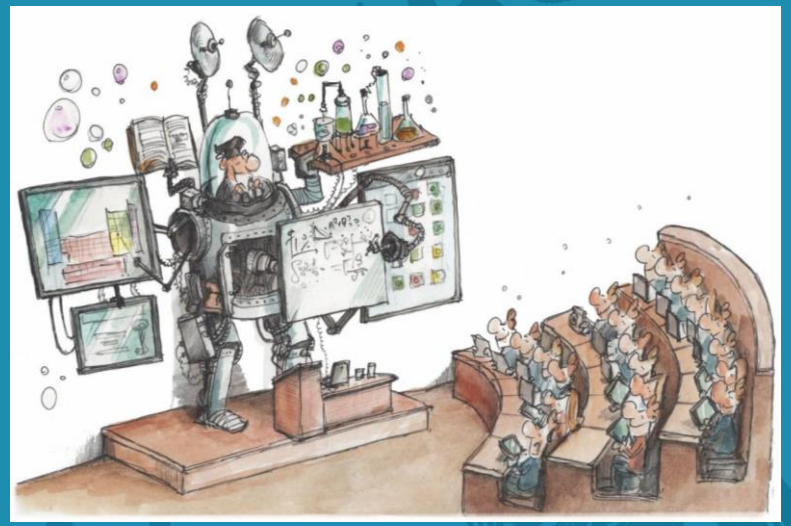
KU LEUVEN

Media & Learning 2024

2024.06.20

Going digital. Staying Human

Artificial intelligence and other Edtech challenges @KU Leuven



Piet Desmet, vice rector KU Leuven

In collaboration with Anke Pesch, Anneleen Cosemans, Jan De Baere, Wim Machiels, Jan Scheerlinck, Leen Van Rentergem & Kenny Verbeke

I. Edtech@KU Leuven –
7 key principles

II. AI in Education (AIED) –
Why? What? What's next?

I. Edtech@KU Leuven
7 key principles

1. It’s all about strategy

Strategy @ KU Leuven

"On Crossroads, For A Sustainable Society"
Strategic Plan for KU Leuven (2017-2021)

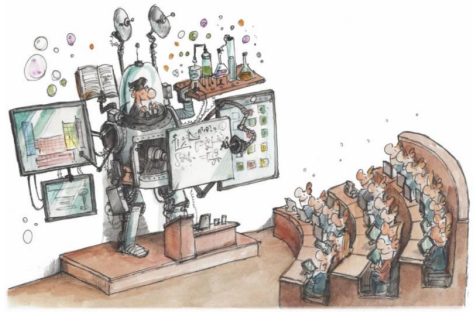
A long term vision in **5 projects**:

1. Truly International
2. Future-Oriented Education
3. Going Digital
4. Interdisciplinarity
5. Sustainability

Luc Sels, Rector

Our goal is to make decisions for the long term: ten to fifteen years.
This approach is necessary: if each management team only thinks about the next four years, we can never properly start the debate about the long-term development of our university.

Going digital as a powerful tool to stimulate



(a) Better learning and assessment

Active and collaborative **learning**

cf. *learning experience platforms*

collaborative learning spaces

blended learning & flipped classrooms

Effective and efficient **assessment**

cf. *online testing platform*

online examination centers

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(b) New learning contexts

Multilocation learning

Lifelong learning (continuing education, working students, etc.)

(c) Better incoming students and better study results

Better orientation and preparation

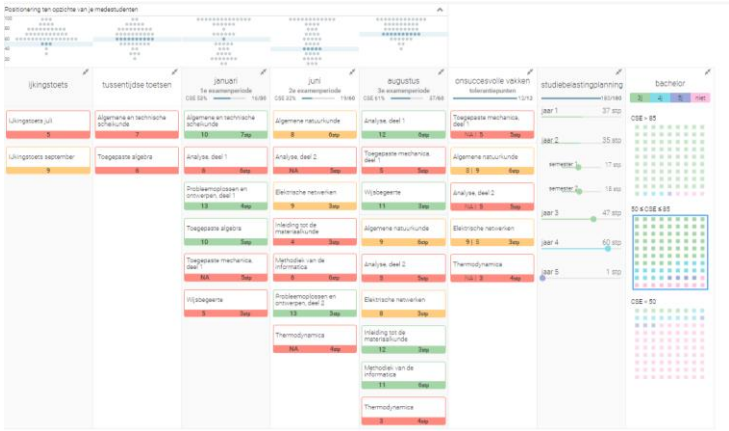
cf. *calibration tests for prospective students (“ijkingsproeven”)*

cf. admission examen for Medical School

Better monitoring, lower drop-out and better reorientation

cf. *adaptive learning environments*

cf. learning dashboards



(d) Stronger internationalisation

International students

International positioning

International *network of excellence*

“On Crossroads, For A Sustainable Society”
Updated Strategic Plan for KU Leuven (2021-2025)

A long term vision in **4 projects**:

1. Truly International
2. Future-Oriented Education
3. Going Digital, Staying Human
4. Sustainability

\+ **2 transversal themes**

1. Inclusive University

KU Leuven strives for an inclusive, respectful and safe learning, working and living environment.

2. Lifelong learning

Thanks to lifelong learning we can offer high-quality training for everyone who also wants to continue to develop their mind.

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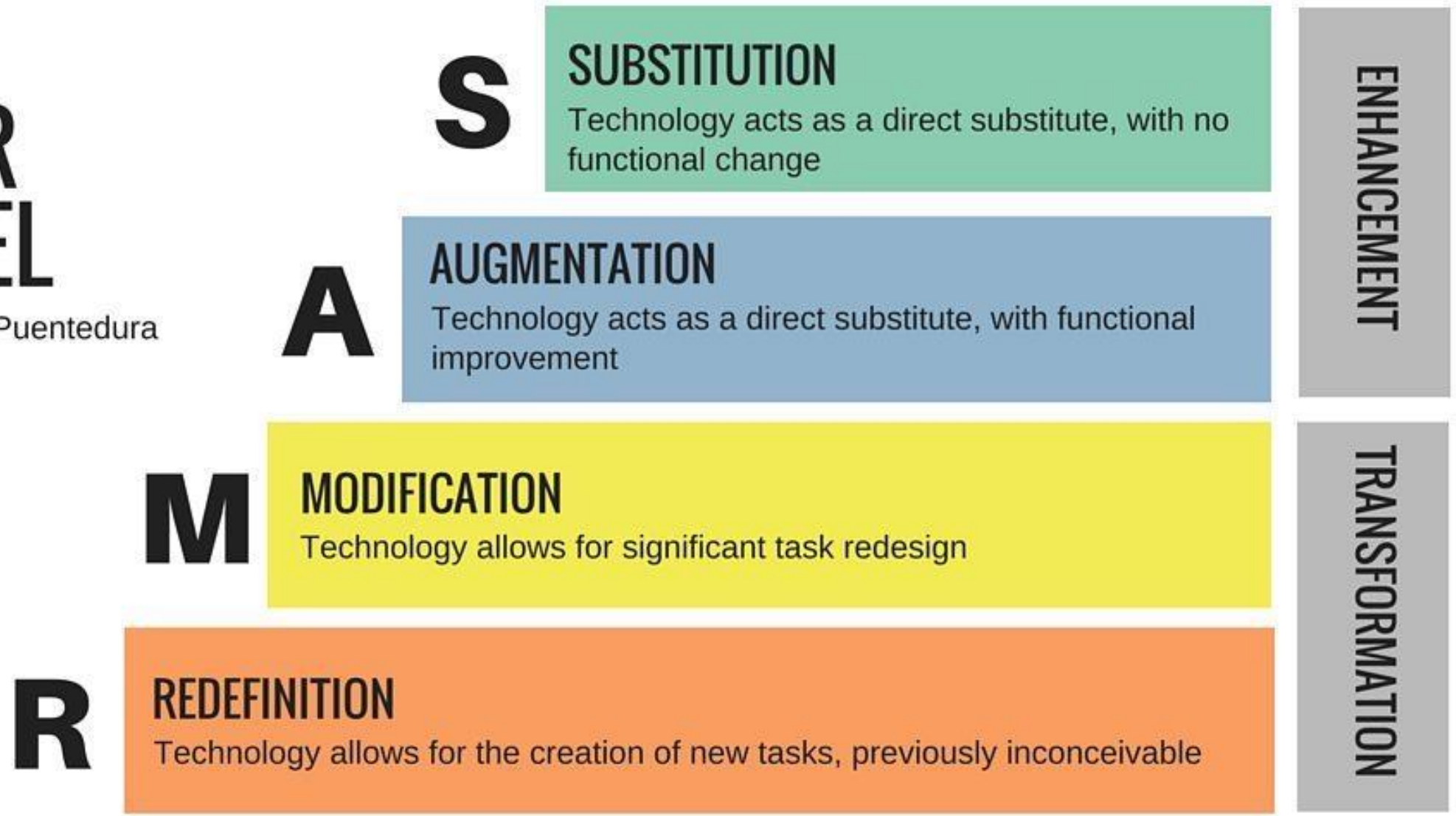
2. It’s all about transformation

