelijke en technologische vorming. De daaropvolgende master is verdiepend. De leerresultaten van de bacheloropleiding dragen dan ook bij aan het uiteindelijke profiel dat we na de masteropleiding voor ogen hebben: een **technisch onderlegde en implementatie-gerichte ingenieur** die de beroepstitel 'industrieel ingenieur' (Ing.) mag dragen. De opleiding streeft ernaar bachelors af te leveren met een kritische geest, met creatieve ideeën en zin voor innovatieve ontwikkelingen, met aandacht voor duurzaamheid en maatschappelijke verankering. Een opleiding vandaag voor een ingenieur van de toekomst.

De bachelor in de industriële wetenschappen met afstudeerrichting chemie streeft meer bepaald de volgende **opleidingsspecifieke leerresultaten (OLR's)** na *(Figuur 1)*:

Figuur 1: Schematisch overzicht en samenhang van de vaardigheden binnen de opleiding.

Meer info over de leerresultaten: https://iiw.kuleuven.be/personeel/ects/handleiding/leerresultaten.

1B Context

De Faculteit Industriële Ingenieurswetenschappen situeert zich binnen de Groep Wetenschap & Technologie van KU Leuven, en telt **meerdere campussen** in Vlaanderen.

De bachelor in de industriële wetenschappen, afstudeerrichting chemie wordt aangeboden op Campus De Nayer, Campus Diepenbeek[1], Campus Groep T en Technologiecampus Gent. De opleiding wordt op alle campussen in het Nederlands aangeboden *(Figuur 2)*. Op Campus Groep T wordt het volledige traject bijkomend ook in het Engels georganiseerd.

Figuur 2: Campussen binnen FIIW die de BA IW met afstudeerrichting chemie aanbieden.

De regionale spreiding en intense samenwerking binnen FIIW bieden studenten de kans om kwaliteitsvol onderwijs in eigen regio te volgen maar evengoed om hun horizon te verbreden en zich te specialiseren in een domein dat niet aanwezig is op hun startcampus. Binnen dit **multicampusmodel** kunnen studenten na het afleggen van de eerste drie semesters hun bacheloropleiding ook op een andere campus verderzetten. Ook na het behalen van het bachelordiploma kunnen de studenten kiezen voor een masteropleiding op een andere campus.

De organisatie, planning en opvolging van het onderwijs is de bevoegdheid van onderwijscommissies:

- **Per campus** is er voor de polyvalente basisvorming en voor de afstudeerrichting chemie een **onderwijscommissie (OC)** verantwoordelijk die bestaat uit alle collega's die betrokken zijn bij de opleidingsonderdelen in de opleiding, met vertegenwoordiging van studenten, en als voorzitter telkens een opleidingshoofd. De OC werkt de visie op de opleiding lokaal uit; garandeert een goede organisatie van het onderwijs op de betrokken campus; zorgt voor de profielbewaking aan de hand van masterproeven en regionale netwerking met het werkveld; neemt eigen initiatieven en volgt de initiatieven van de POC op alsook de opvolging van het kwaliteitszorgsysteem; en rapporteert en adviseert aan de POC.

[1] De opleiding op Campus Diepenbeek is een gezamenlijke opleiding van KU Leuven en UHasselt. Het is een decretaal aparte opleiding die in functie van de eigen context de kwaliteit borgt volgens het kwaliteitszorgsysteem van UHasselt. In deze blauwdruk wordt aldus niet in detail ingegaan op deze opleiding.

Opleidingsblauwdruk bachelor in de industriële wetenschappen, afstudeerrichting chemie

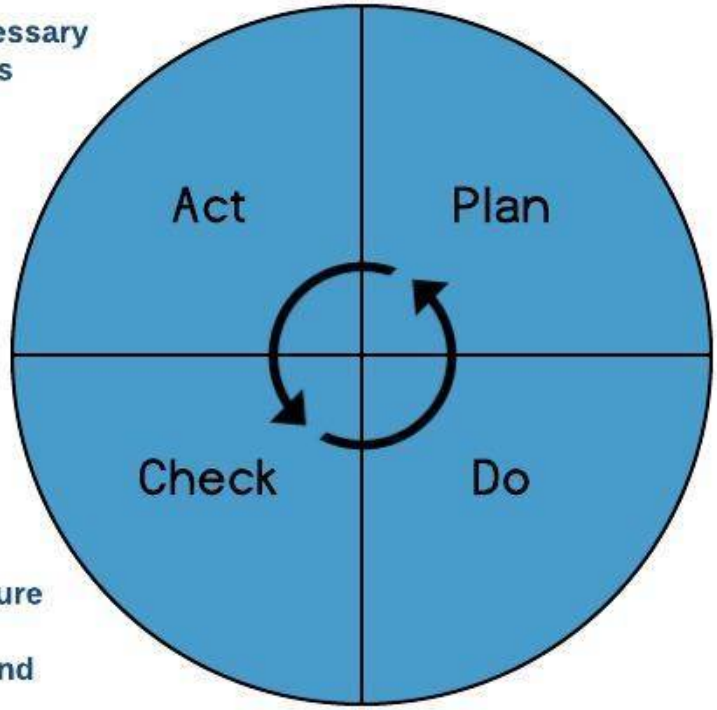
Lessons learned

Lesson 1:
There is no “ideal” system

- Determine which system best suits your context
  - Each system has strengths & weaknesses
  - System that works for you, may not work for others, and vice versa
  - Monitoring output vs. monitoring processes
- Changes in context may warrant changes in systems

Quality improvement models

- Establish and agree improvement goals
- Understand current process
- Identify the baseline from which to measure any improvements



- Implement actions
- Design measures and implementation plan

- Monitor and measure changes
- Record changes and findings

- Evaluate
- Modify where necessary to fix any problems identified

Lesson 2:
Be proactive

- Don’t wait for legislation
- Take responsibility – to get responsibility
- Give responsibility – to get results

Lesson 3:
Stay in touch with stakeholders

- Knowledge is power (“meten is weten”, to measure is to know): use tools to gather data and input/feedback, to create a strong foundation for your QA
- Determine your blind spots
  - What is important in your context?
  - How well do you perform on each of these criteria?
  - How well can we monitor these?
  - Good practices?
  - Critical problems to address first?
  - How do you adapt for improvement?

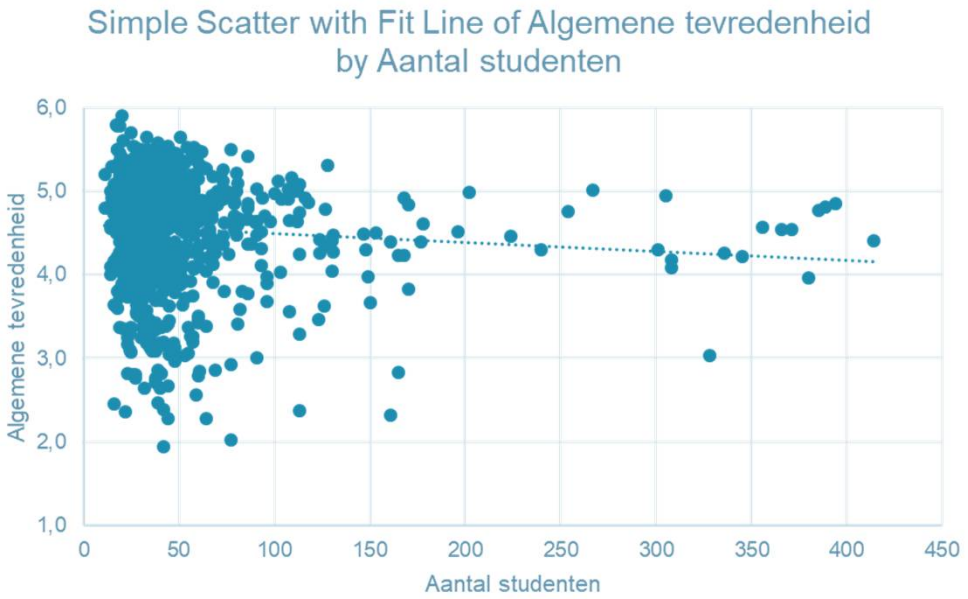
Lesson 4:
Stay critical and flexible

- Be critical about your own performance as an institution
- Be critical of your QA system's fit with the context
- Be willing to make changes if necessary or desirable

Only course units with a response rate > 30% and >10 respondents are included in the analysis.

Group size course unit

"I was satisfied with the quality of teaching in this course."



Correlations

		Algemene tevredenheid	aantal_stud
Algemene tevredenheid	Pearson Correlation	1	-,078*
	Sig. (2-tailed)		,022
	N	864	864
aantal_stud	Pearson Correlation	-,078*	1
	Sig. (2-tailed)	,022	
	N	864	864

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation significant: general satisfaction on average slightly higher in smaller groups.

Lesson 5:
Learn from others

- Look at others for inspiration
  - Limited number of possible approaches – it always comes back to one of a few categories
- Involve external peers in your QA
  - For advice from a fresh perspective
  - Use your international network!
- Share your experiences

Literature

QA systems

- ENQA (2015). *Standards and Guidelines for Quality Assurance in the European Higher Education Area.* Yerevan: European Association for Quality Assurance in Higher Education.
- Hodson, P. & Thomas, H. (2003). Quality assurance in Higher Education: Fit for the new millennium or simply year 2000 compliant? *Higher Education, 45*, pp. 375-387.
- Billing, D. (2004). International comparisons and trends in external quality assurance of higher education: Commonality or diversity? *Higher Education, 47*(1), pp. 113-137.

Surveys, student evaluations of teaching (SET), student ratings of instruction (SRI), course evaluations

- Benton, S.L. & Ryalls, K.R. (2016). Challenging Misconceptions About Student Ratings of Instruction. *IDEA paper #58,* The IDEA Center, pp. 1-21; https://www.ideaedu.org/Portals/0/Uploads/Documents/IDEA%20Papers/IDEA%20Papers/PaperIDEA_58.pdf
- Linse, A.R. (2017). Interpreting and using student ratings data: Guidance for faculty serving as administrators and on evaluation committees. *Studies in Educational Evaluation, 54*, pp. 94-106. http://www.sciencedirect.com/science/article/pii/S0191491X16300232

Questions?

Ask away!

julie.vermeersch@kuleuven.be

Brainstorm

How do you monitor the quality of your programmes?

- Similarities?
- Available data?
- Measurements?
- Method? Frequency?
- What would you like to change in the future?

What do you do with the results?

- Who do you report to?
- Who is involved in the follow-up?

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Learn to learn for life -

How can educators support the development of students' lifelong learning competencies?

Co-funded by the European Union

KU LEUVEN
FACULTY OF ENGINEERING TECHNOLOGY

Employees need to continuously update and up-skill their competencies, to keep pace with the changing technology and shifting requirements of the labor market.

(European Commission 2019, OECD 2019)

What & Why?

What is lifelong learning?

Progressively acquire, finetune, and transfer knowledge over long time spans while retaining previously learned experiences, known as lifelong learning

(Parisi et al., 2019)

What is lifelong learning?

Lifelong learning is continued learning in both formal and informal settings by an individual, and it continues throughout a person's professional life
(Sengstock, Moxham, & Dwyer, 2006).

An attribute involving a set of self-initiated activities and information-seeking skills with sustained motivation to learn and the ability to recognize one's own learning needs
(Hojat et al., 2003; Hojat, Veloski, Nasca, Erdmann, & Gonnella, 2006).

Encompassing all purposeful learning activity, whether formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence.
(Memorandum on Lifelong Learning (EC, 2000))

What is lifelong learning?

A definition

Almost always includes

- Time aspect
- Learning aspect

Sometimes includes

- Focus on an individual
- Different types of learning
- Intentionality and self-initiated
- Why

Why do we need to focus on lifelong learning in higher education?

"KU Leuven offers its students an academic education based on high-level research, with the aim of preparing them to assume their social responsibilities"

(Mission statement KU Leuven, 2012)

Higher education needs to prepare students for e.g.,

→ Changing technologies

→ Shifting requirements

→ Global challenges

Preparing for the work environment = Preparing for lifelong learning

Making everyone eager to learn

"Universities play a critical role in promoting lifelong learning through research on the topic, training of teachers to believe in the importance of lifelong learning and serve as role models, and providing learning experiences which encourage students to continue learning throughout their lives." (Martinez and Lord 2012)

RefL³ect

Learning to learn for a lifetime – Self-regulation as a core competency for lifelong learning

TRAINengPDP

Training engineers for lifelong learning through a personal development process

KU LEUVEN

Three Engineering faculties

Co-funded by the European Union

Meet the team

Greet Langie

Tinne De Laet

RefL³ect

Lynn Van den Broeck

Shandris Tuyaerts

Greet Langie

Sofie Craps

TRAINengPDP

Lynn Van den Broeck

Rani Dujardin

Agenda

01 What & Why

02 Meet the team

03 **Lifelong learning competencies**

04 Students' and lecturers' perceptions

05 What can we do as higher education institutions?

06 Key take-away messages

03 Lifelong learning competencies

Lifelong learning vs. lifelong learning competencies

Towards a general lifelong learning framework

Measuring lifelong learning competencies

Lifelong learning vs. Lifelong learning competencies

Lifelong learning vs. Lifelong learning competencies

Lifelong learning vs. Lifelong learning competencies

Lifelong learning competencies = Competencies needed
- To be prepared for a life full of learning
- To act as a lifelong learner

Towards a general lifelong learning framework

Systematic literature review of LLL competencies

Screening >3000 abstracts

Reading 175 full papers

Included 87 full papers + 3 additional snowballs

Lessons learned
- LLL = buzz word or key word
- LLL in the first or last sentence of an abstract

> 300 competencies → Seven categories

Lifelong learning competencies

INFORMATION LITERACY

SELF-REGULATION & SELF-DIRECTION

INTRINSIC MOTIVATION

LEARNING STRATEGIES

LEARNING BELIEFS &SELF-EFFICACY

INITIATIVE & GRIT

FLEXIBILITY & ADAPTABILITY

Measuring lifelong learning competencies

Difficult to assess some of these competencies (Zlatkin-Troitschanskaia et al., 2015).

Seven methods according to literature review (Cruz et al. 2020)

- Questionnaires
- Rubrics
- Tests
- Observations
- Interviews
- Portfolios
- Reflections

Validated questionnaires

LIFELONG LEARNING SCALE (LLS) (KIRBY ET AL. 2010)

- Holistic approach on lifelong learning
  - Goal setting, Application of knowledge and skills, Self-direction and evaluation, locating information, adaptable learning strategies
- One factor, 14 items, Five-point Likert scale
- *E.g. I love learning for its own sake; I can deal with the unexpected and solve problems as they arise,*

SELF-REFLECTION AND INSIGHT SCALE (SRIS) (GRANT ET AL. 2002)

- Subcompetency of lifelong learning
- Three factors, 20 items, Five-point Likert scale
  - Engagement in self-reflection: E.g. *I frequently take time to reflect on my thoughts*
  - Need for self-reflection: E.g. *It is important to me to try to understand what my feelings mean*
  - Insight: E.g. *My behavior often puzzles me*

Data collection

LIFELONG LEARNING SCALE (LLS) (KIRBY ET AL. 2010)

- February 2023
- First-year & second-year students
- Faculty of Engineering Technology (N= 80)

SELF-REFLECTION AND INSIGHT SCALE (SRIS) (GRANT ET AL. 2002)

- October 2022
- All study phases
- Faculty of Engineering Technology (N= 783)
- Faculty of Engineering Science
  - Engineering Science (N= 1045)
  - Architecture (N= 172)
- Faculty of Bioscience Engineering (N= 348)

Results lifelong learning scale

Study	Domain	Country	Sample size	Mean LLS
Yap & Tan, 2022	Chemical engineering	Malaysia	109	M = 3.93
Kirby et al., 2010	Mixed	Canada	309	M = 3.72
Dujardin et al., 2023	**Engineering Technology**	**Belgium**	**80**	**M = 3.44**
Van den Broeck et al., 2020	Engineering Technology	Belgium	160	M = 3.37

Results self-reflection and insight scale

Study	Domain	Country	Sample size	Mean SRIS
Naeimi et al., 2019	Medicine	Iran	136	3.80
Bulmer et al., 2022	Healthcare	USA & Canada	154	3.77
Roberts & Stark, 2008	Medicine	UK	462	3.75
Harrington & Loffredo, 2011	Mixed	USA	121	3.49
Tuyaerts et al., 2023	**Engineering**	**Belgium**	**2348**	**3.41**
Paloniemi et al., 2021	Medicine	Finland	198	3.31
Aşkun & Çetin, 2017	Mixed	Turkey	659	3.27
Nakajima et al., 2017	Psychology	Japan	149	3.14
Grant et al., 2002	Psychology	Australia	260	3.13
Carr & Johnson, 2021	Medicine	Australia	164	2.83
Mosalanejad et al., 2020	Medicine	Iran	35	2.74