THE SAMR MODEL

Dr. Ruben R. Puentedura



From online exams to a digital assessment platform

- From predefined online exams to digital assessment (formative and summative) on the basis of a calibrated pool of items and scenarios
    - More flexible
    - Comparable difficulty level of exams
    - Usable on a large scale
- From fixed scores to an advanced analysis of test results

Online assessment @ KU Leuven

MODIFICATION

Testing platform that supports both paper-based and digital administrations of formative and summative tests

Part of a larger set of software tools for evaluation

Blackboard Ultra / Ans / Turnitin / FeedbackFruits / Bookwidgets/ Polleverywhere

REDEFINITION

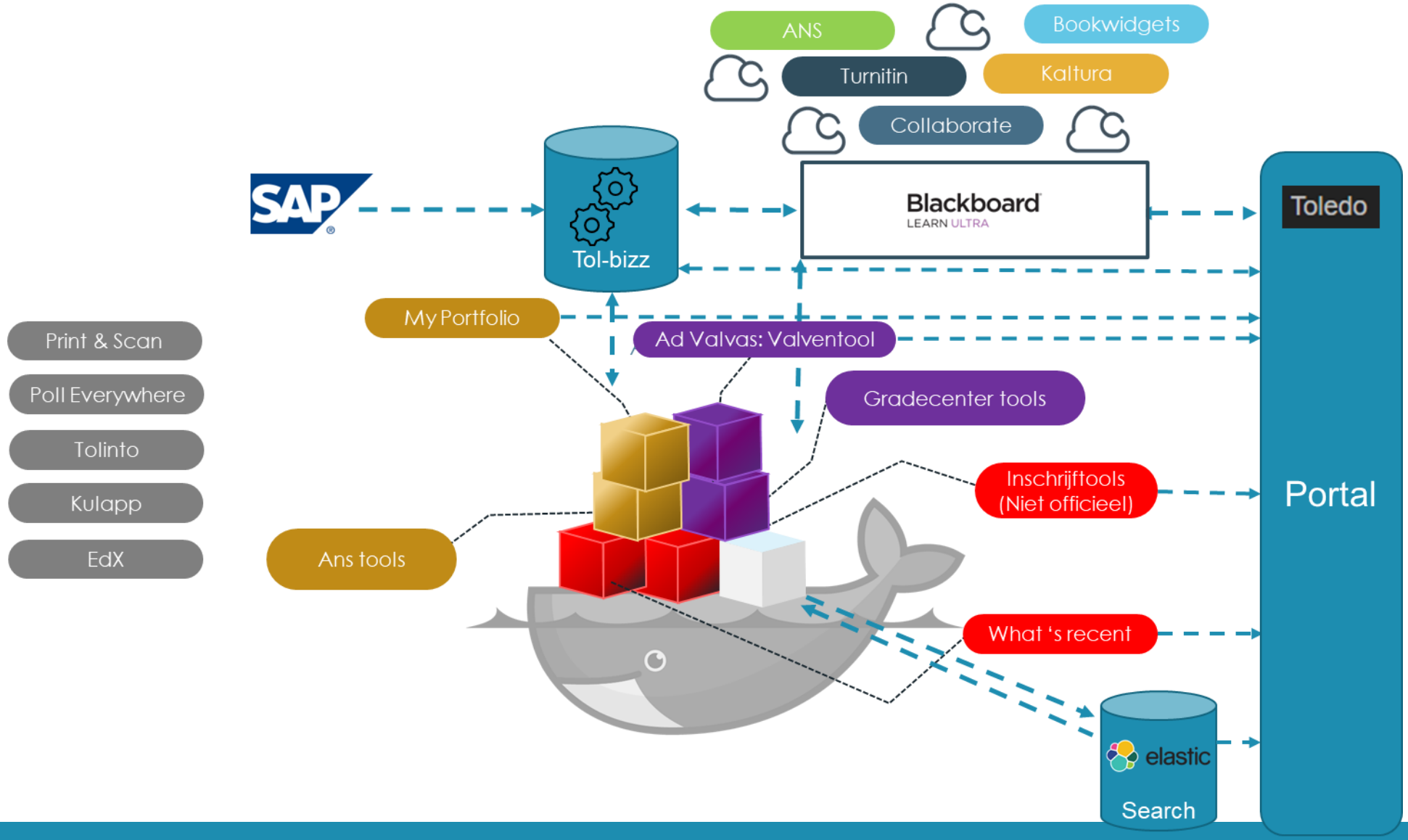
Impact on the global evaluation policy of KU Leuven

Impact on the broader organisation of exams and need for organisational support

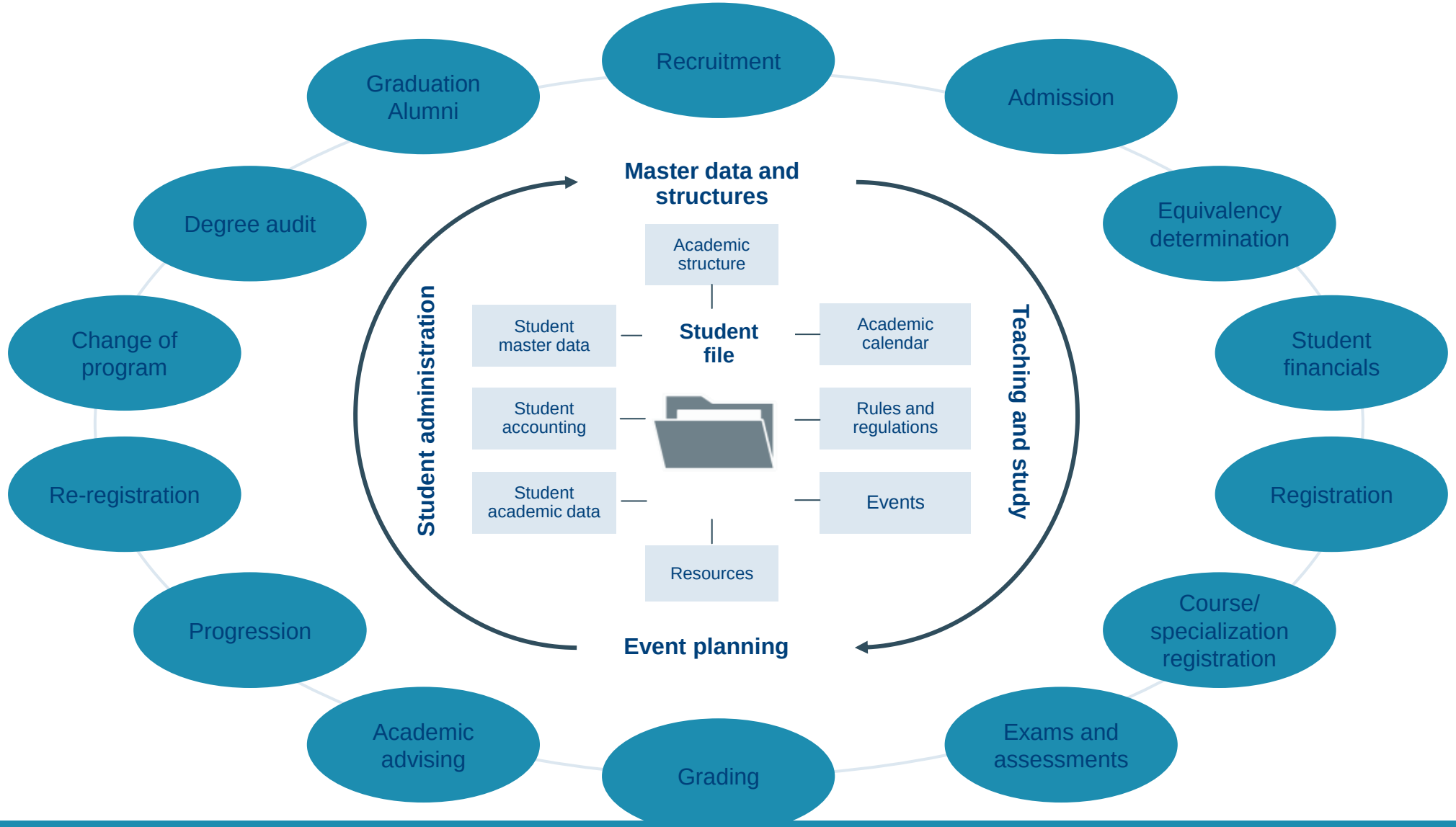
PC classrooms
Bring Your Own Device Exams (on campus)
Proctoring (off campus)
Paper Exams with Digital Post-processing

3. It’s all about integration

Online assessment as part of the larger Toledo integrated learning environment



Integration of SAP Student Lifecycle Management and Toledo



4. It’s all about scalability

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13 campusses in 10 cities across Flanders

65.000 students in BAMA (+ approximately 25.000 in LLL)

Association KU Leuven

KU Leuven + 5 university colleges

115.000 students (= 43% of Flemish higher education)

→ scalability is key

An innovation that is not scalable is useless…

Course Creation Services

Ben je op zoek naar ondersteuning bij je online cursusontwerp? Dan kan je beroep doen op de Course Creation Service!

Ontdek hieronder de mogelijkheden of maak meteen een afspraak voor een vrijblijvend gesprek.

Afspraak maken ›

Bootcamps

Snel uit de startblokken met je online cursusontwerp via hands-on didactiek en multimediatraining?
Dat lukt via een bootcamp!

Meer over de bootcamps ›

Begeleidingstraject

Ontzorging op maat bij het uitwerken van een online cursusontwerp na de bootcamp?
Dat vind je in een begeleidingstraject!

Meer over de begeleidingstrajecten ›

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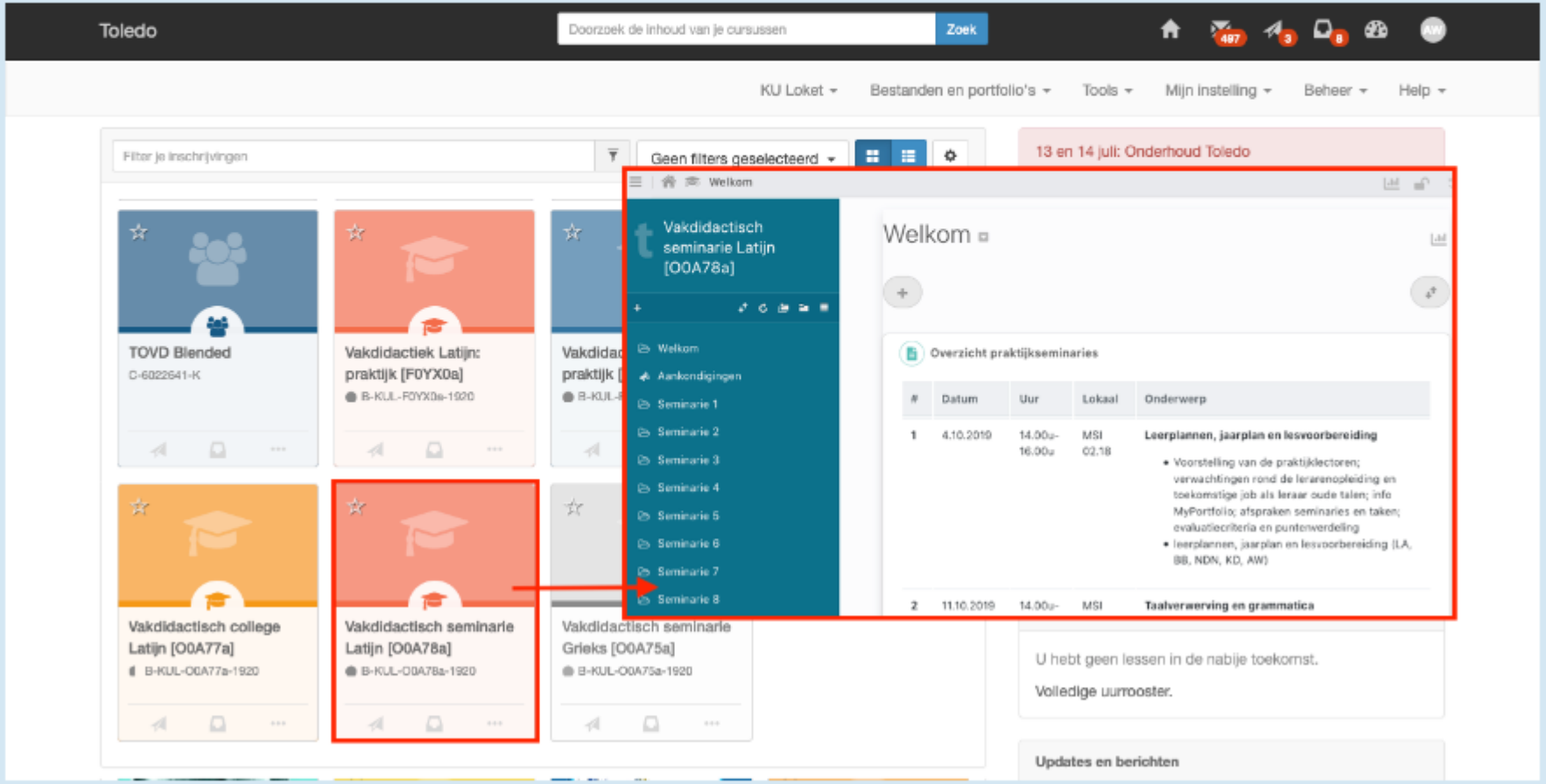
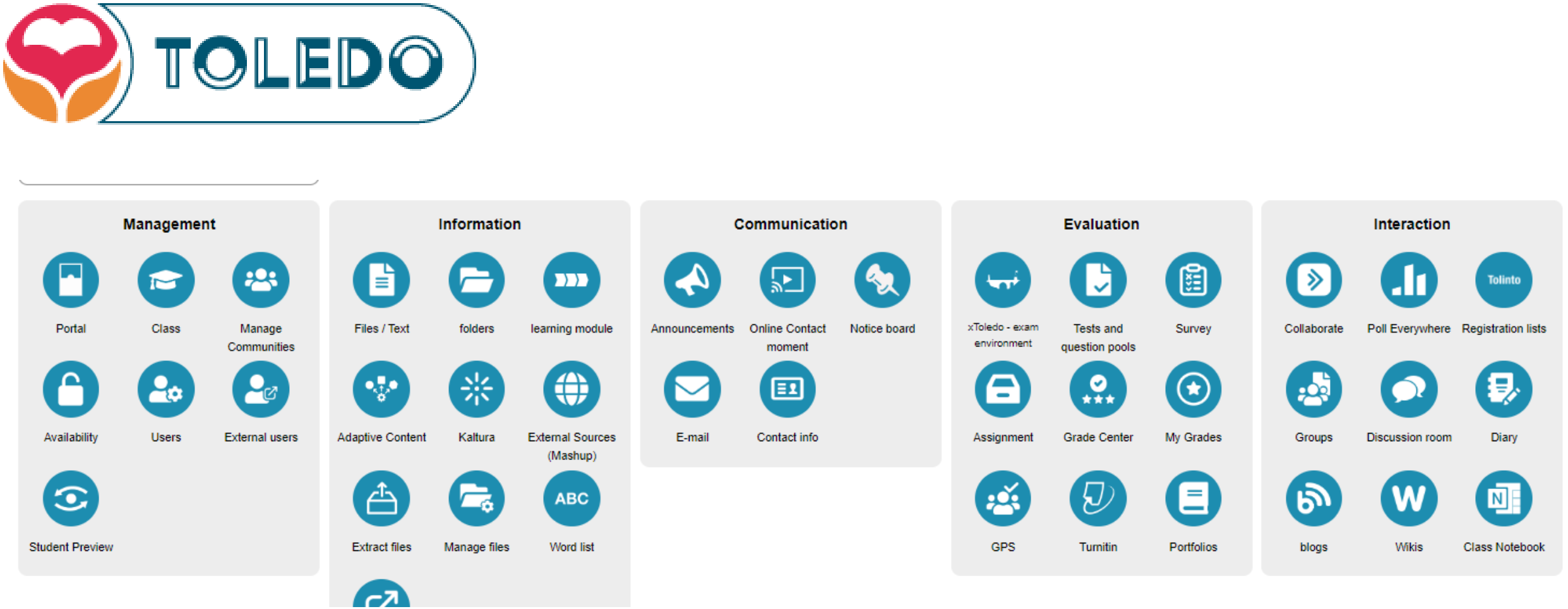
Course Creation Services

Scalable in production
& in use

Only scalable in use

Courses in Toledo are created automatically based on the university's programme guide. An online environment (*course*) is generated automatically for each learning activity at KU Leuven. The course holder of a learning activity is listed as *instructor* in the corresponding Toledo course. On toledo.kuleuven.be, teaching staff can find their respective *courses*.