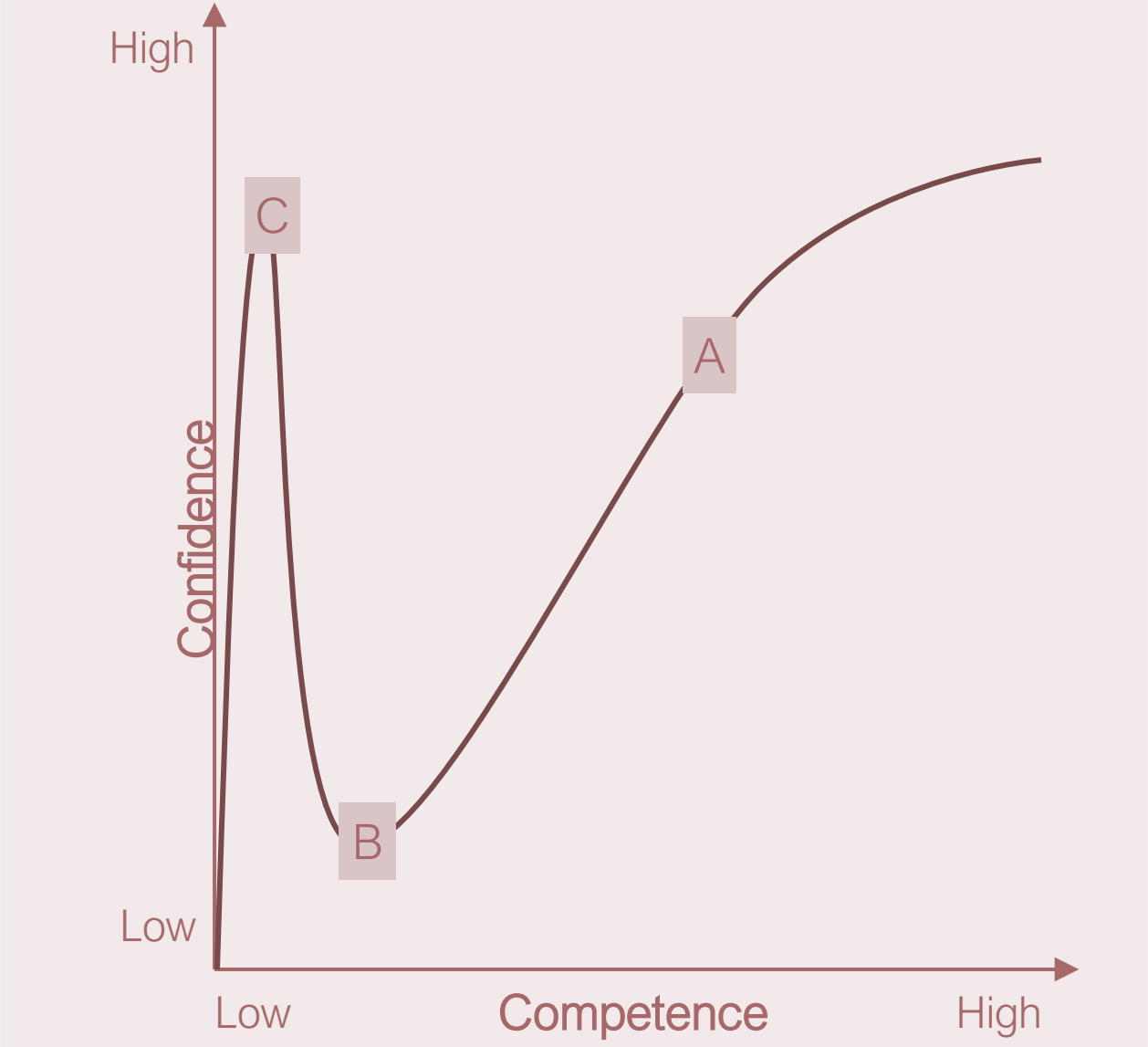
What we know so far

- Students score themselves above the midpoint
- Lower than another engineering study, but often higher than other disciplines
- But what is a good score?

Combine self-reported results with lecturer scores

Combining self-reported questionnaire with lecturer scores

Self-reflection reports
Students received an A/B/C score on how critical and concrete they were.



Possible Dunning-Kruger effect

N=48

When measuring lifelong learning competencies

- Use mixed-method approach
- Take efficiency into account: e.g., are time consuming methods such as observations feasible on long term?
- In the future also looking towards more innovative assessments such as situational judgement tests and immersive learning

04 Students' and lecturers' perceptions

Perceptions on professional and lifelong learning competencies

Lifelong learning competencies as learning outcomes

Perceptions on professional and lifelong learning competencies

Professional competencies:

Self-directed and lifelong learning, Intellectual, innovative and critical thinking, Ethical thinking, Conscientiousness, Communication, Teamwork, Leadership and project management, Social and intercultural thinking

Lifelong learning competencies:

Self-reflection, Locating and scrutinizing information, Willingness, motivation and curiosity to learn, Creating a learning plan, Self-monitoring

Rating on a four-point Likert scale

1. How **important** do you think these competencies are in engineering practice?
2. To what extent are these competencies **taught** in your curriculum?
3. To what extent are these competencies **assessed** in your curriculum?

32 lecturer responses

138 student responses

Perception on professional and lifelong learning competencies - Importance

LECTURERS

1. Intellectual, innovative and critical thinking
2. Self-directed and lifelong learning
3. Communication
4. Teamwork
5. Conscientiousness / Locating and scrutinizing information

STUDENTS

1. Intellectual, innovative and critical thinking
2. Communication
3. Teamwork
4. Conscientiousness
5. Willingness, motivation, and curiosity to learn

Perception on professional and lifelong learning competencies - Importance

LECTURERS

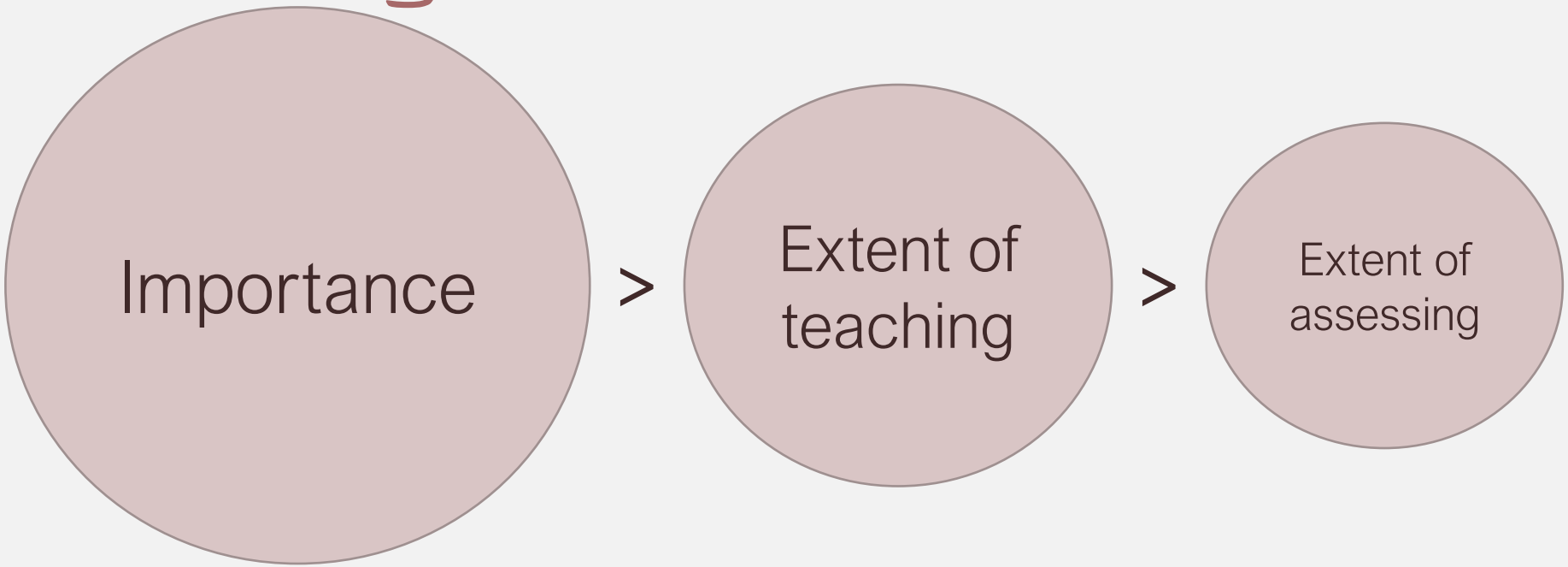
- Lifelong learning rated second most important
- Lifelong learning competencies are perceived to be less important than lifelong learning

STUDENTS

- Lifelong learning rated 8th most important
- Some LLL competencies perceived more important than lifelong learning:
  - Willingness, motivation and curiosity to learn
  - Locating and scrutinizing information

Lecturers emphasize the importance of LLL in general, whereas students seem to value the attitudinal and concrete aspect of LLL more.

Perceptions on Importance, extent of teaching, and assessment



1. Teaching staff recognize the importance, but do not consider them as primary teaching goals (Nesterova, 2019)
2. Less assessment can be reinforced by the fact that it is difficult to assess these competencies

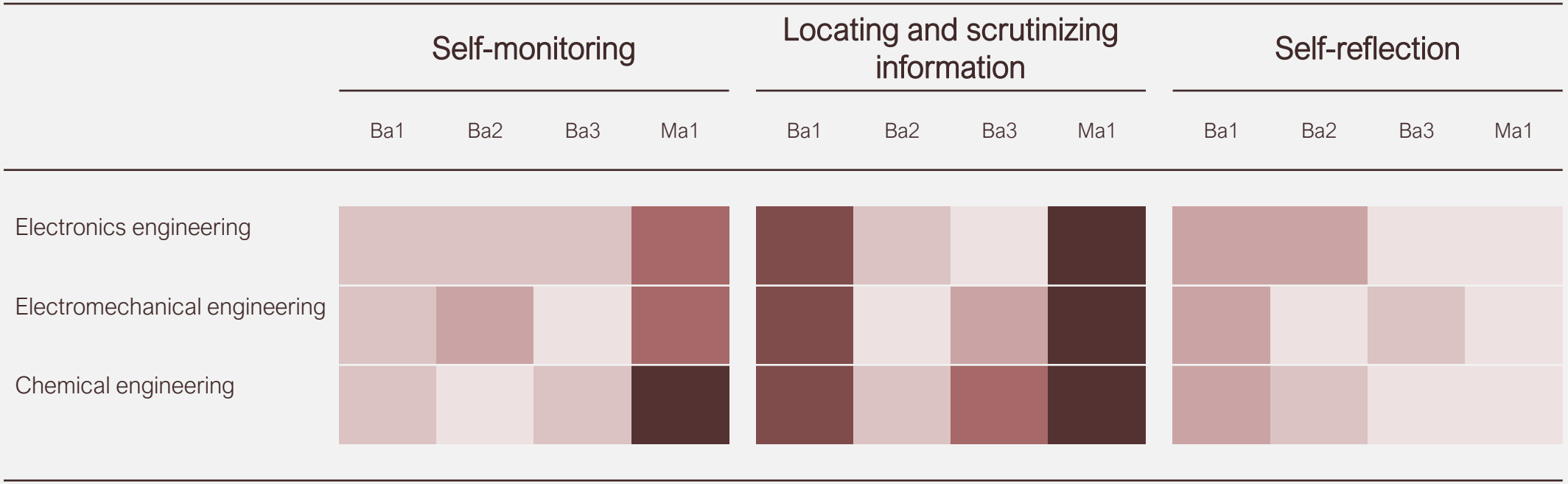
Lifelong learning competencies as learning outcomes

- Analysing different engineering programmes
- >1600 learning outcomes for a four-year study programme
- Mapping learning outcomes: Score of 0 or 1

Example learning outcomes

1. (…) solve problems, can respect deadlines, be flexible and shows perseverance
2. (…) collect, critically process, and interpret new information and knowledge
3. (…) think critically, rationally, and logically coherently about the role and responsibilities of engineers (…)

Lifelong learning competencies as learning outcomes



1. Highest mapping score N=13 (<1%)
2. Often present in courses that are not part of the core engineering curriculum.

Similar finding as Kovacs et al. (2020) on professional competencies in an engineering programme.

3. Competency development throughout the programme is missing.

However…

Learning outcomes are not always a perfect representation of what goes on in the lecture hall and in the minds of students (Armstrong & Niewoehner, 2008; Maher, 2004; Orón Semper & Blasco, 2018).

Educational practice can be much richer than these written statements.

Especially plausible for professional competencies since they are often considered to be a by-product of education and part of the hidden curriculum (Orón Semper & Blasco, 2018).

In need of

1. A top-down strategic plan that takes the whole programme into account
2. A bottom-up input from lecturers and educational practitioners.

(Walkington, 2002)

05

What can we do as higher education institutions?

Possible interventions

Opinions of the lecturer

Possible interventions

Systematic literature review of LLL interventions

Screening 276 abstracts

Reading 41 full papers

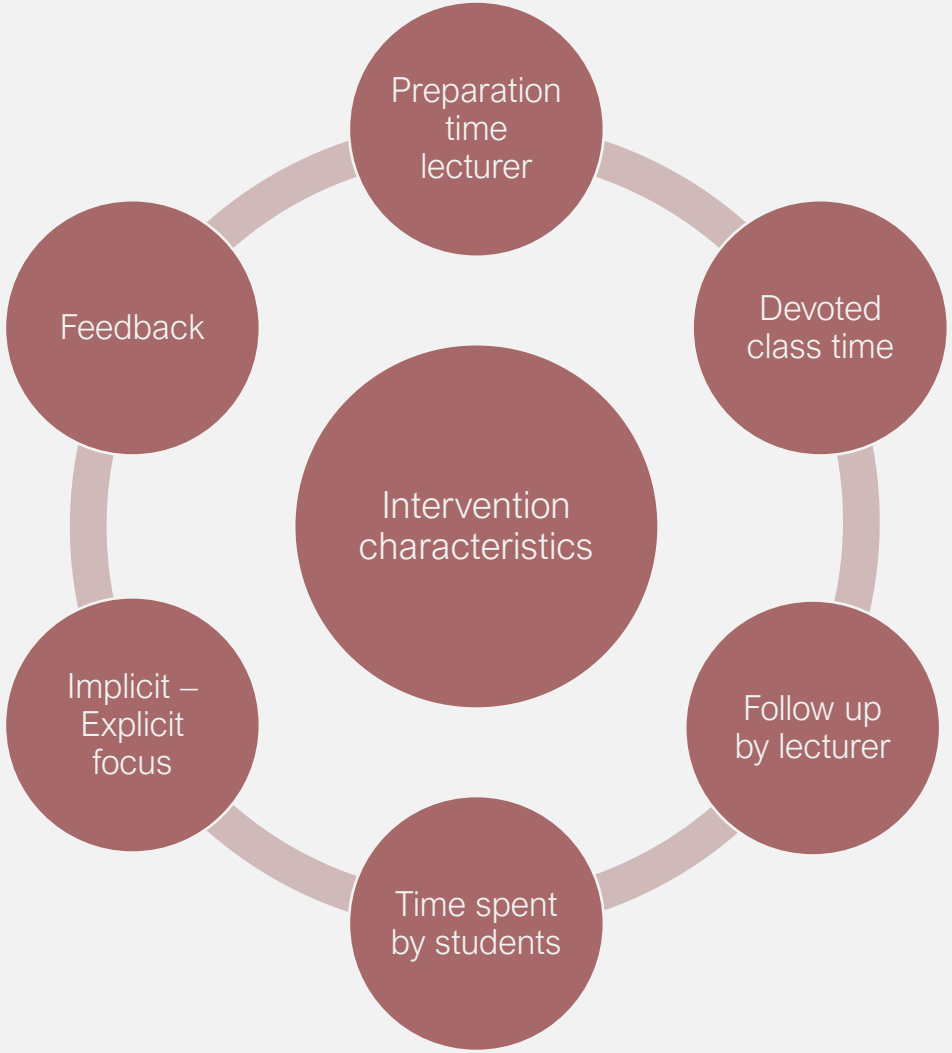
Included 16 full papers

Lessons learned
- LLL = buzz word or key word
- Often no intervention included

Possible interventions - Content

1. Student-centred teaching methods such as Problem/Project Based Learning (PBL)
2. Focus on self-regulation via (e)Portfolios, personal development plans, specific sessions, or online material
3. Reflective journals or practice
4. Use of Peer and Self-assessment

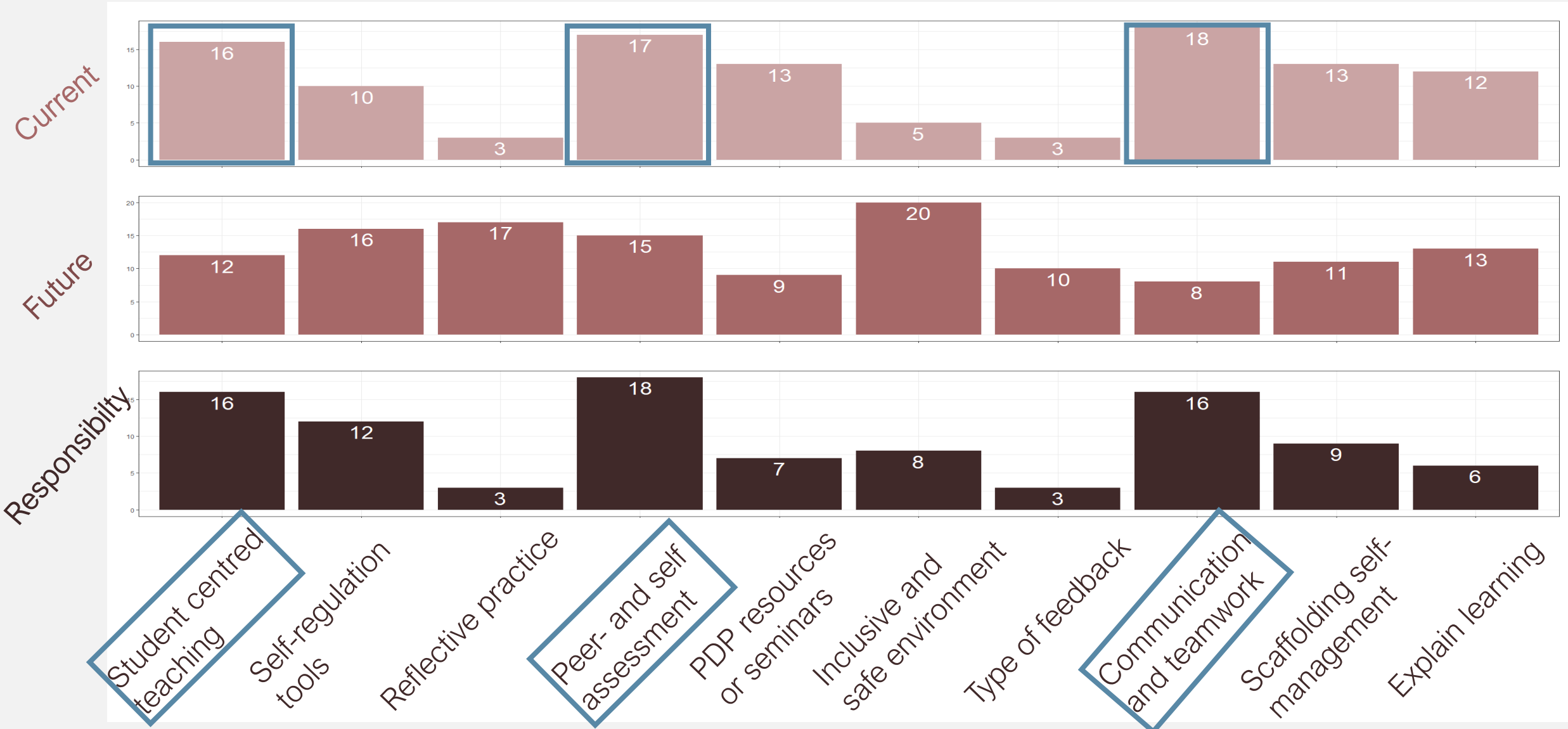
Possible interventions – Characteristics



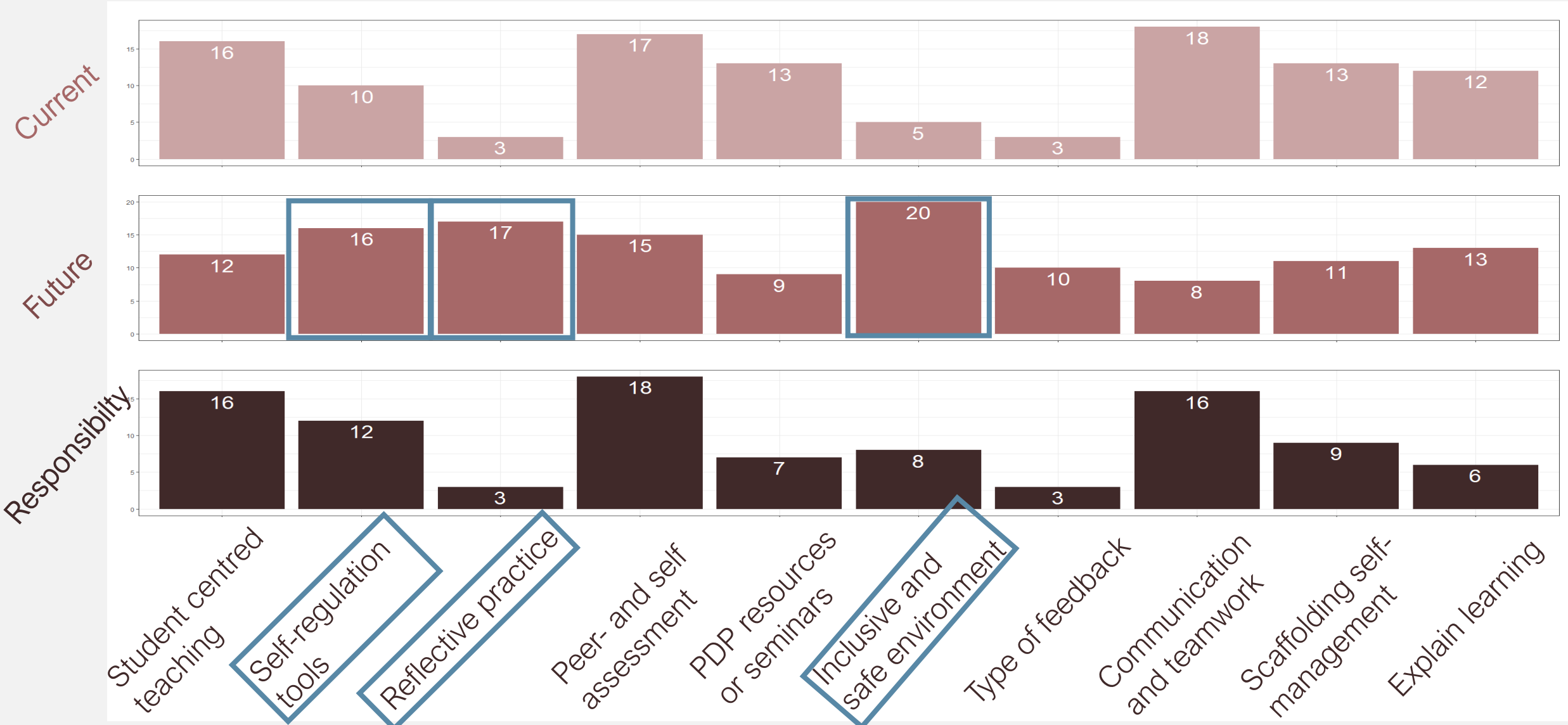
What should we need to take into account?

- Focus on a student-centred approach
  - → LLL is a personal matter!
- Competency development is a continuous process
  - → In need of longitudinal interventions starting from the first year
- For effectiveness measurements: quasi-experimental design but students' satisfaction is also important.
- Intervention characteristics: what is suitable for a specific context?
- Efficiency: to make intervention sustainable

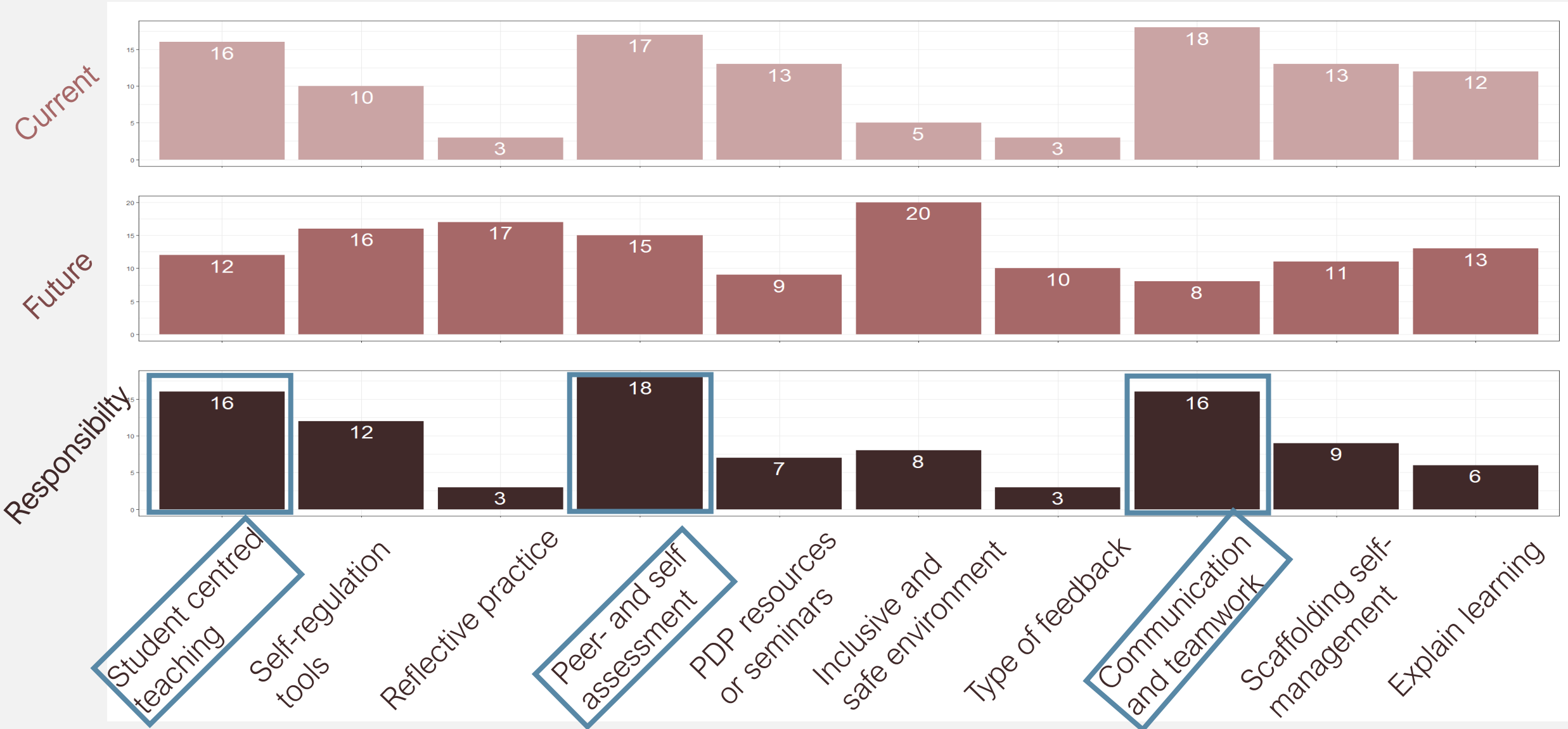
Opinions of lecturers



Opinions of lecturers



Opinions of lecturers



06 Key take-away messages

Importance

- Lecturers ≠ Students
- Not all lecturers do feel comfortable yet for some aspects

Explicit

- Not a by-product
- Learning outcomes
- Teach & assess

Context

- Integrated in engineering curriculum

Interventions

- No one-size-fits-all
- Start from day one
- Longitudinal
- Sustainable

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RefL³ect

TRAINeng PDP

DUBLIN TECHNOLOGICAL UNIVERSITY DUBLIN

KU LEUVEN

LUT University

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KU LEUVEN

SMART PL

Education Innovation SET& FET – Distance Education

Wouter Van der Hoeven

101082928 — SMART-PL ERASMUS-EDU-2022-CBHE-STRAND-2

Co-funded by the European Union

https://set.kuleuven.be/en/education/innovation/distance-education

Agenda

1. Education Innovation SET – Distance Education
2. Distance Education at SET – 1. Surveys & Focus groups (2020 - 2023)
3. Distance Education at SET – 2. Framework for teachers
4. Vision on Distance Education at FET

What is your background?

1. Lecturer
2. Assistant
3. PhD
4. Faculty staff
5. Other

Do you have experience with distance education?

1. Very much
2. A considerable amount
3. A moderate amount
4. A little
5. None

Will you keep offering theory through distance education in the future?

1. Extremely unlikely
2. Unlikely
3. Neutral
4. Likely
5. Extremely likely

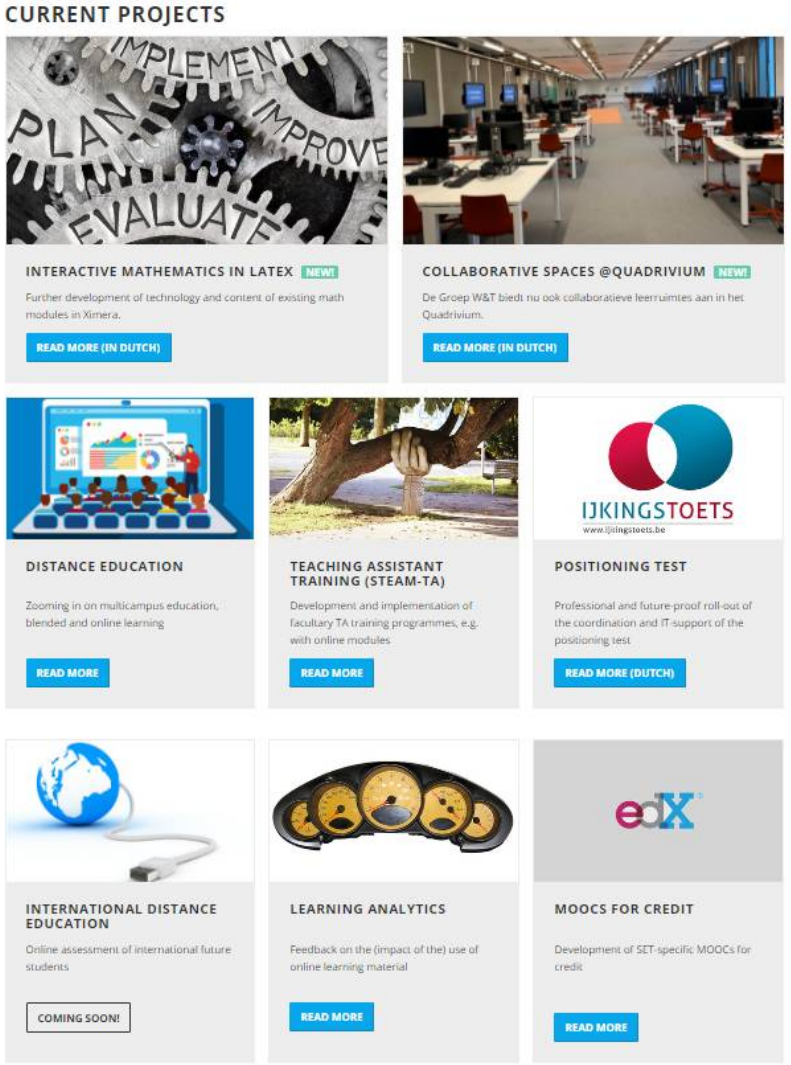
Will you keep offering more practice-oriented formats (exercise sessions, labs, presentations) through distance education in the future?

1. Extremely unlikely
2. Unlikely
3. Neutral
4. Likely
5. Extremely likely

Education Innovation SET

“Five faculties of the Group of Science, Engineering and Technology combine forces to give several educational innovation themes a boost.”

https://set.kuleuven.be/en/education/innovation



Background

Distance education is a challenge in the SET Group:

- Ba and Ma programmes in eleven campuses spread over Flanders
- Rollout SET Master of Educational Studies
- Switch to distance education due to COVID-19

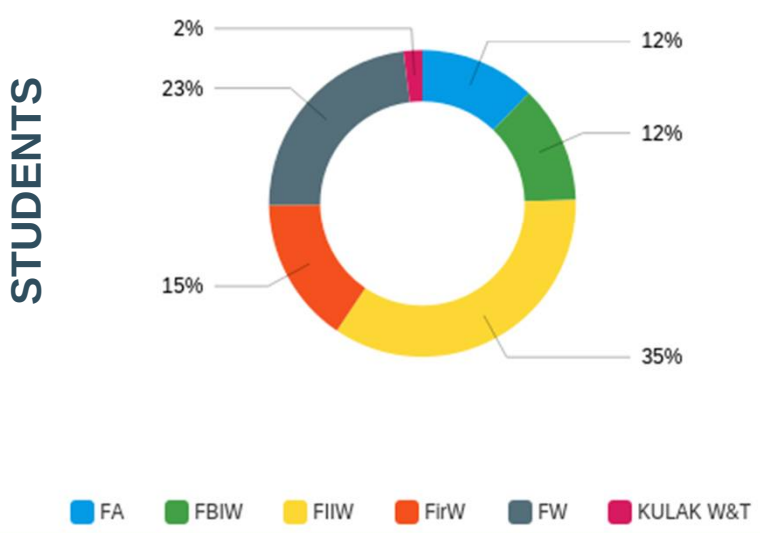
Goals & Approach

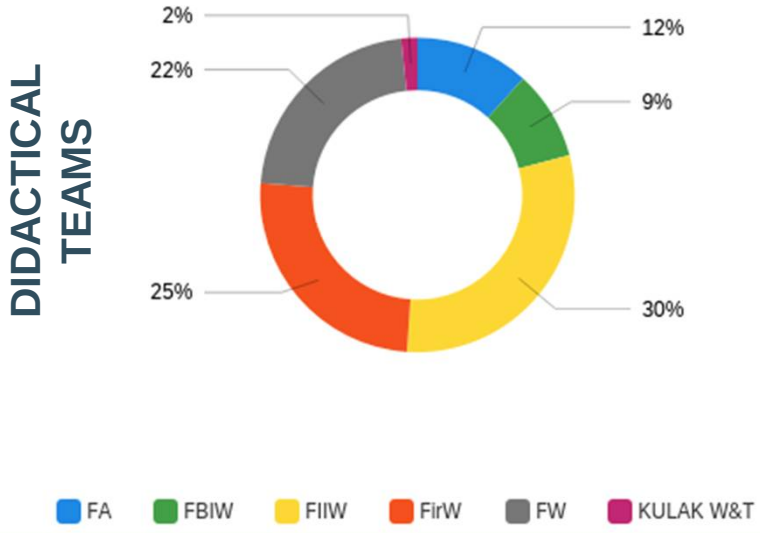
- Distance education in the multicampus context of the SET Group in **a blended learning format** facilitated by technology

- **Phase 1** → **Analysis** of the current SET Group educational context/needs through surveys and focus groups
- **Phase 2** → **Development of a framework for teachers** to help them design pedagogically and didactically sound courses using distance education
- **Phase 3** → Implementing and evaluating this framework through **pilot cases**
- **Phase 4** → Develop the **professional capacity** for distance education on all campuses of the SET Group

Survey students & didactical teams SET

- **Students:** May - July 2020, ± 5250 resp. (>25%)
- **Didactical teams:** July - August 2020, ± 510 resp. (>25%)
- **Goal:** Distance education in the past, present and future





Results – Distance Education during Covid

*How was **theory** offered?*

Did it help to achieve the learning goals of the course?