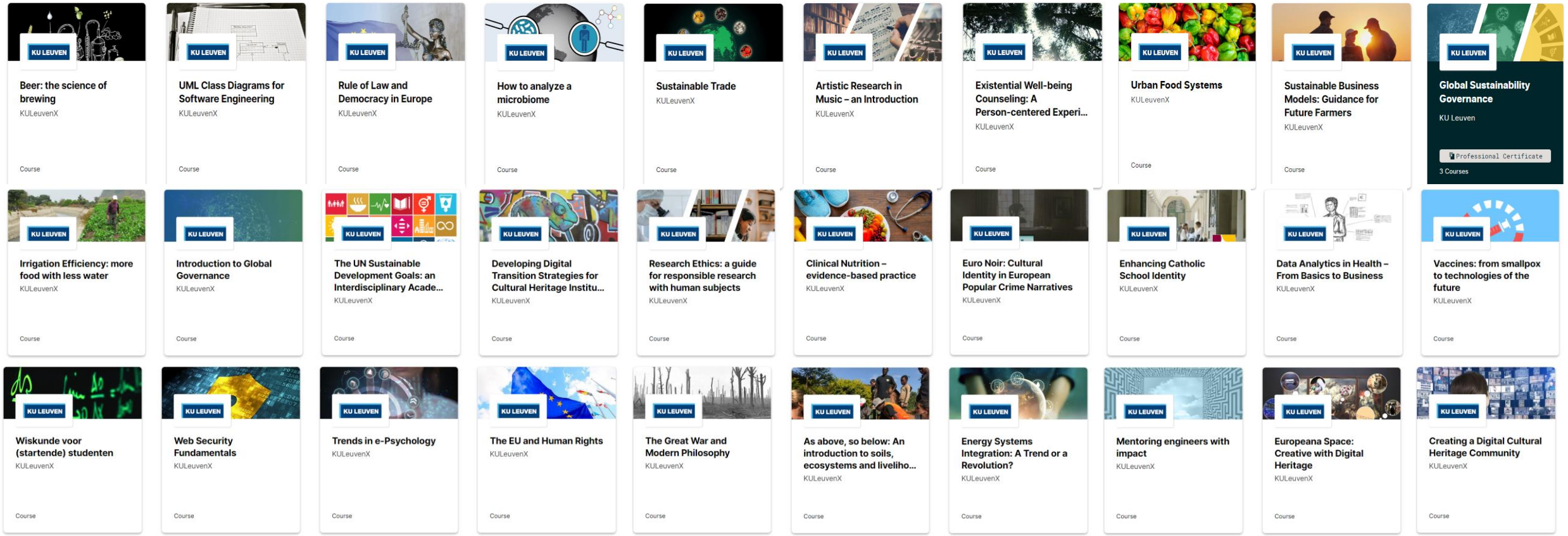



Management
Portal
Class
Manage Communities
Availability
Users
External users
Student Preview
Information
Files / Text
folders
learning module
Adaptive Content
Kaltura
External Sources (Mashup)
Extract files
Manage files
Word list
Communication
Announcements
Online Contact moment
Notice board
E-mail
Contact info
Evaluation
xToledo - exam environment
Tests and question pools
Survey
Assignment
Grade Center
My Grades
GPS
Turnitin
Portfolios
Interaction
Collaborate
Poll Everywhere
Registration lists
Groups
Discussion room
Diary
blogs
Wikis
Class Notebook

Creating a MOOC is an intensive process. At KU Leuven, you can count on support from the MOOC Team for the creation of your MOOC. This team combines the talents of the DOO, LIMEL and ICTS departments. Here, you can find more information on how this team can support you (in Dutch).

Members of the teaching staff at KU Leuven who want to get started on creating their MOOC themselves, can register for a private course called Making MOOCs @ KU Leuven on the edX - platform. The course describes how to design, develop, monitor, and evaluate a MOOC.

KU Leuven has its own channel on edX called KULeuvenX. Here, you can find all MOOCs made at KU Leuven.



35 MOOC's of which 22 are still active
10 MOOCs under development
In total **126 (re)runs**

335.000 enrollments

+ MOOCs in regular curricula

75% of all MOOCs are used in regular courses
as part of an integrated blended learning approach

(KU Leuven students interact with th world!)

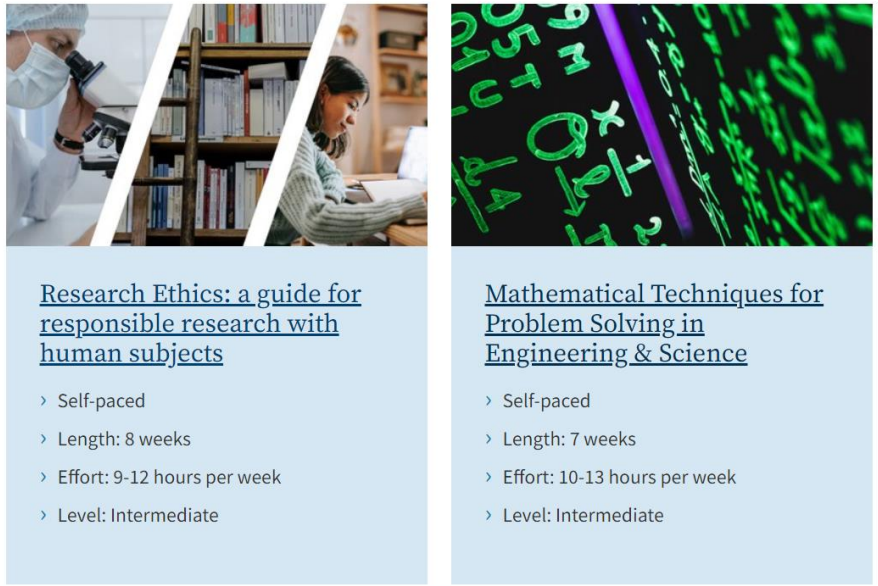
+ MOOCs4credit

replace an entire course.

6 MOOCs
Mathematical techniques for problem solving in Engineering & Science
Research Ethics: A guide for responsible research with human subjects
AI in healtcare
etc.