		STUDENTS	DIDACTICAL TEAMS
		EFFICIENCY	
TOP 3	1. Recordings	77%	87%
	2. Live lecture	65%	85%
	3. Self-study package on Toledo	28%	87%

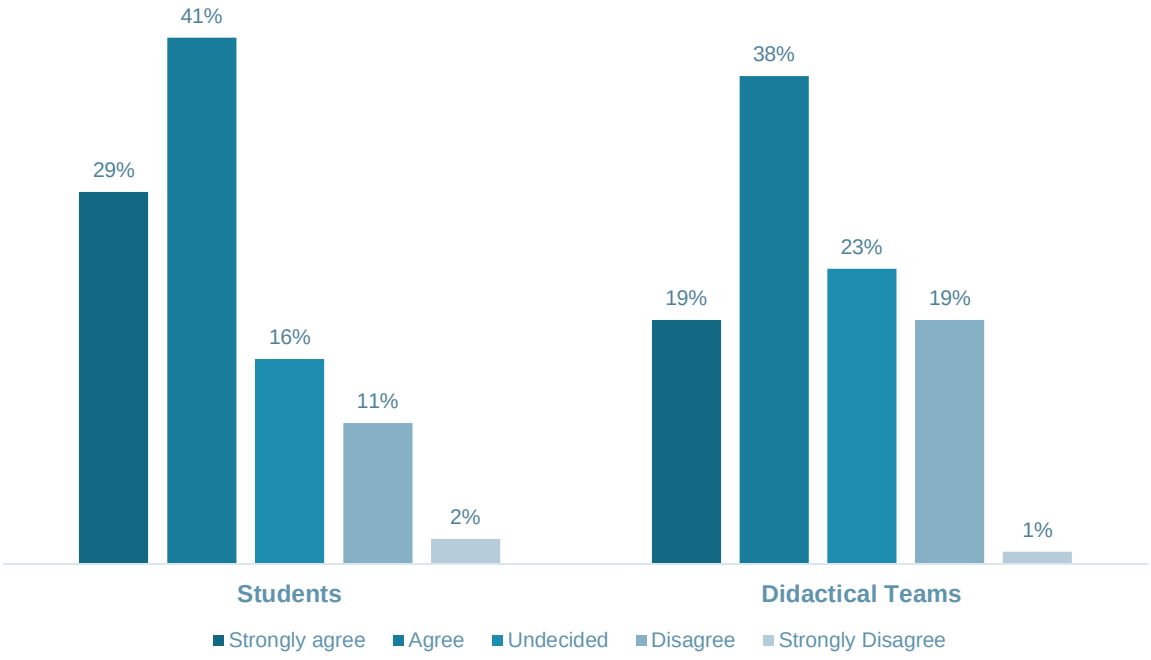
Results – Distance Education during Covid

*How were **exercise sessions, labs, presentations …*** **(other teaching formats)** offered*? Did they help to achieve the learning goals of the course?*

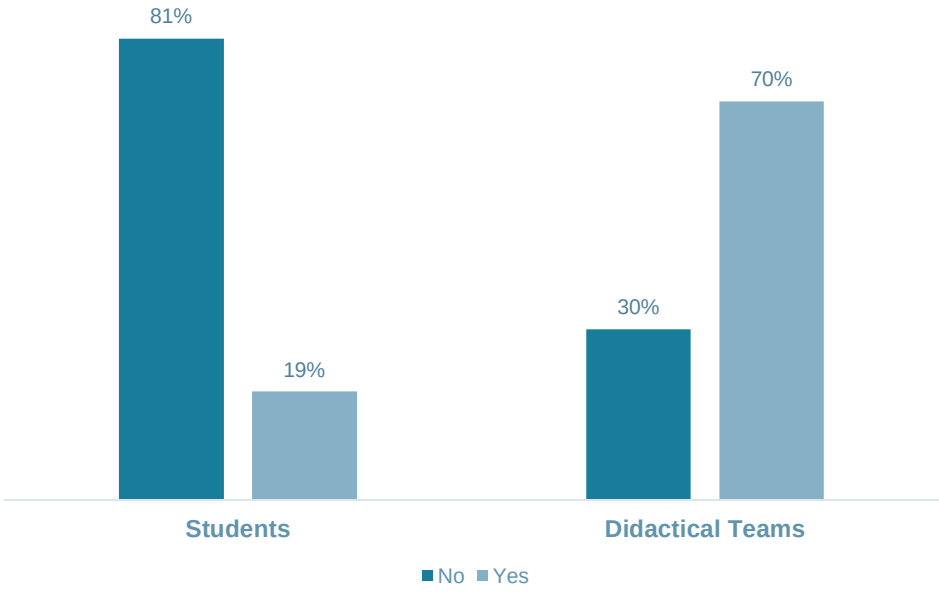
		STUDENTS	DIDACTICAL TEAMS
		EFFICIENCY	
TOP 3	1. Replacement Toledo assignement	55%	84%
	2. Live exercise session	55%	79%
	3. Live presentation	62%	82%

Results – Distance Education during Covid

More **need for feedback** during distance education compared to face-face education?



Did you also **receive/provide** this extra feedback?



Results – Distance Education during Covid

*What did you **like or dislike** about distance education?*

	STUDENTS	DIDACTICAL TEAMS
POSITIVE	1. Working at my own pace	1. No/reduced travel
	2. No/reduced travel	2. Experience with digital tools
	3. Apply my own structure	3. Experience with course design
NEGATIVE	1. Missing fellow students	1. Missing students
	2. Too much time behind a screen	2. Missing colleagues
	3. Missing didactical teams	3. Too much time behind a screen

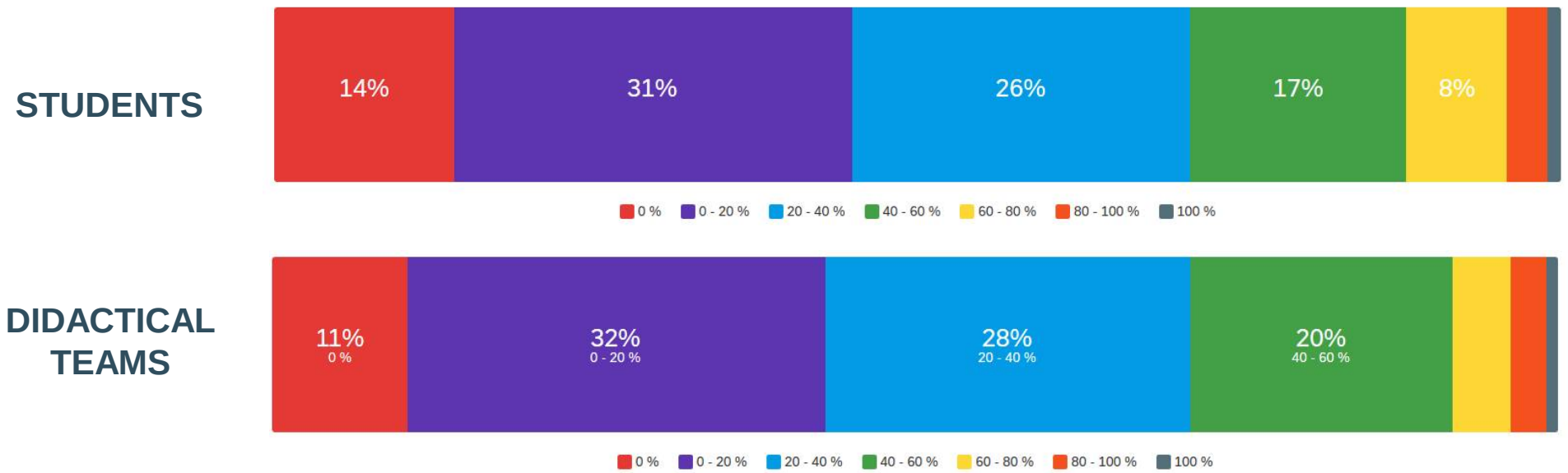
Results – Distance Education in the future

*Which **learning activities** and **formats** would you like to continue through distance education in the future?*

	STUDENTS	DIDACTICAL TEAMS
Learning activities	▪ Theory	▪ Theory ▪ Self-study
Formats	▪ Recorded lectures ▪ Feedback & communication using live question time – mail – discussion board	▪ Recorded lectures ▪ Self-study packages ▪ Assignments on Toledo ▪ Feedback & communication using live question time & mail

Results – Distance Education in the future

*What **percentage** of the total number of contact hours would you ideally like to spend on distance education in non-corona times?*



Focus groups with students

- Distance Education is here to stay → How to efficiently organise + optimise it?
- Quantitative data → Qualitative data
- In collaboration with COBRA + own initiatives
- Topics: - Theory through video
  - Self-study & learning activities
  - Feedback & communication
  - Other formats (or parts of them)


RESEARCH DATA PHASE 1
DEVELOP DISTANCE EDUCATION 2.0
FOR SET
33
%
33%
SUSTAINABILITY
421 644 561

	THEORY	OTHER FORMATS	COMMUNICATION	INTERACTION	ORGANISATION	EVALUATION	FEEDBACK	LEARN - TEACH	WELL-BEING	TOOLS & TECH	SUPPORT
Data (survey –focus groups)											
Results											
Lessons learned											
↕ **Literature**											
PED-DID support needed											
TECH support needed											
Good practices											
Differences (fac. – stages – roles)											

THEORY	OTHER FORMATS	COMMUNICATION	INTERACTION	ORGANISATION	EVALUATION	FEEDBACK	LEARN - TEACH	WELL-BEING	TOOLS & TECH	SUPPORT

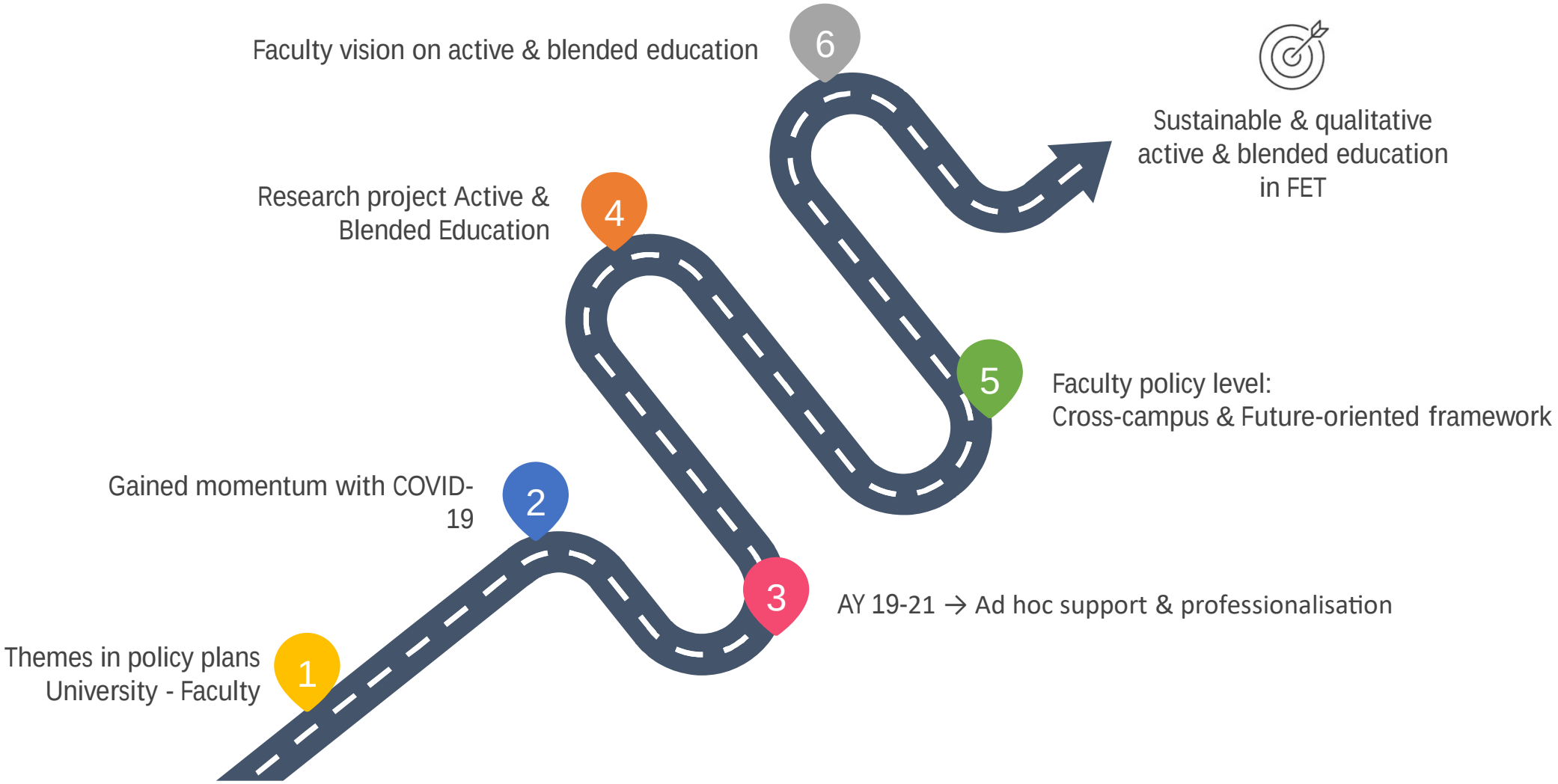
THEMATICAL DOMAINS

- **Theory:** How was theory offered online?
- **Other formats:** How were the more practice-oriented formats (exercise sessions, labs, presentations, …) offered online?
- **Communication:** How did both parties communicate online with each other and among themselves?
- **Interaction:** How was interaction and interactivity in online moments facilitated?
- **Organisation:** How was DE organised on a course, programme and faculty level?
- **Evaluation:** How was the evaluation organised?
- **Feedback:** How did students receive feedback on their learning and working?
- **Learn - Teach:** How did DE impact the learning – teaching processes of both parties?
- **Well-being:** Which impact did DE have on the well-being of both parties?
- **Tools & Tech:** Which digital tools and technologies were used and why?
- **Support:** How and in which format were both parties ped – did – tech supported during this period of DE?

	THEORY	OTHER FORMATS	COMMUNICATION	INTERACTION	ORGANISATION	EVALUATION	FEEDBACK	LEARN - TEACH	WELL-BEING	TOOLS & TECH	SUPPORT
Data (survey –focus groups)											
Results											
Lessons learned											
↕ **Literature**											
PED-DID support needed											
TECH support needed											
Good practices											
Differences (fac. – stages – roles)											

Data (survey –focus groups)	Available data from surveys and focus groups on this topic?
Results	What does the analysis of this data tell us about this topic?
Lessons learned	Which lessons can we learn from this for the future of DE in the SET Group?
↕ **Literature**	How do these relate to literature on this topic?
PED-DID support needed	Which pedagogical – didactical support is needed to optimise this aspect?
TECH support needed	Which technological support and digital tools are needed to facilitate this aspect?
Good practices	Are there SET examples of good practices of this aspect?
Differences (fac. – stages – roles)	Which differences (between faculties – stages – roles) need to be taken into account?

Faculty vision on active & blended education



Vision on active & blended education

GOAL

- Framework with cross-campus agreements on active & blended education
- Suggestions on how these could be realised and supported

KU Leuven Learning Lab – Blended learning in your programme

PER AGREEMENT

Background

Intended added value

Faculty elaboration

Actors & processes

Challenges

Momentum (Covid 19) → Qualitative & Sustainable (°Faculty Vision) → Implementation

Multi-campus

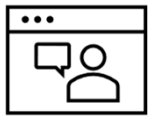
Practice-oriented

Supporting our staff

Learning process student

Role of the campus?

New version LMS



Recordings?

Innovation fatigue/shift


WE WANT
YOUR
FEEDBACK

Pedagocial - didactical support?

Organisational changes?

Good practices?

Digital tools?

????????

WHAT DO **YOU** NEED TO DESIGN OR SUPPORT COURSES FOR DISTANCE EDUCATION IN A BLENDED LEARNING FORMAT?

Online support materials?

Hardware & facilities?

Technological support?

Policy changes?

Personalised training?

KU LEUVEN

Stuvo

SMART PL

101082928 — SMART-PL ERASMUS-EDU-2022-CBHE-STRAND-2

Individualized learning at Stuvo KU Leuven

Ghent, campus Rabot

Co-funded by the European Union

Stuvo KU Leuven

Individualized learning at KU Leuven

Faculty of Engineering Technology

Academic adviser

→ Advice regarding the Individual Study Programme

Tutorial services

→ Subject-related guidance

→ Guidance study method (students 1st bachelor and bridging students)

Student services (STUVO)

- Housing, food & transport
- Money matters & living costs
- Student counselling
- Welcome activities & meeting people
- Health & well-being
- Working, volunteering & career
- Religion, inclusion & diversity

Individualized learning at KU Leuven

Faculty of Engineering Technology

Academic adviser

→ Advice regaring the Individual Study Programme

Tutorial services

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- Housing, food & transport
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- Working, volunteering & career
- Religion, inclusion & diversity

Individualized learning at KU Leuven during study career

Individualized learning at KU Leuven

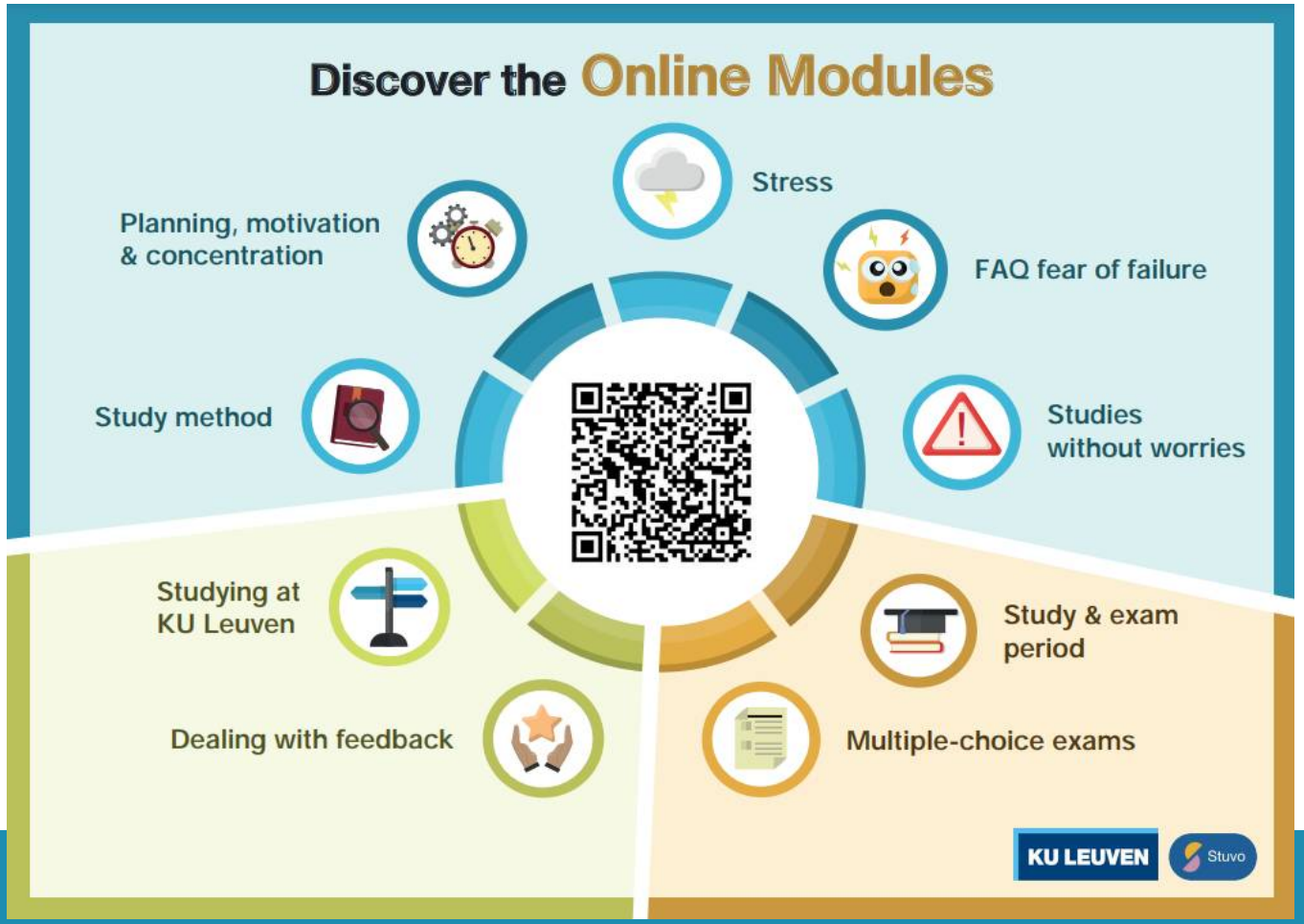
	Inflow	Troughflow	Outflow
Student counseling	Info & advice	Info & advice	Advice regarding additional studies
Support for students with disability	Info & advice	• Point of contact • Disability student status • Education and exam accomodations • Advice student exchange (e.g. Erasmus)	To the labor market with a disability
Student career center		Study-related student job	Career coaching, Screening CV and motivation letter
Social services	Info & advice	Worries or questions about study costs	

Student counseling

Inflow	Throughflow	Outflow
- Info, advice and study choice guidance through counseling, info fairs, … - Student choice test (Luci.be)	- Online modules - Info sessions, workshops and trainings - Individual counseling: psychologist and study coaching	- Advice regarding additional studies

Online modules

- Several themes
- At your own pace
- Independent of time and place



Planning, motivation & concentration

Start

41

Planning, motivation & concentration


INTRODUCTION


SETTING GOALS


TIMEKEEPING AND PRIORITISING


PLANNING


CONCENTRATION

MOTIVATION


SELF-CONTROL


CONTACT AND FEEDBACK

Planning, motivation & concentration

- Introduction 1
- Setting goals 4
  - Setting goals ✓
  - Dividing goals into sub-goals
  - Analysing your own goals
  - SMART?
  - Reflection
- Timekeeping and prioritising 5
  - Timekeeping or registration
  - Looking back at your time registration
  - Pie chart
  - Prioritise
  - Reflection
- Planning 5
- Concentration 8
- Motivation 7
- Self-control 7
- Contact & feedback 2

Setting goals

A first step in time management

Before you start working with concrete planning tools, it is important to **focus on your goals**. When you have a goal in mind, it is easier to focus. Writing down your goals can help you to map them out clearly and to see how you can achieve them. In moments of doubt, goals help you to stay **motivated**.

For the exercise below, it may help to divide your goals into short-term goals (days and weeks) and long-term goals (months and years), but it is not necessary to do so.

Exercise

Write down three goals you want to achieve in the next three to five years.

1. Make sure these goals align with what you really want.
2. Dare to dream.
3. Dream big and then be realistic.

Info sessions, workshops and trainings

- Several themes:
  - Time management
  - Concentration & motivation
  - Writing a master thesis
  - ….

Workshops & training

KU Leuven Stuvo workshops, training, info sessions and events.

Calendar 2022-2023

Month	Title	Where?	For whom?
May			
15/05/2023	Breaking bad habits	Leuven	All campuses
Continuously			
Ask the job coach		Online	All campuses

Individual counseling

- Study coaching
  = Individual coaching (planning & motivation, master thesis, study skills,...)

- Psychologist
  = Possible referral to external care givers

Support for students with disability

Inflow	Throughflow	Outflow
Info & advice	- Point of contact - Disability student status - Education and exam accommodations - Advice student exchange (e.g. Erasmus)	- To the labor market with a disability (infosessions and counseling)

Support for students with disability

- Disability student status
  - Based on a diagnosis, medical documentation and an assessment interview
  - During the assessment interview, the disability officer will go into the specific strengths, difficulties and needs of the student
  - Dissability officer as point of contact during the study career of the student

- Education and exam accommodations
  - Based on specific needs of the student with disability
  - E.g. education accommodations: permission to make audio recordings during class, use of reading software, ...
  - E.g. exam accommodations: extend examination time, reschedule exams,...

Student career center

Inflow	Throughflow	Outflow
	- Study-related student job - Screening CV and motivation letter	- Career coaching, Screening CV and motivation letter - Career test (Career Compass) - Platform vacancies (KU Leuven Career Zone)

Social services

- Worries or questions about study costs
- Unclear what is expected when a student receives letters or bills from tax authorities, electricity company, etc.
- We want to be a 'steppingstone' where a student can ask any question of a practical, legal or financial nature related to his stay as a student.

KU LEUVEN

101082928 — SMART-PL ERASMUS-EDU-2022-CBHE-STRAND-2

SMART PL

Monitoraat
Study support

Co-funded by the European Union

Faculty of Engineering Technology

Pauline Deltour

1. Monitoraat: study support for starting students
2. Adaptive remediation for mathematics for starting students

First year, a transition year

- New city
- New packages
- New friends
- New way of examination
- …..

➔ A lot of new things….. So students can count on extra support

Monitoraat

Dimitri Coppens

Pauline Deltour

Febe Beirnaert

Monitoraat

Study support for first year students:

- How to study
- How to plan
- …

- But also with mathematics, chemistry, physics….

Monitoraat

Study support for first year students:

- How to study
- How to plan
- …

- But also with mathematics, chemistry, physics….

Multilayered support offer

- 1. the open door

Multilayered support offer

1. the open door
2. Individual questions with or without appointment

Multilayered support offer

1. the open door
2. Individual questions with or without appointment
3. Weekly appointments
    - small tests
    - following up of their planning
    - …

Multilayered support offer

1. the open door
2. Individual questions with or without appointment
3. Weekly appointments
4. Group sessions ‘excercises with support’

    Students free to work on any course

    tutors available to ask questions

Multilayered support offer

1. the open door
2. Individual questions with or without appointment
3. Weekly appointments
4. Group sessions ‘excercises with support’

   Students free to work on any course

   tutors available to ask questions
5. Workshops study method and time management

Lowering the barrier

Lowering the barrier

1. Open door: welcome without appointment

2. Invest in connection with our students
   - Work sessions with excercises
   - Student welcome days

3. Indiviuals questions but in group offer

Adaptive remediation for mathematics for starting students

Adaptive learning path mathematics

Most adaptive learning paths

Another part

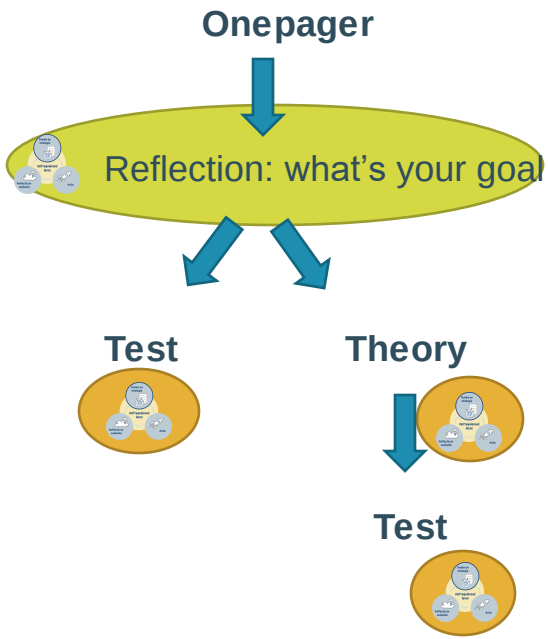
More questions
Questions of other level
…

FIIW learning path

Students take their optimized learning path guided by reflection questions

➔ To stimulate self regulated learning

Adaptive learning path mathematics



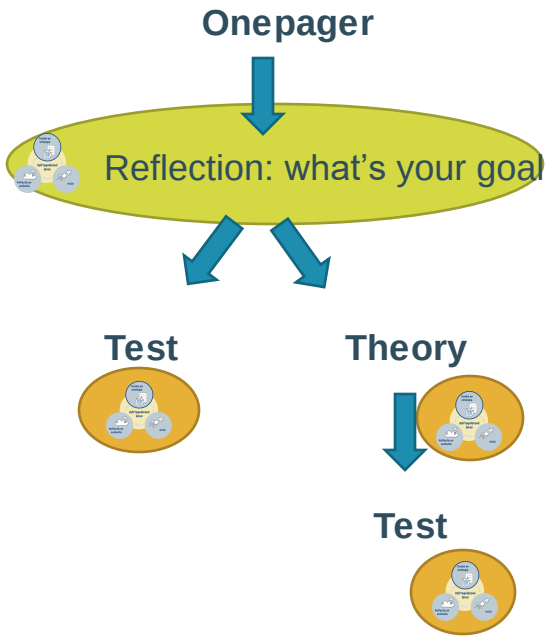
Invitation to think about their learning proces:
- What goes wel
- What could go better

FIIW learning path

Students take their optimized learning path guided by reflection questions

➔ To stimulate self regulated learning

Adaptive learning path mathematics



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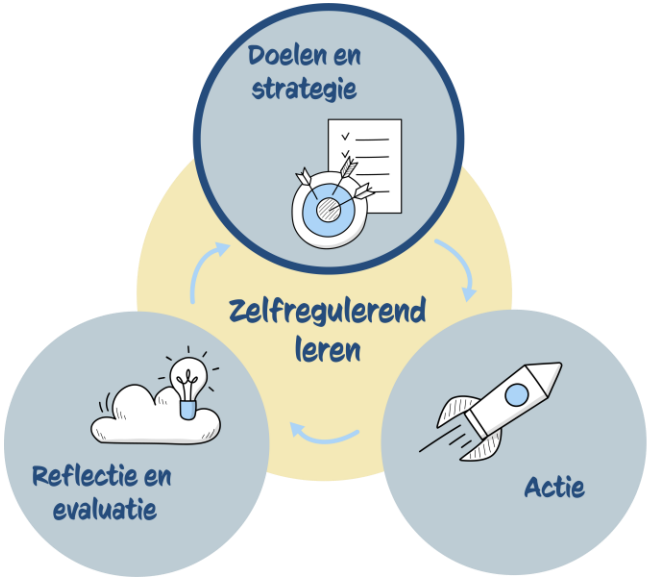
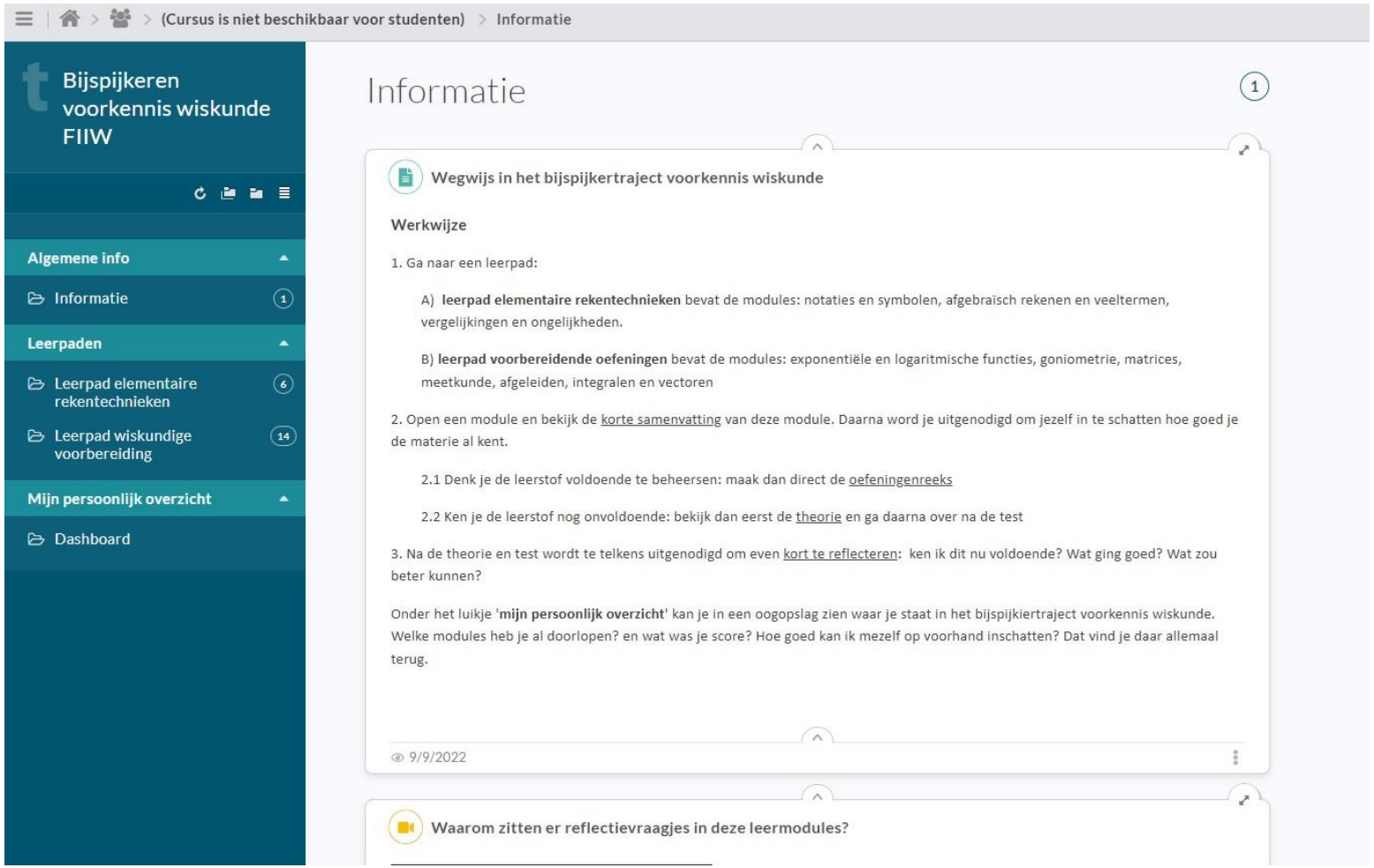
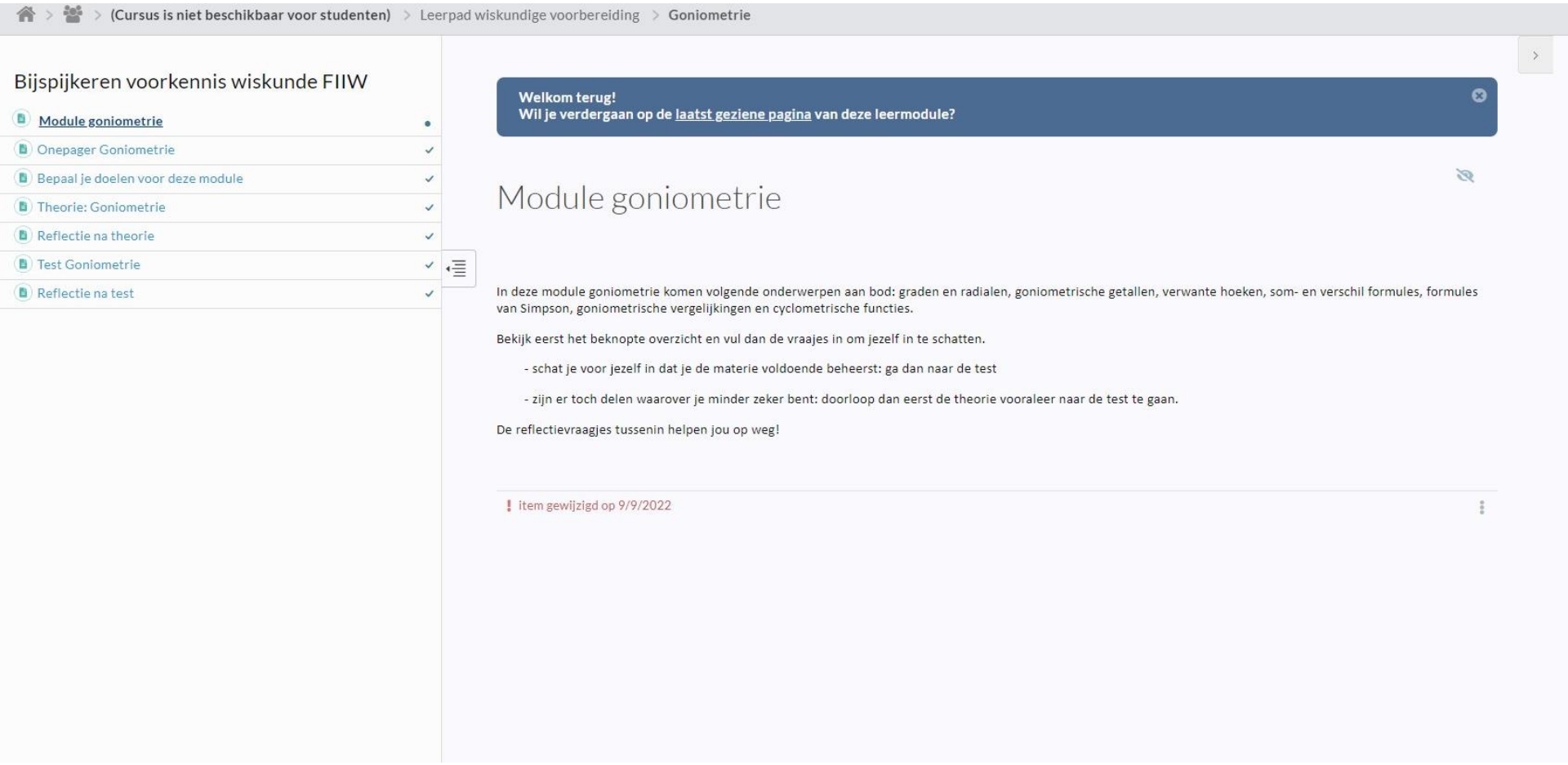