+MOOCs4LLL

KU LEUVEN | CONTINUE



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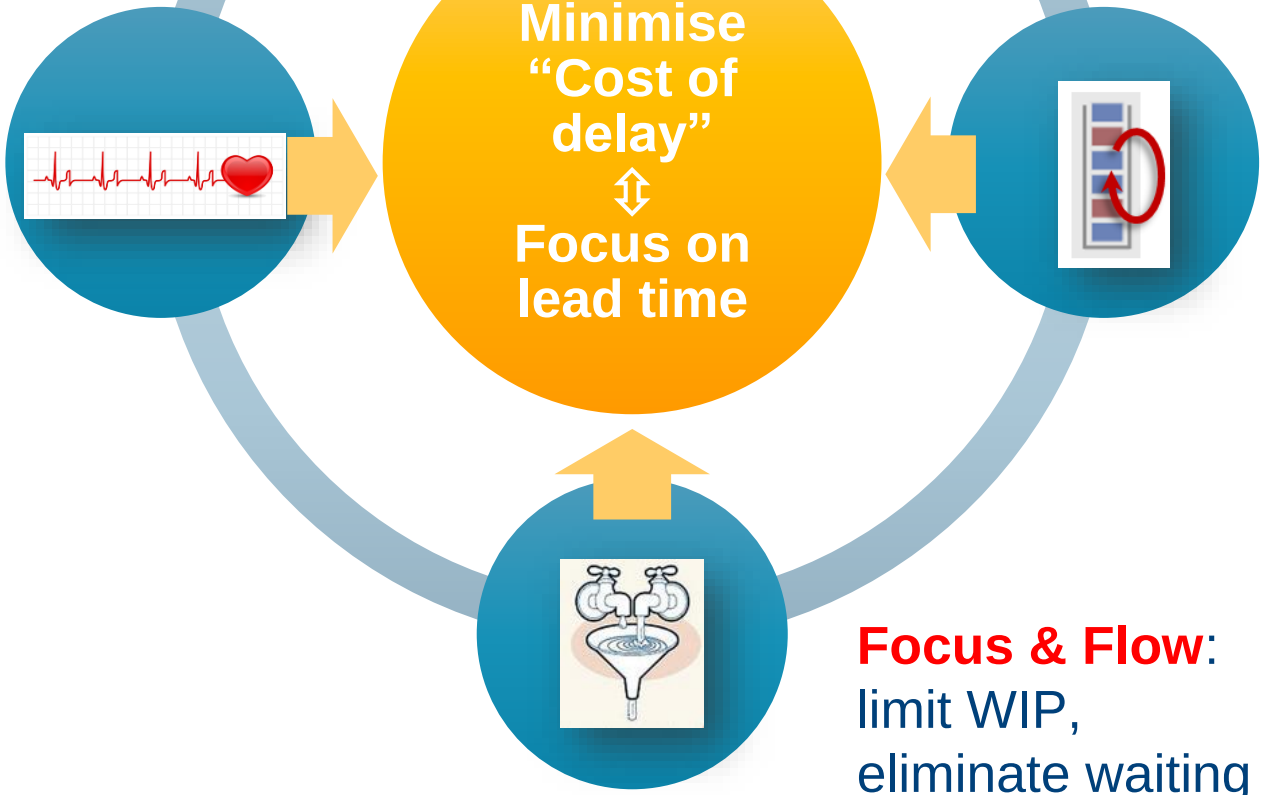
5. It’s all about agility

Sw3ll!
Lean & agile principles

Design and build incrementally



From long term planning to a **synchronized cadence**

Set priorities: do the “right” things first

Focus & Flow:
limit WIP,
eliminate waiting time

Design and build incrementally

EPICS

"strategic direction"

IT Initiatives

xxx md

IT component of
an EPIC
go/no go required
prioritization

Procesblok

Maintenanc
Action Items

Improvement of existing processes

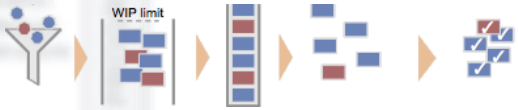
> x md

< x md

Features

xx md

To be delivered in one period (10 weeks)



User Stories
(small action points)

x md

User stories

x md

To be completed in one sprint (2 weeks)

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Set priorities

Board

- Monitor the overall **Strategic Direction**
- Approve the assigned **Means** based on lean reporting

Portfolio Steering Committee

- Set priority of **Initiatives** aligned with the strategy themes (epics)

prio

Reporting

Portfolio Priority Council

prio

- Set priority of **Features**

Advisory councils, interdisciplinary teams, …

Inform

Content input

Concern applications

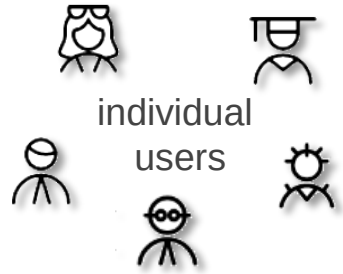
- Central, standardised offer (mandatory)
- Business sets priorities

Services

- Demand & supply (for the individual user) – economies of scale
- IT sets priorities based on market

Advise

Needs



Infrastructure & System management

- Supports both Concern applications and Services
- ICTS sets priorities based on expertise

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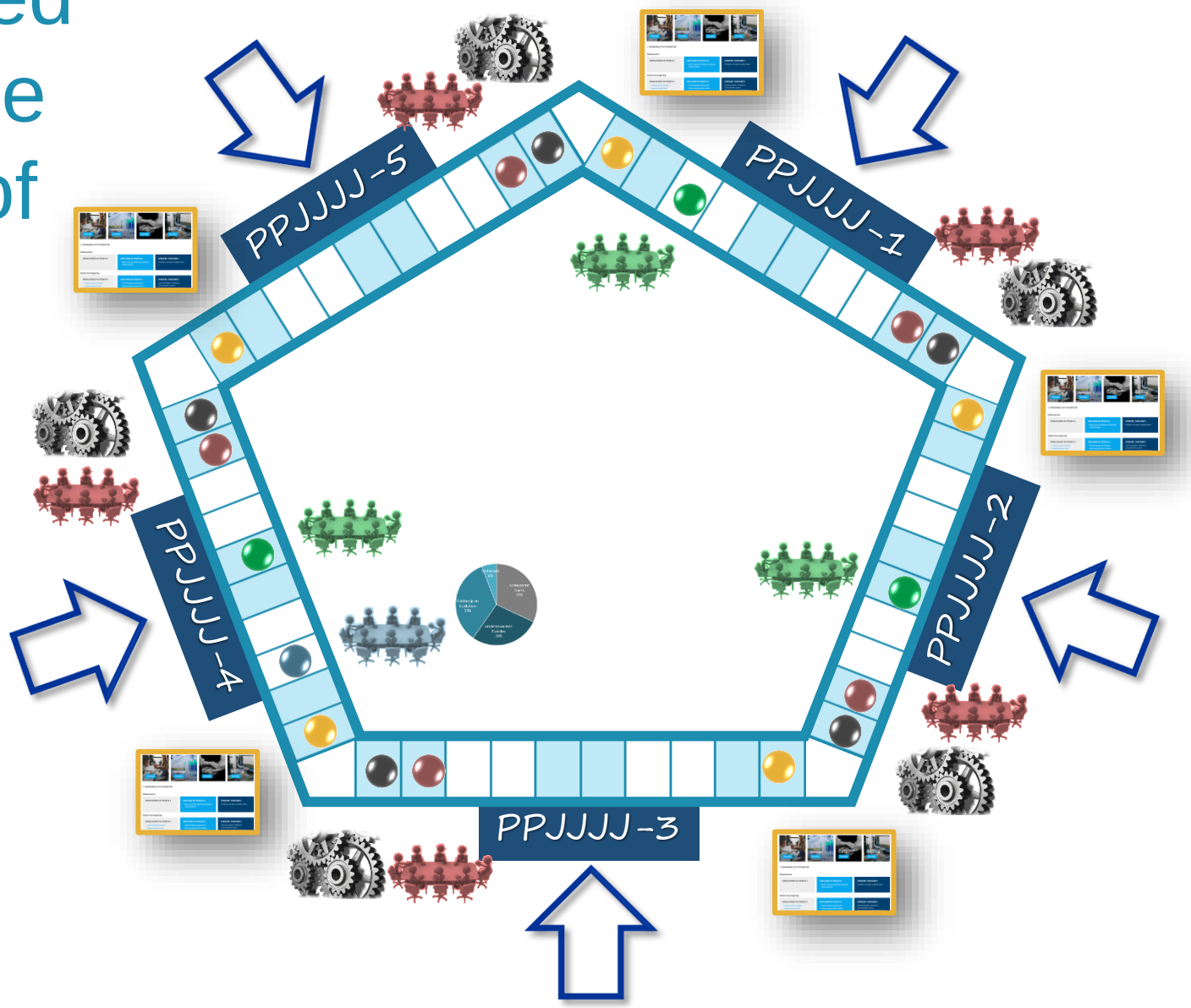
Focus & Flow : limit work in progress

NEW	IDEA	PREPARATION	BACKLOG	IMPLEMENTATION	FINISHED
New arrivals since last steering committee	WAIT for preparation	Preparation is IN PROGRESS	WAIT for implementation	Implementation is IN PROGRESS	Finished…
	Prioritize		Prioritize		