- Zimmerman (2008) Investigatin self-regulation and motivation: histrical backgroud, methodological developments, end future prospects. American Educational research journal, 45:1, p166-183
- Schmitz, B. and Wiese, B.S. (2006) New perspectives for the evaluation of training sessions in self-regulated learning: time-series analyses of diary data. Contemporary Educational Psychology, 31, p64-96

Demonstration learning path FIIW




(Cursus is niet beschikbaar voor studenten)
Leerpad wiskundige voorbereiding
Goniometrie
Bijspijkeren voorkennis wiskunde FIIW
Module goniometrie
Onepager Goniometrie
Bepaal je doelen voor deze module
Theorie: Goniometrie
Reflectie na theorie
Test Goniometrie
Reflectie na test
Welkom terug!
Wil je verdergaan op de laatst geziene pagina van deze leermodule?
Module goniometrie
In deze module goniometrie komen volgende onderwerpen aan bod: graden en radialen, goniometrische getallen, verwante hoeken, som- en verschil formules, formules van Simpson, goniometrische vergelijkingen en cyclometrische functies.
Bekijk eerst het beknopte overzicht en vul dan de vraajes in om jezelf in te schatten.
- schat je voor jezelf in dat je de materie voldoende beheerst: ga dan naar de test
- zijn er toch delen waarover je minder zeker bent: doorloop dan eerst de theorie vooraleer naar de test te gaan.
De reflectievraagjes tussenin helpen jou op weg!
item gewijzigd op 9/9/2022

- Reflectie na theorie ✓
- Test Goniometrie ✓
- Reflectie na test ✓

goniometrie_pdf(3).pdf 1 / 1 94%

Goniometrie

Graden en radialen

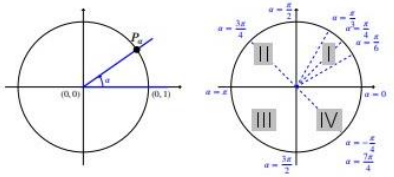
Hoeken kunnen uitgedrukt worden in zowel radialen (**rad**) als graden (°).

Je kan de omzetting tussen graden en radialen maken met behulp van *de regel van drie*. Je vertrekt van het feit dat 360° gelijk is aan 2π radialen, berekent dan hoeveel radialen één graad is, en daarna hoeveel radialen bijvoorbeeld 7 graden zijn. Dezelfde redenering werkt voor de omrekening van radialen naar graden.

- 360° meet 2π rad $\Rightarrow$ 1° komt overeen met $\frac{\pi}{180}$ rad $\Rightarrow$ 7° is gelijk aan $\frac{7\pi}{180}$ rad.
- 2π rad meet 360° $\Rightarrow$ π rad komt overeen met 180° $\Rightarrow$ $\frac{5}{4}\pi$ rad is $\frac{5}{4} \cdot 180° = 225°$.

Goniometrische cirkel

De **goniometrische cirkel** is de cirkel met straal 1 en centrum in de oorsprong.
Met elke georiënteerde hoek α komt een uniek **beeldpunt** P_α van de goniometrische cirkel overeen (en vice versa)



Als P_α het punt is op de goniometrische cirkel dat hoort bij een hoek α, dan is de **cosinus** van de hoek α per definitie de x-coördinaat van het punt P_α, en de **sinus** van de hoek α per definitie de y-coördinaat van het punt P_α:

$$P_\alpha = (\cos\alpha, \sin\alpha)$$

De goniometrische cirkel wordt verdeeld in vier **kwadranten**, die vanaf rechtsboven tegen de klok in genummerd worden met Romeinse cijfers I, II, III, IV zoals op de figuur hierboven.

De **Hoofdformule van de goniometrie** stelt dat voor elke hoek α geldt:

$$\cos^2\alpha + \sin^2\alpha = 1$$

Formules

- **Som- en verschilformules (en varianten):**

$\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$ $\quad$ $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$
$\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$ $\quad$ $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$

$\sin 2\alpha = 2\sin\alpha\cos\alpha$ $\quad$ $\sin\alpha = 2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}$
$\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$ $\quad$ $\cos\alpha = \cos^2\frac{\alpha}{2} - \sin^2\frac{\alpha}{2}$
$\cos 2\alpha = \frac{1-\tan^2\alpha}{1+\tan^2\alpha}$ $\quad$ $\cos\alpha = \frac{1-\tan^2\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}}$
$\sin 2\alpha = \frac{2\tan\alpha}{1+\tan^2\alpha}$ $\quad$ $\sin\alpha = \frac{2\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}}$
$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$ $\quad$ $\tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}}$

- **Formules van Simpson:**

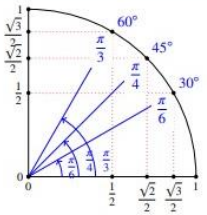
$\sin\alpha + \sin\beta = 2\sin\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$ $\quad$ $\sin\alpha - \sin\beta = 2\sin\frac{\alpha-\beta}{2}\cos\frac{\alpha+\beta}{2}$
$\cos\alpha + \cos\beta = 2\cos\frac{\alpha+\beta}{2}\cos\frac{\alpha-\beta}{2}$ $\quad$ $\cos\alpha - \cos\beta = -2\sin\frac{\alpha+\beta}{2}\sin\frac{\alpha-\beta}{2}$

- **Verwante hoeken:**

$\cos\alpha = \cos(-\alpha) = -\cos(\pi-\alpha) = -\cos(\pi+\alpha)$
$= \sin(\frac{\pi}{2}-\alpha) = \sin(\frac{\pi}{2}+\alpha)$
$= -\sin(-\frac{\pi}{2}-\alpha) = -\sin(\alpha-\frac{\pi}{2})$
$\sin\alpha = -\sin(-\alpha) = \sin(\pi-\alpha) = -\sin(\pi+\alpha)$
$= \cos(\frac{\pi}{2}-\alpha) = -\cos(\frac{\pi}{2}+\alpha)$
$= -\cos(-\frac{\pi}{2}-\alpha) = \cos(\alpha-\frac{\pi}{2})$

Standaardhoeken

α	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin\alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos\alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan\alpha$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	/



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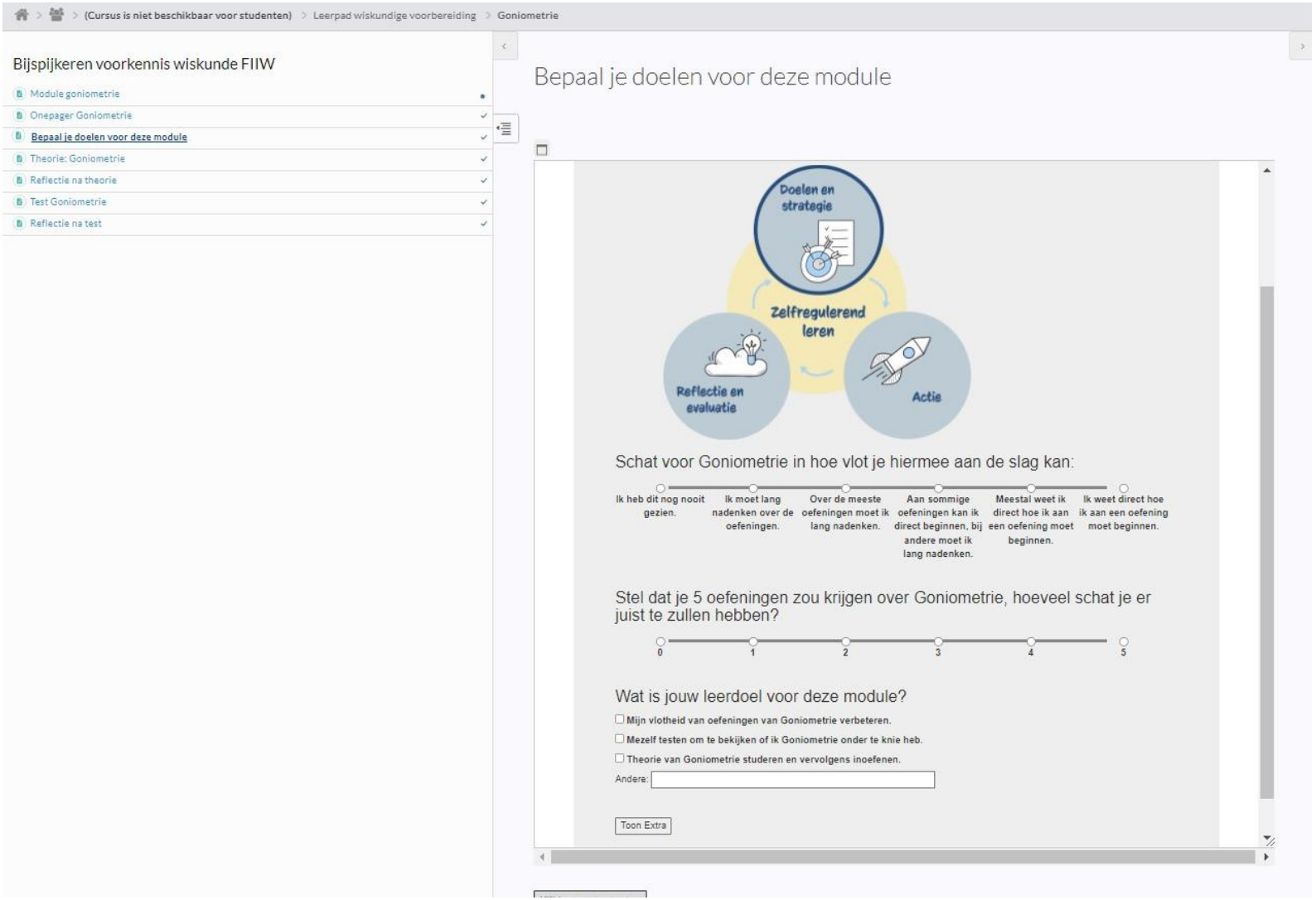
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Reflectie na theorie
Test Goniometrie
Reflectie na test
Bepaal je doelen voor deze module
Doelen en strategie
Zelfregulerend leren
Reflectie en evaluatie
Actie
Schat voor Goniometrie in hoe vlot je hiermee aan de slag kan:
Ik heb dit nog nooit gezien.
Ik moet lang nadenken over de oefeningen.
Over de meeste oefeningen moet ik lang nadenken.
Aan sommige oefeningen kan ik direct beginnen, bij andere moet ik lang nadenken.
Meestal weet ik direct hoe ik aan een oefening moet beginnen.
Ik weet direct hoe ik aan een oefening moet beginnen.
Stel dat je 5 oefeningen zou krijgen over Goniometrie, hoeveel schat je er juist te zullen hebben?
0
1
2
3
4
5
Wat is jouw leerdoel voor deze module?
Mijn vlotheid van oefeningen van Goniometrie verbeteren.
Mezelf testen om te bekijken of ik Goniometrie onder te knie heb.
Theorie van Goniometrie studeren en vervolgens inoefenen.
Andere:
Toon Extra

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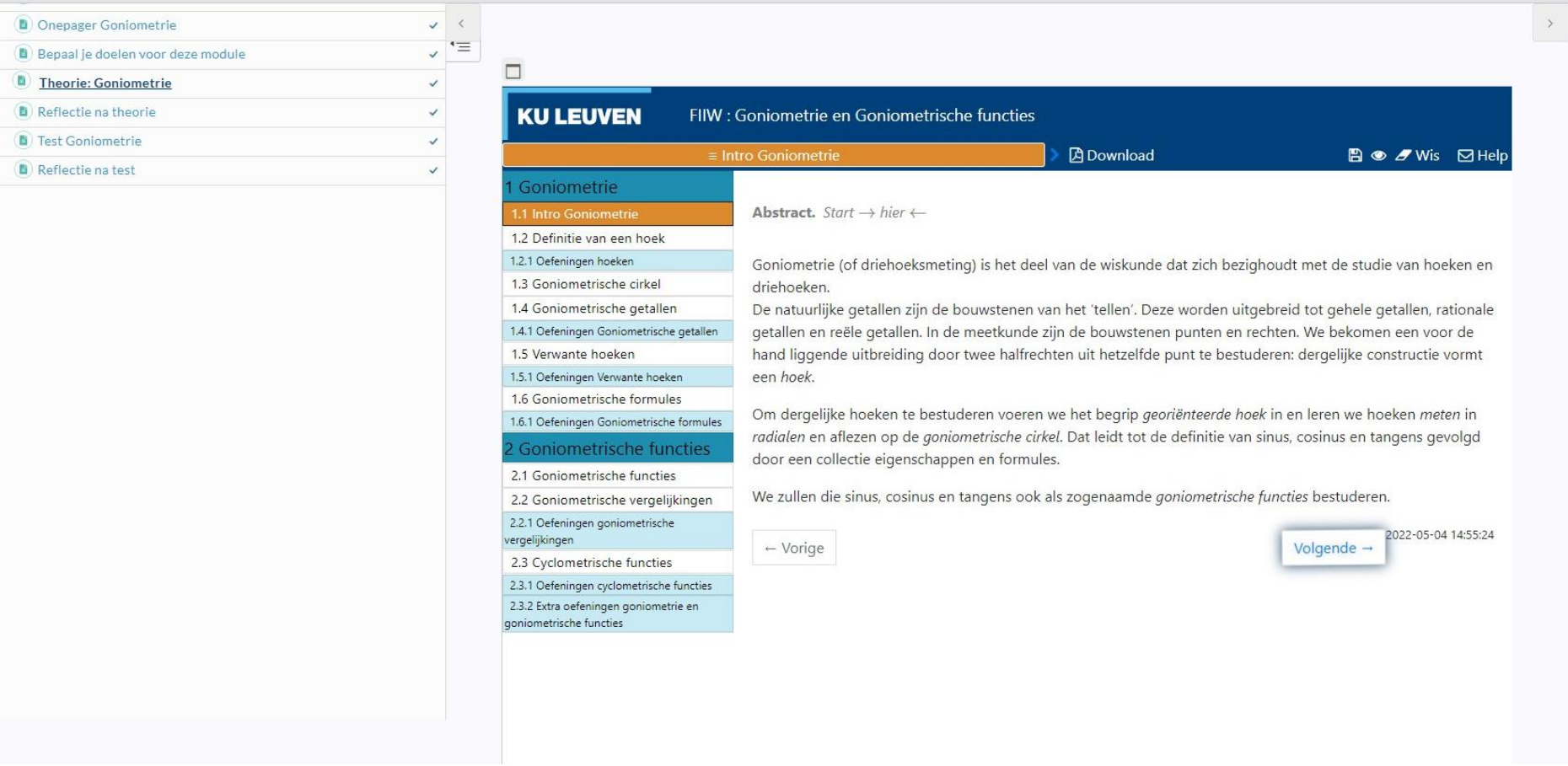
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KU LEUVEN
FIIW : Goniometrie en Goniometrische functies
≡ Intro Goniometrie
Download
Wis
Help
1 Goniometrie
1.1 Intro Goniometrie
1.2 Definitie van een hoek
1.2.1 Oefeningen hoeken
1.3 Goniometrische cirkel
1.4 Goniometrische getallen
1.4.1 Oefeningen Goniometrische getallen
1.5 Verwante hoeken
1.5.1 Oefeningen Verwante hoeken
1.6 Goniometrische formules
1.6.1 Oefeningen Goniometrische formules
2 Goniometrische functies
2.1 Goniometrische functies
2.2 Goniometrische vergelijkingen
2.2.1 Oefeningen goniometrische vergelijkingen
2.3 Cyclometrische functies
2.3.1 Oefeningen cyclometrische functies
2.3.2 Extra oefeningen goniometrie en goniometrische functies
Abstract. Start → hier ←
Goniometrie (of driehoeksmeting) is het deel van de wiskunde dat zich bezighoudt met de studie van hoeken en driehoeken.
De natuurlijke getallen zijn de bouwstenen van het 'tellen'. Deze worden uitgebreid tot gehele getallen, rationale getallen en reële getallen. In de meetkunde zijn de bouwstenen punten en rechten. We bekomen een voor de hand liggende uitbreiding door twee halfrechten uit hetzelfde punt te bestuderen: dergelijke constructie vormt een hoek.
Om dergelijke hoeken te bestuderen voeren we het begrip georiënteerde hoek in en leren we hoeken meten in radialen en aflezen op de goniometrische cirkel. Dat leidt tot de definitie van sinus, cosinus en tangens gevolgd door een collectie eigenschappen en formules.
We zullen die sinus, cosinus en tangens ook als zogenaamde goniometrische functies bestuderen.
← Vorige
Volgende →
2022-05-04 14:55:24

KU LEUVEN FIIW : Goniometrie en Goniometrische functies

≡ Goniometrische getallen | Download | Wis | Help

1 Goniometrie
1.1 Intro Goniometrie
1.2 Definitie van een hoek
1.2.1 Oefeningen hoeken
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Abstract. *sinus, cosinus, tangens en cotangens*

Door een georiënteerde hoek op de goniometrische cirkel te plaatsen bekomen we een punt op die cirkel, en dergelijk punt heeft x en y coördinaten. Deze coördinaten zijn per definitie de cosinus en de sinus van die hoek. We zullen verder zien dat wegens de stelling van Pythagoras deze definitie overeenkomt met de mogelijk meer vertrouwde definities met aanliggende en overstaande zijden in een driehoek.

Definitie 1. Als P_α het punt is op de goniometrische cirkel dat hoort bij een hoek α, dan is de **cosinus** van de hoek α per definitie de x-coördinaat van het punt P_α, en

de **sinus** van de hoek α per definitie de y-coördinaat van het punt P_α:

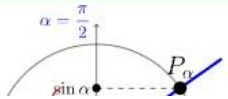
$$P_\alpha = (\cos\alpha, \sin\alpha)$$

Per definitie is ook

$$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} \quad \text{(tangens)} \qquad \sec\alpha = \frac{1}{\cos\alpha} \quad \text{(secans)}$$

$$\cot\alpha = \frac{1}{\tan\alpha} = \frac{\cos\alpha}{\sin\alpha} \quad \text{(cotangens)} \qquad \csc\alpha = \frac{1}{\sin\alpha} \quad \text{(cosecans)}$$

We noemen de $\sin, \cos, \tan, \cot, \sec, \csc$ de **goniometrische getallen** van een hoek.



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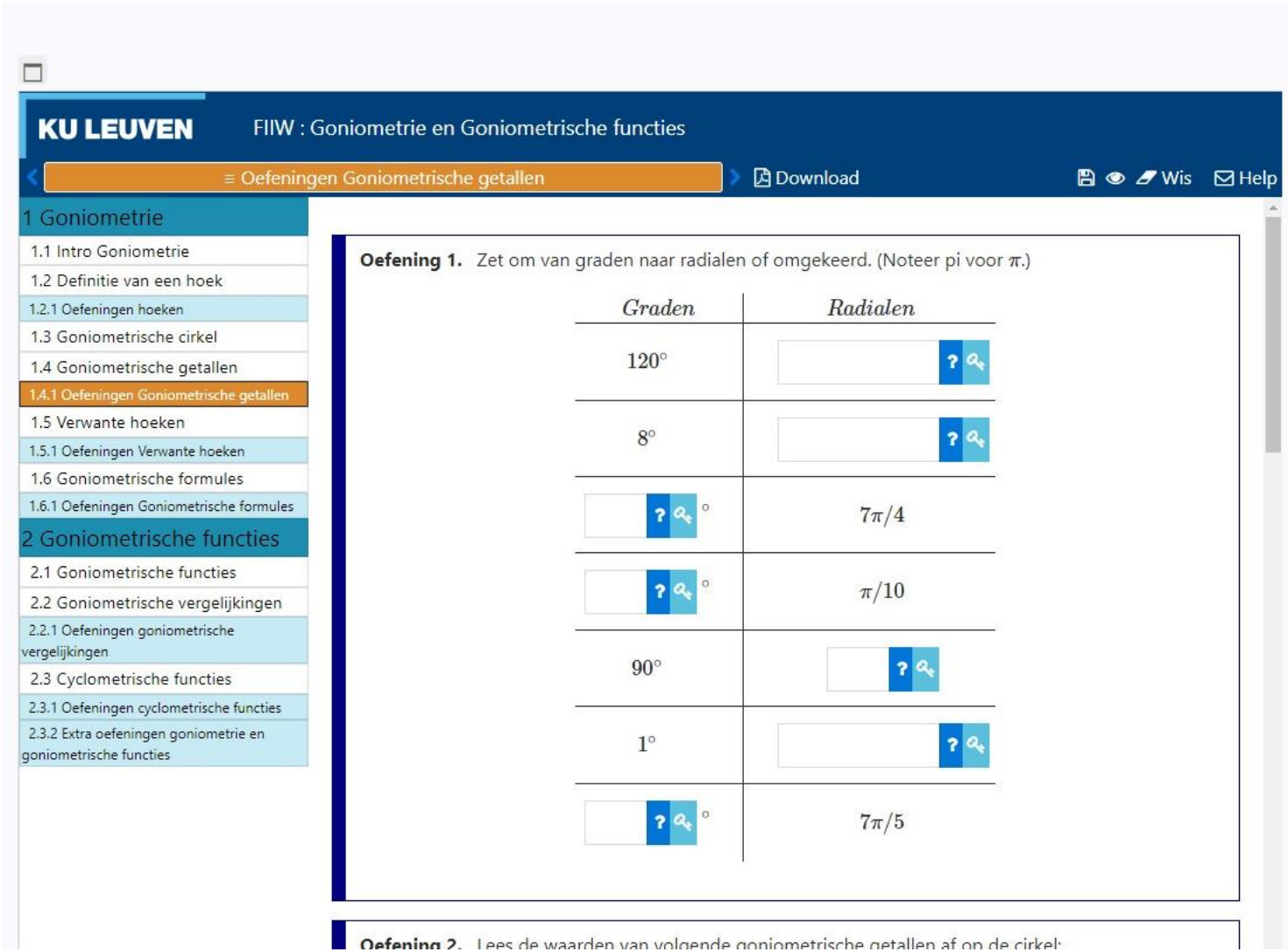
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FIIW : Goniometrie en Goniometrische functies
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2.3.1 Oefeningen cyclometrische functies
2.3.2 Extra oefeningen goniometrie en goniometrische functies
Oefening 1. Zet om van graden naar radialen of omgekeerd. (Noteer pi voor π.)
Graden
Radialen
120°
8°
°
7π/4
°
π/10
90°
1°
°
7π/5
Oefening 2. Lees de waarden van volgende goniometrische getallen af op de cirkel:

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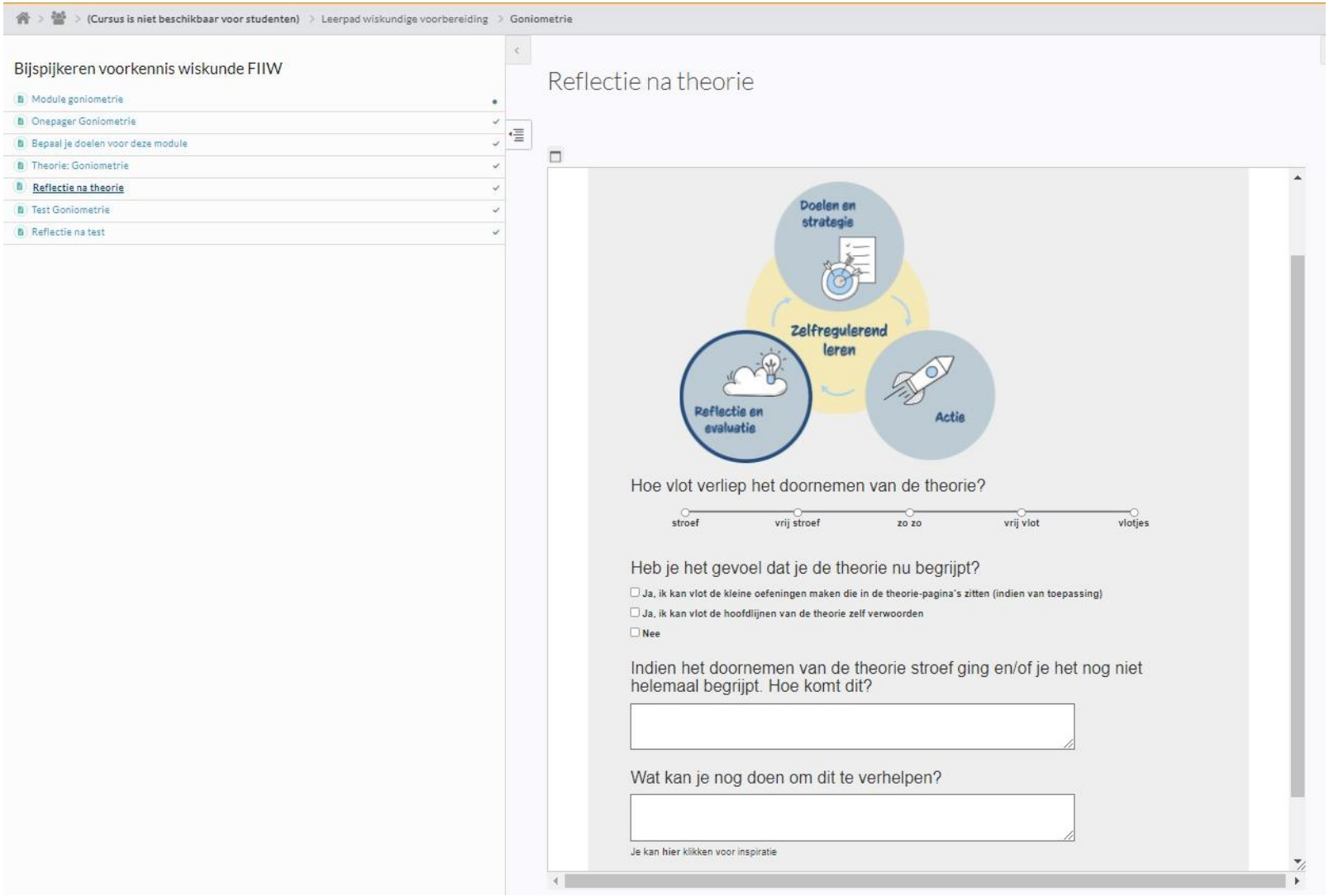
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Reflectie na theorie
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Zelfregulerend leren
Reflectie en evaluatie
Actie
Hoe vlot verliep het doornemen van de theorie?
stroef
vrij stroef
zo zo
vrij vlot
vlotjes
Heb je het gevoel dat je de theorie nu begrijpt?
Ja, ik kan vlot de kleine oefeningen maken die in de theorie-pagina's zitten (indien van toepassing)
Ja, ik kan vlot de hoofdlijnen van de theorie zelf verwoorden
Nee
Indien het doornemen van de theorie stroef ging en/of je het nog niet helemaal begrijpt. Hoe komt dit?
Wat kan je nog doen om dit te verhelpen?
Je kan hier klikken voor inspiratie

KU LEUVEN

Wat kan je nog doen om dit te verhelpen?

Je kan **hier** klikken voor inspiratie

Studiemethode

1. Actief studeren:

   Actief studeren heeft alles te maken met **hoe je studeert**. Je werkt met aandacht, je voelt je emotioneel betrokken bij de leerstof. Actief studeren betekent dat je **nadenkt over de leerstof**, je jezelf veel vragen stelt en antwoorden zoekt. Je zet je hersenen echt aan het werk. Je doet dus veel meer dan lezen alleen, hier en daar wat tekst overschrijven, of passief een videoles bekijken.

   - Maak zelf een beknopt overzicht na het doornemen van de theorie
   - Herformuleer de leerstof in eigen woorden
   - Leg een formule eens in woorden aan jezelf uit
   - Stel zelf enkele vragen op over het doorgenomen stuk theorie
   - Maak de oefeningenreeksen

2. Durf eens teruggrijpen naar het vorige deel

   - Herhaling zorgt ervoor dat je beter kennis en vaardigheden vastlegt!
   - Misschien kan je het deel dat je net studeerde wel goed, maar lukken de oefeningen niet omdat je vastzit met een ander deel van de wiskunde?

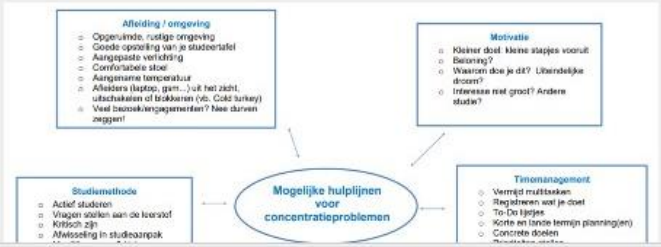
3. Blijf niet haperen op een moeilijk stuk: Vraag hulp!

   - Monitoraat
   - Medestudenten
   - Studiebegeleider

4. Concentratie:

   Is je concentratie niet optimaal? Maak je bijvoorbeeld almaar kleine rekenfoutjes omdat je gedachten er niet helemaal bij zijn?

   Dan kan een (of meerdere) van de tips in onderstaande figuur helpen.