PULL

PULL

Synchronized cadence, the heart beat of our agility



Continuously: input of new ideas and strategic initiatives

Portfolio Priority Council

ICTS Planning event “Big room”

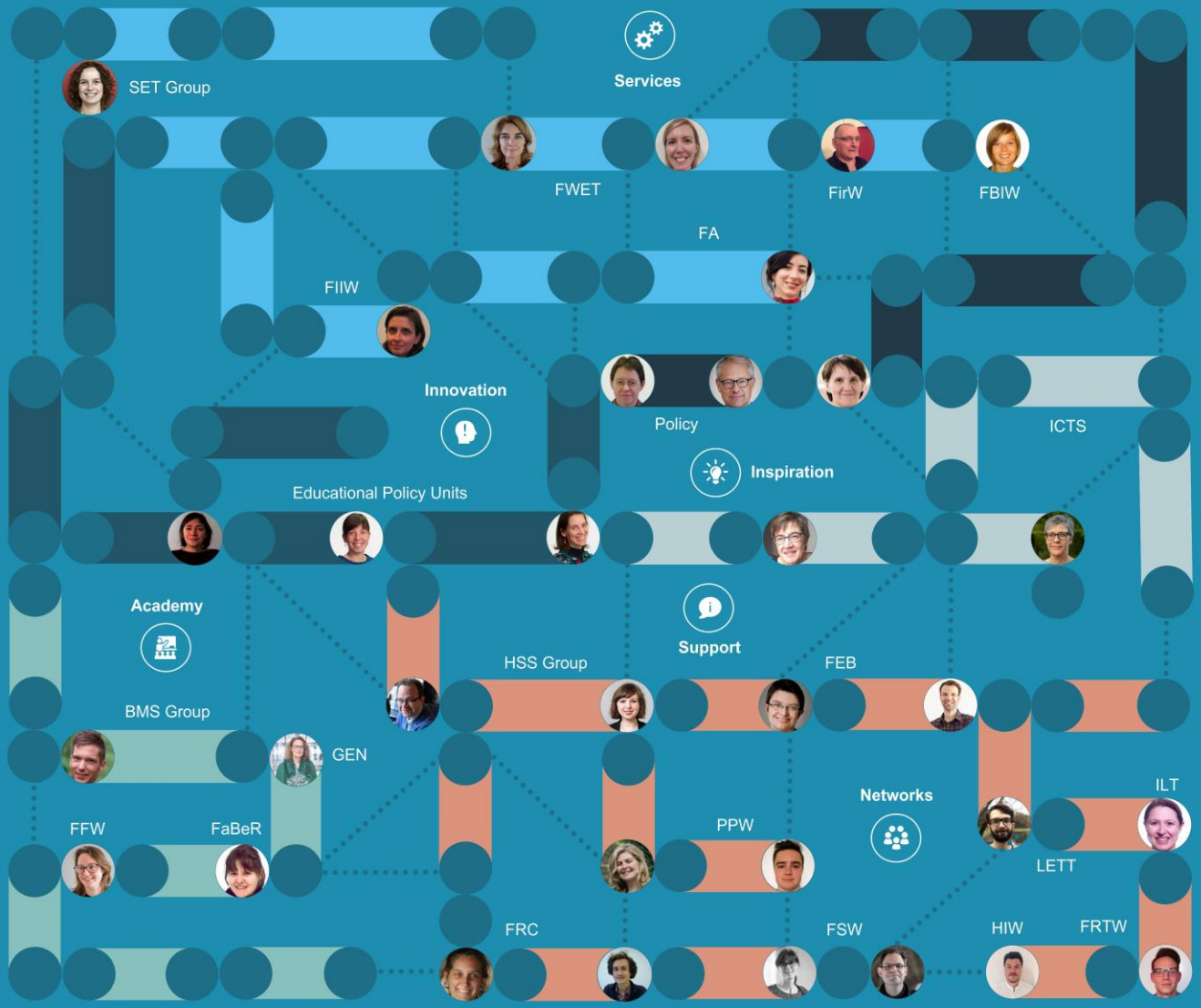
Rapporting (roadmap)

Portfolio Steering committee (3x/year)

GEBU (1x/year)

6. It’s all about people

KU Leuven Learning Lab: a network for educational innovation



A network for educational innovation defined by

‘Learning’

Through community building

‘Action’

Realising articulated policy priorities together

Network support model

Project teams on e.g. online assessment, blended teaching, learning spaces, …

- Temporary group of colleagues
- Clear focus
- Mixed composition: units, groups, faculties

Community building

- *Knowledge and expertise*
- *Reflection on the role of ED*
- *Create bridges*

Network of programme directors and heads of programme

Within this network, peers get to know one another, strengthen their leadership skills, exhange experiences and reflect together upon current policy themes.

Network of educational developers

The network of educational developers is a hub for meeting, exhanging, co-creating, community-building and other aspects that shape educational developers's roles.

Niet te missen onderwijs- en beleidsupdates

Policy updates

Samen bouwen aan kwaliteitsvol onderwijs

Schaaf je onderwijs-administratieve skills bij

Coworking & Intervision

Dag van de onderwijsondersteuner

Heb jij ook zo genoten van de dag van de onderwijsondersteuner? Tijdens de voorbije editie dachten we na over onderwijs ten tijde van COVID-19 en blikten we bovenal vooruit op de toekomst. Hopelijk hebben de verschillende sessies je gewapend met inspirerende ideeën en toepasbare tips waarmee je zelf aan de slag kan. Hou zeker de website van KU Leuven Learning Lab in de gaten voor een verslag met de hoogtepunten.

Community Event

Journal Clubs: een duik in jouw werkdomein

Skill building & learning group

Groeien als onderwijsondersteuner

Action: network support model

KU Leuven Learning Lab website

- Manuals, documentation, tool guide, good practices > *in cocreation*

KU Leuven Learning Lab Academy

- Train-the trainer for local educational developers
- Training for teaching teams

Support services for faculties and their first line support for didactical teams

- Training of students to support teaching teams in educational design, coaching by local educational developer
- Knowledge clip studios
- Lending service for multimedia equipment
- Editing and screencast facilities

Do you need help with blended & future-oriented education at KU Leuven?

Support portal on blended and future-oriented education with didactic formats, roadmaps for educational tools, inspirational cases,...

Take me to the portal

Academy with training initiatives and online modules on blended education for educational developers and faculties.

Dive into the Academy

University-wide **services** on educational multimedia and b education for shaping teachin practices.

Check out the services

Projects and innovation

We support project teams in their exploration and implementation of innovative ideas for the realisation of the Future-oriented Education and Going Digital policy projects.

Learn more about it

Network of educational developers

The network of educational developers is a hub for meeting, exhanging, co-creating, community-building and other aspects that shape educational developers's roles.

Discover our offer (in Dutch)

Network of programme directors and heads of programme

Within this network, peers get to know one another, strengthen their leadership skills, exhange experiences and reflect together upon current policy themes.

Find out more (in Dutch)

KU LEUVEN LEARNING LAB

KU Leuven Learning Lab is a learning network that brings together educational expertise in different faculties and departments.

We focus on Future-oriented Education and Going Digital policy projects.

Get to know us (in Dutch)

#kuleuven learninglab

Tweets from @KULLearningLab Follow

KU Leuven L... @KU... · Apr 28
😎Ready #22tango
#netwerkeventProgrammadirecteurs EnOpleidingshoofden
1

KU Leuven L... @KU... · Apr 26
Welkom aan boord

Leen S... @LeenSe... · Apr 26
Welkom bij @KULLearningLab, nieuwe onderwijsondersteuners van @HSS_KULeuven! ...
1 4

Tweet #kuleuvenlearninglab

Follow @KULLEARNINGLAB

arningLab?ref_src=twsrc%5Etfw%7Ctwc...

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7. It’s all about evidence-based practice

Use case: Extended Reality

Real Life

real, physical life around us in the world (not digital)

Augmented Reality

the technology that projects digital information onto the real world

Mixed Reality

Fusion of the real and digital worlds. A lot of interaction is possible.