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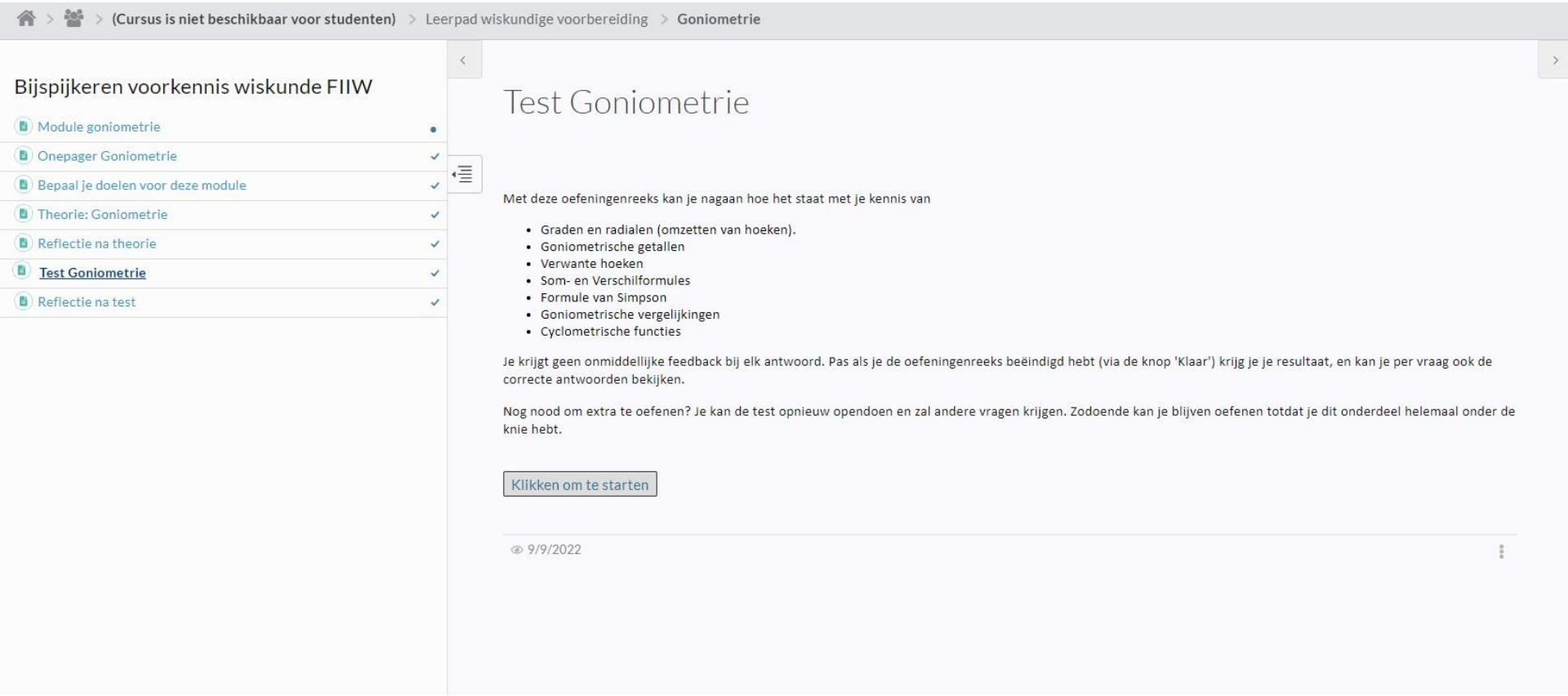
(Cursus is niet beschikbaar voor studenten)
Leerpad wiskundige voorbereiding
Goniometrie
Bijspijkeren voorkennis wiskunde FIIW
Module goniometrie
Onepager Goniometrie
Bepaal je doelen voor deze module
Theorie: Goniometrie
Reflectie na theorie
Test Goniometrie
Reflectie na test
Test Goniometrie
Met deze oefeningenreeks kan je nagaan hoe het staat met je kennis van
Graden en radialen (omzetten van hoeken).
Goniometrische getallen
Verwante hoeken
Som- en Verschilformules
Formule van Simpson
Goniometrische vergelijkingen
Cyclometrische functies
Je krijgt geen onmiddellijke feedback bij elk antwoord. Pas als je de oefeningenreeks beëindigd hebt (via de knop 'Klaar') krijg je je resultaat, en kan je per vraag ook de correcte antwoorden bekijken.
Nog nood om extra te oefenen? Je kan de test opnieuw opendoen en zal andere vragen krijgen. Zodoende kan je blijven oefenen totdat je dit onderdeel helemaal onder de knie hebt.
Klikken om te starten
9/9/2022

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Test Goniometrie (FIIW)

raag 1	1 punt	Niet gemaakt.
raag 2	8 punten	Niet gemaakt.
raag 3	1 punt	Niet gemaakt.
raag 4	3 punten	Niet gemaakt.
raag 5	4 punten	Niet gemaakt.
raag 6	1 punt	Niet gemaakt.
raag 7	1 punt	Niet gemaakt.
raag 8	8 punten	Niet gemaakt.
raag 9	5 punten	Niet gemaakt.

Weergave-opties

Gegeven is de hoek α in het eerste kwadrant en $\cos\alpha = \frac{4}{5}$. Bereken de andere goniometrische getallen van α.

Als je $\sqrt{\cdot}$ zou moeten gebruiken, schrijf je sqrt(·) in je oplossing.

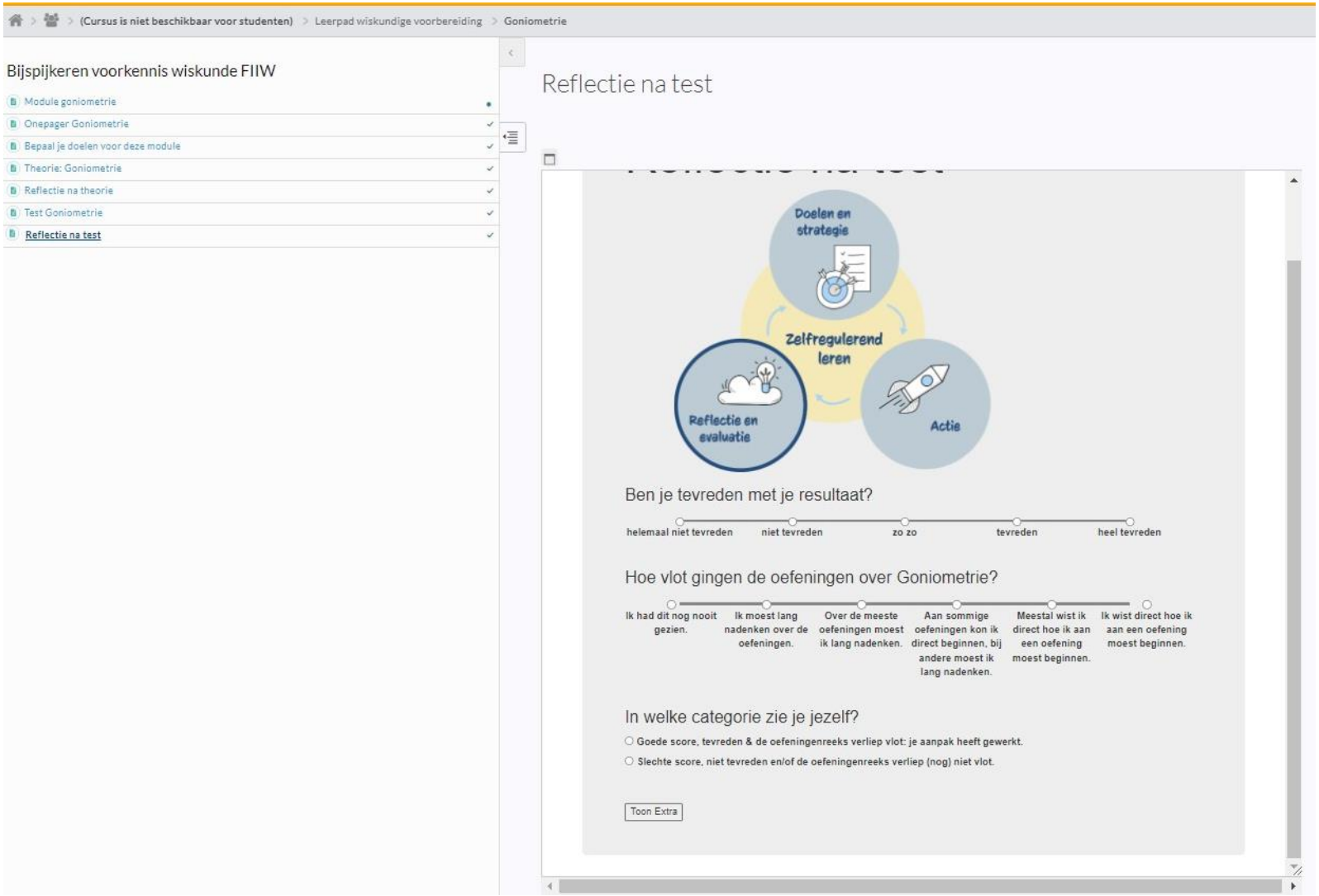
$\sin\alpha =$ ____

$\tan\alpha =$ ____

$\cot\alpha =$ ____

Verzend **3 punten** Laat zien

Created using Numbas, developed by Newcastle University.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Goniometrie
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Reflectie na theorie
Test Goniometrie
Reflectie na test
Reflectie na test
Doelen en strategie
Zelfregulerend leren
Reflectie en evaluatie
Actie
Ben je tevreden met je resultaat?
helemaal niet tevreden
niet tevreden
zo zo
tevreden
heel tevreden
Hoe vlot gingen de oefeningen over Goniometrie?
Ik had dit nog nooit gezien.
Ik moest lang nadenken over de oefeningen.
Over de meeste oefeningen moest ik lang nadenken.
Aan sommige oefeningen kon ik direct beginnen, bij andere moest ik lang nadenken.
Meestal wist ik direct hoe ik aan een oefening moest beginnen.
Ik wist direct hoe ik aan een oefening moest beginnen.
In welke categorie zie je jezelf?
Goede score, tevreden & de oefeningenreeks verliep vlot: je aanpak heeft gewerkt.
Slechte score, niet tevreden en/of de oefeningenreeks verliep (nog) niet vlot.
Toon Extra

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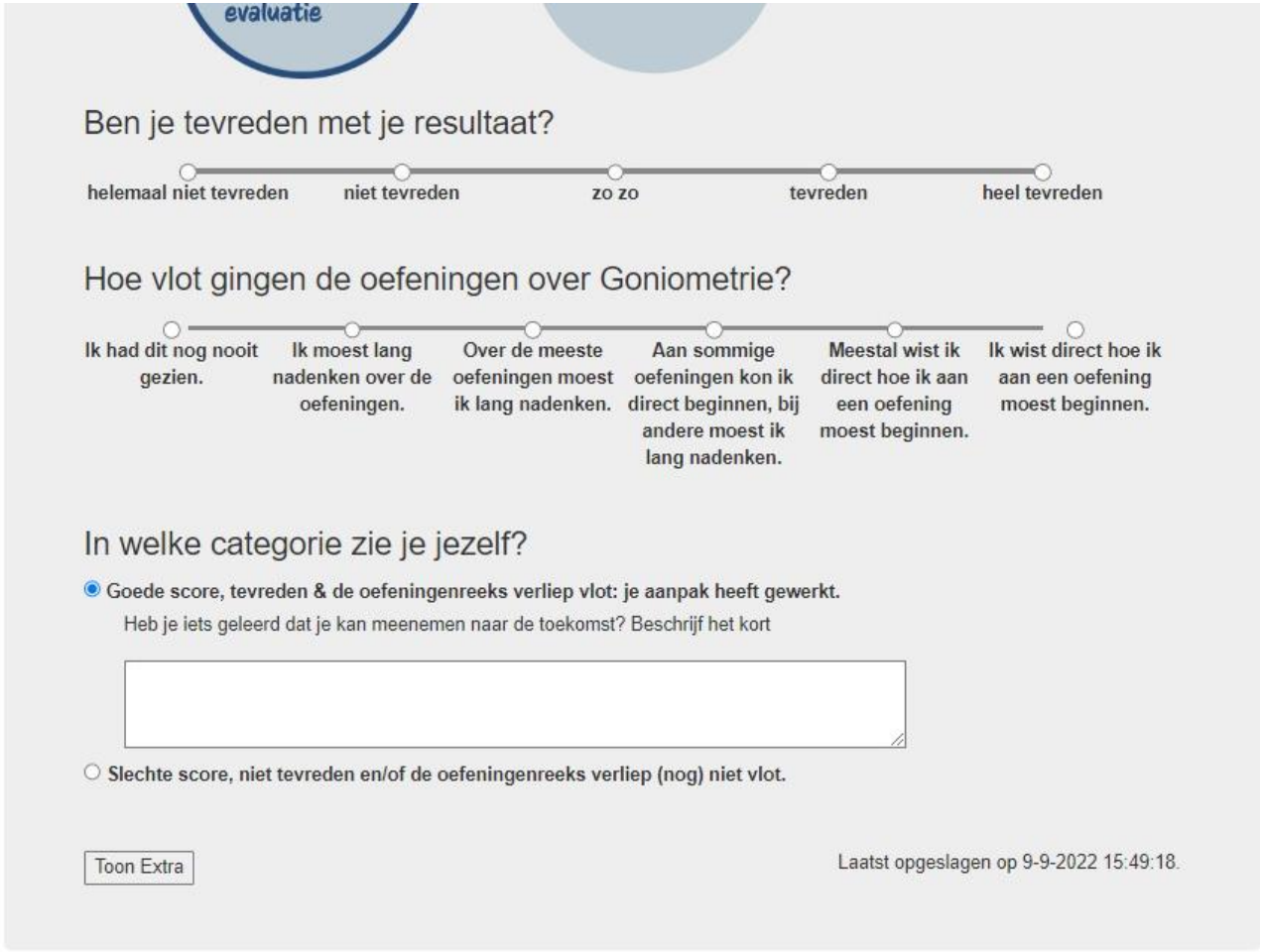
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helemaal niet tevreden
niet tevreden
zo zo
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Heb je iets geleerd dat je kan meenemen naar de toekomst? Beschrijf het kort
Slechte score, niet tevreden en/of de oefeningenreeks verliep (nog) niet vlot.
Toon Extra
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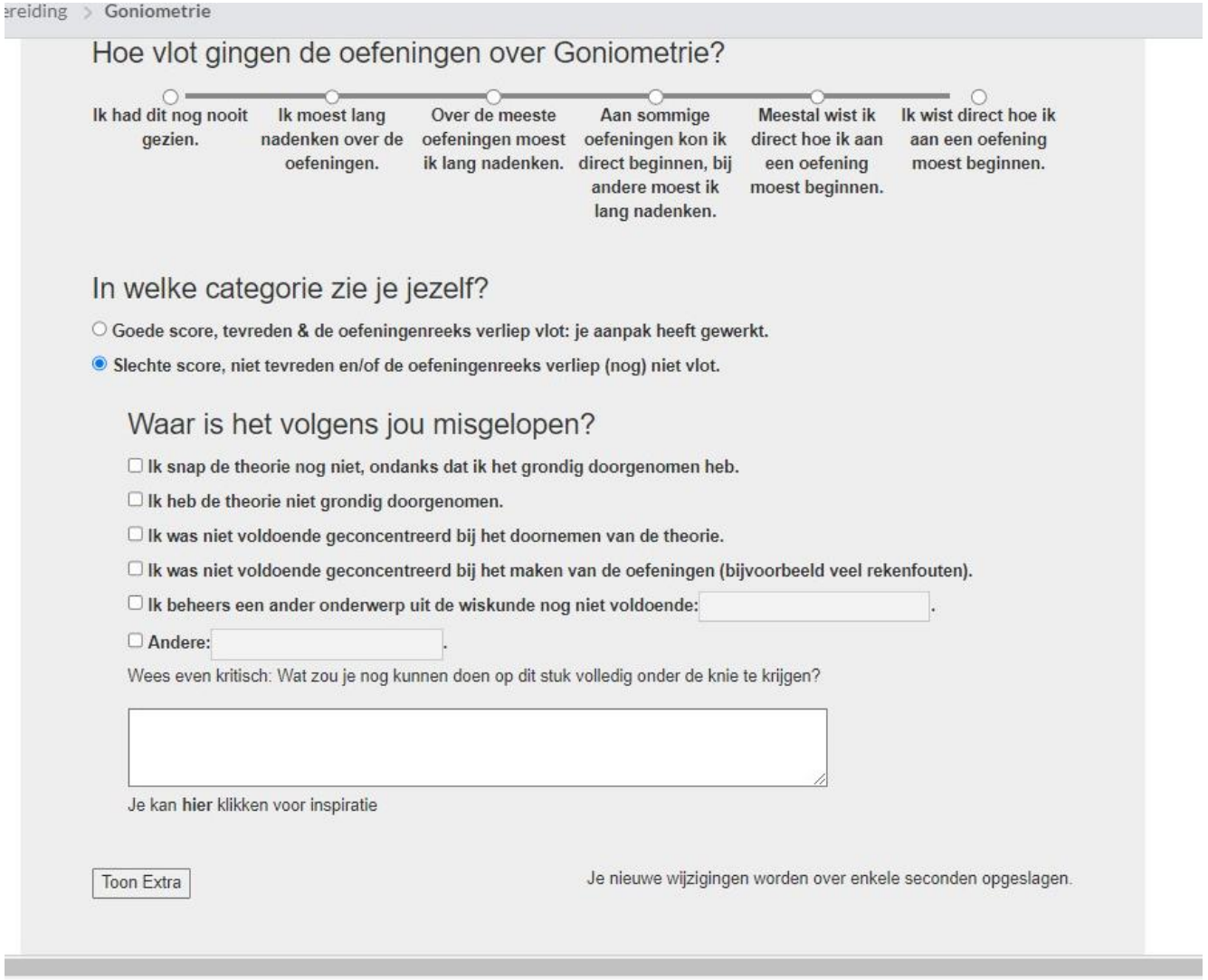
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Slechte score, niet tevreden en/of de oefeningenreeks verliep (nog) niet vlot.
Waar is het volgens jou misgelopen?
Ik snap de theorie nog niet, ondanks dat ik het grondig doorgenomen heb.
Ik heb de theorie niet grondig doorgenomen.
Ik was niet voldoende geconcentreerd bij het doornemen van de theorie.
Ik was niet voldoende geconcentreerd bij het maken van de oefeningen (bijvoorbeeld veel rekenfouten).
Ik beheers een ander onderwerp uit de wiskunde nog niet voldoende:
Andere:
Wees even kritisch: Wat zou je nog kunnen doen op dit stuk volledig onder de knie te krijgen?
Je kan hier klikken voor inspiratie
Toon Extra
Je nieuwe wijzigingen worden over enkele seconden opgeslagen.

KU LEUVEN