Virtual Reality

immersing a user in a fully digital world

Added value of ER within education

- SCALE: A particular setup or situation can be reproduced over and over again. This is not always possible in a real environment, e.g. a crime scene.
- INTERACTIVITY: When interaction is important for learning the subject. Interaction creates increased engagement.
- IMMERSION: When immersion in an environment for the subject adds value.
- SIMULATION: This can be done within a safe environment where mistakes can be made

Viskilab – 1st BA Biomedical Sciences

- 360° video interactive experience
- Hotspots, 2D videos, Multiple choice questions, … → with feedback
- Authentic lab environment
- Captivating storyline: Cluedo

BLS

- 3D VR experience
- Aim: VR simulation tool for CPR training
- Different scenarios: in hospital/out-of-hospital

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DENTAL PROSTHESIS SIMULATOR

medɔa Awards '21
AUDIENCE VOTE

FACULTY OF MEDICINE

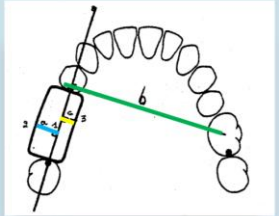
KU LEUVEN

FUNCTION
CRITERIA
POSITION

On tooth next to saddle

- Rigid design => on tooth side adjacent to saddle
- Resilient design => on tooth side non-adjacent to saddle

Voorbeeld 1
Kennedy Kl III, star ontwerp

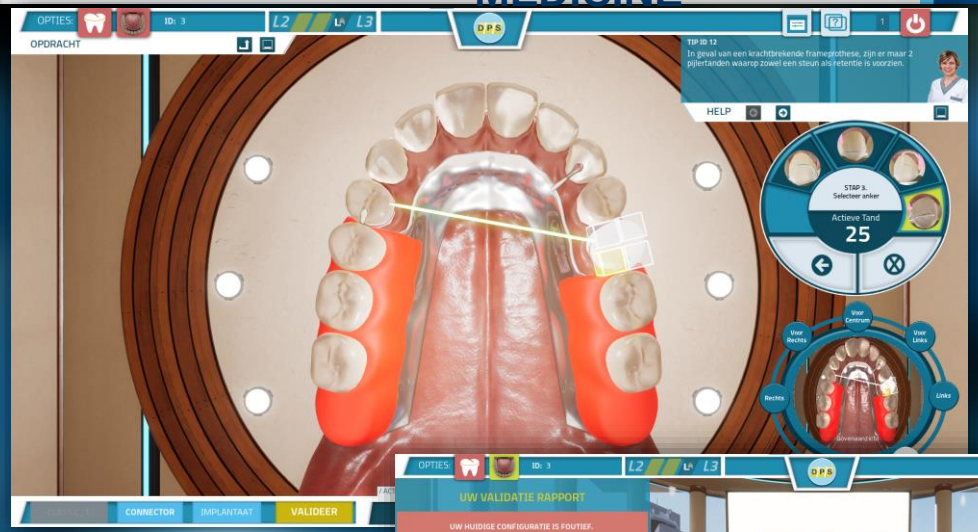


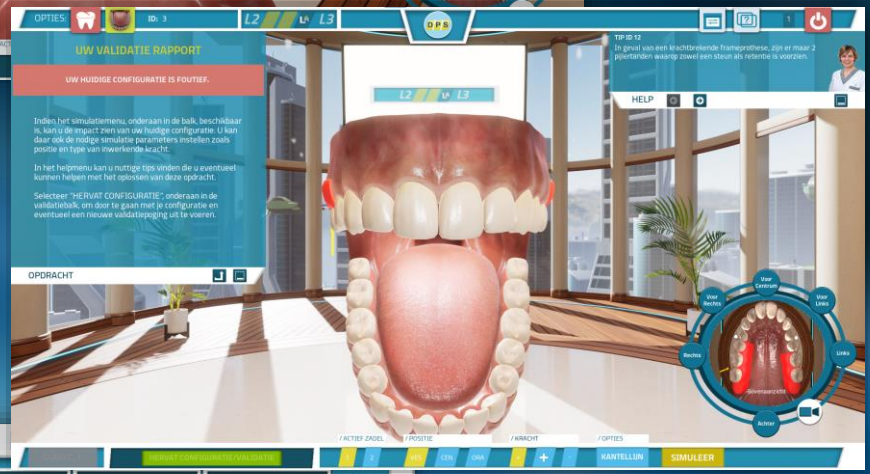
$F_1^{+/-}$	Enkel kracht, geen buigmoment
F_2^+	$BM_{2+} = F_2^+ \times a = b \times r$(etentie)
F_2^-	$BM_{2-} = F_2^- \times a = b \times s$(teun)
F_3^+	$BM_{3+} = F_3^+ \times c = b \times s$(teun)
F_3^-	$BM_{3-} = F_3^- \times c = b \times r$(etentie)

F^+	34	37	Contralaterale pijler
F_1^+	S	S	-
F_2^+	S	S	r
F_3^+	S	S	s

F^-	34	37	Contralaterale pijler
F_1^-	r	r	-
F_2^-	r	r	s
F_3^-	r	r	r

$F^{+/-}$	34	37	Contralaterale pijler
	S+r	S+r	s+r





To help students and the teacher with the complicated process of a prosthesis design, we developed in association with the faculty of medicine and ECO, a 3D application (on screen) that allows both teacher and students to design a prosthesis through a set of exercises. The application will also visualize what happens when the design is incorrect.

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BIOMEDICAL TECHNOLOGY LAB
3D-VR-AR

II. AI in Education
Why? What? What's Next?

AI in (formal) education (AIED)

3 perspectives & 3 dimensions

AI euphorics

AI realists

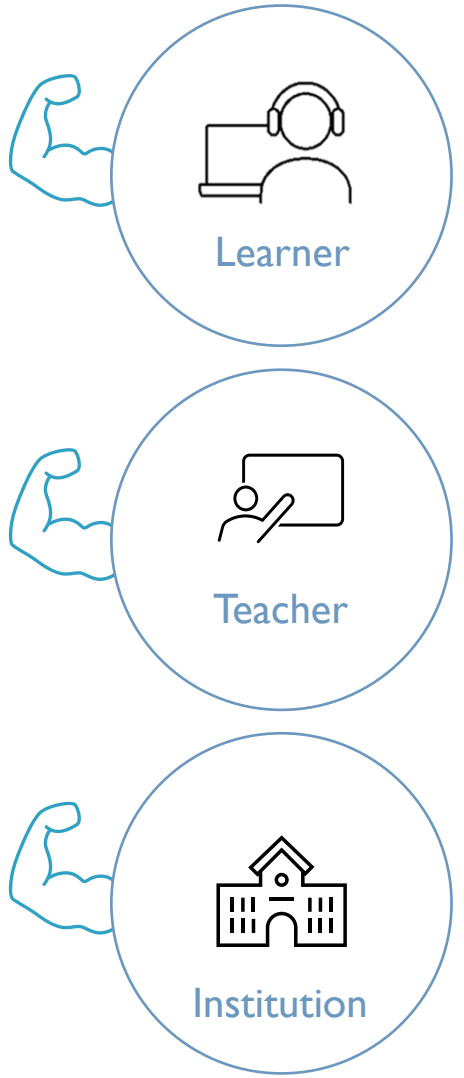
AI sceptics

REPLACEMENT MOVEMENT

AUGMENTATION MOVEMENT

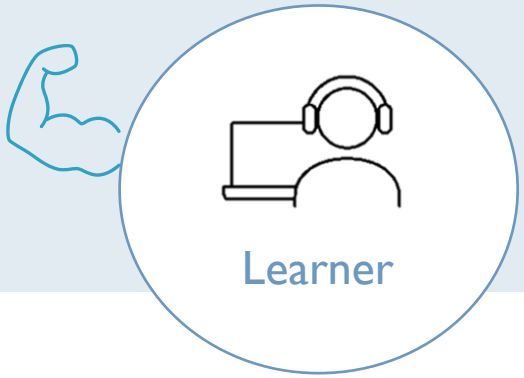
BANNING MOVEMENT

1. Why?
2. What?
3. What's next?



1. Why?

1.1 Learner
1.2 Teacher
1.3 Institution



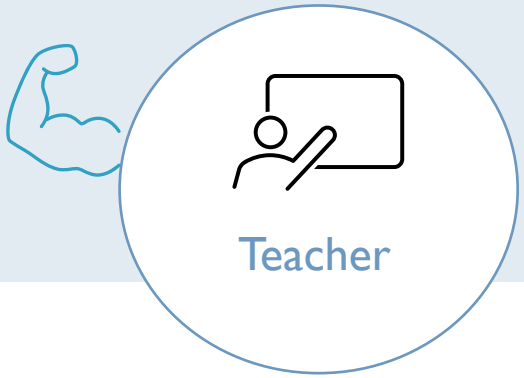
1.1 Learner empowerment

EFFECTIVITY

- Adapting to different **learner profiles**
  - Cognitive and non cognitive parameters
  - Level of AI-literacy
  - Degree of Self-Regulation
  - Etc.
- Adapting to different **contexts**
  - Informal and formal learning
  - Individual and collaborative learning
  - Etc.

AGENCY

- Degree of **learner control** on the adaptive learning environment
- Explainable AI: **understanding** what happens in the learning environment



1.2 Teacher empowerment

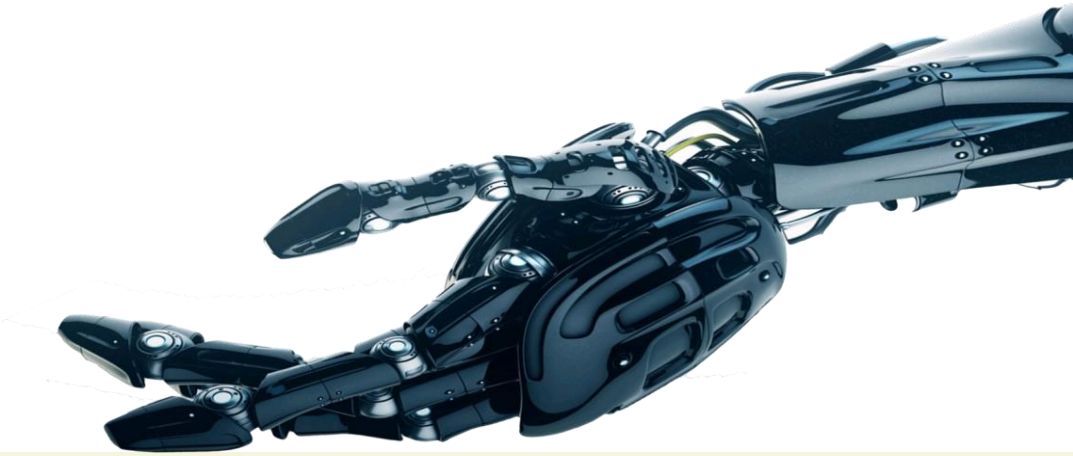
EFFECTIVITY

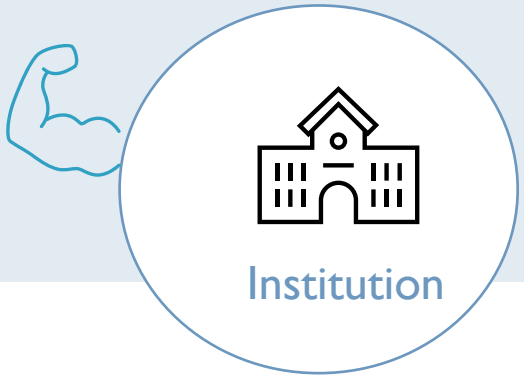
- AI-based **repetitive tasks**, allowing more focus on the core of teaching
- Role of AI systems in **integrated blended learning,** allowing a redesign of the classroom activities

AGENCY

- Degree of **teacher control**
- Explainable AI: **understanding** what happens

SYNERGY





1.3 Institutional empowerment

IN HIGHER EDUCATION

EFFICIENCY

- AI-based **administrative processes:**
  lower cost, decrease time to completion, etc.
  - Admissions
  - Individualized study programs
  - Certification
  - Exchange programs
  - Etc.

EFFECTIVITY

- AI-based **monitoring:**
  increase retention, increase output, etc.
  - Identify students at risk
  - Predict drop-out
  - Etc.

2. What?

2.1 Learner

2.2 Teacher

2.3 Institution

STUDENT-FOCUSED AIED
Intelligent Tutoring Systems (ITS)
AI-assisted Apps (e.g., maths, text-to-speech, language learning) ←
AI-assisted Simulations (e.g., games-based learning, VR, AR) ←
AI to Support Learners with Disabilities
Automatic Essay Writing (AEW)
Chatbots ←
Automatic Formative Assessment (AFA) ←
Learning Network Orchestrators
Dialogue-based Tutoring Systems (DBTS)
Exploratory Learning Environments (ELE)
AI-assisted Lifelong Learning Assistant
TEACHER-FOCUSED AIED
Plagiarism detection
Smart Curation of Learning Materials ←
Classroom Monitoring ←
Automatic Summative Assessment
AI Teaching Assistant (including assessment assistant) ←
Classroom Orchestration
INSTITUTION-FOCUSED AIED
Admissions (e.g., student selection)
Course-planning, Scheduling, Timetabling
School Security
Identifying *Dropouts* and *Students at risk* ←
e-Proctoring

The taxonomy of Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, 57(4), 542-570.

2. 1 Learner-focused AIED

2.1.1. AI-based adaptive learning apps

2.1.2. AI-based open ended tasks

2.1.3. AI-based learner support

2. 2 Teacher-focused AIED

2.2.1. AI-based content creation

2.2.2. AI-based content recommendation

2.2.3. AI-based classroom monitoring

2.3 Institution-focused AIED

2.3.1. AI-based monitoring of students at risk

2.3.2. AI-based student coaching

2.3.3. AI-based administrative processes

2.1. Learner-focused AIED
2.1.1 AI-based adaptive learning apps

Adapt what?

- Immersive game experience for SLA

Adapt what?

- Adaptive **task sequencing**
- Personalised **feedback**

LiNGUiNEO Baekeland VLAIO

Julie Gijpen
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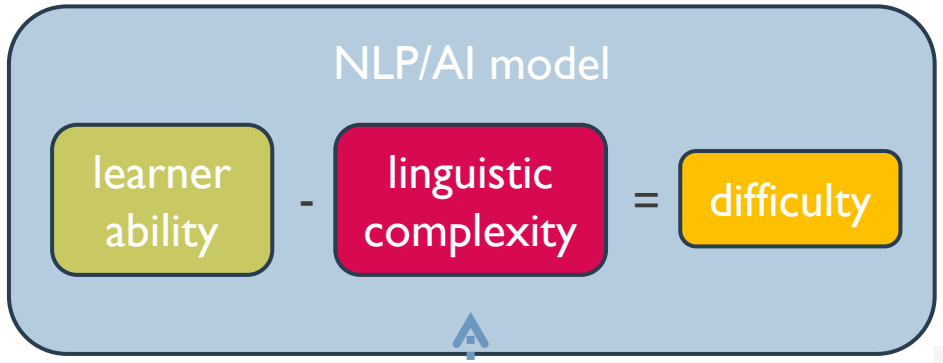
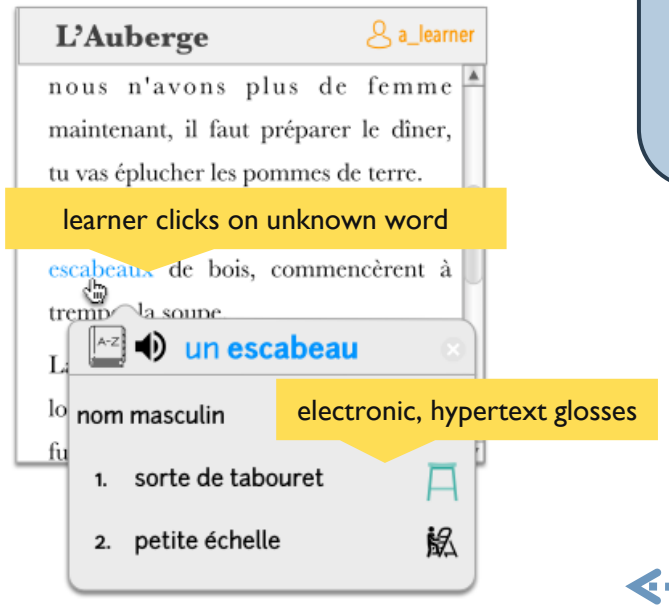
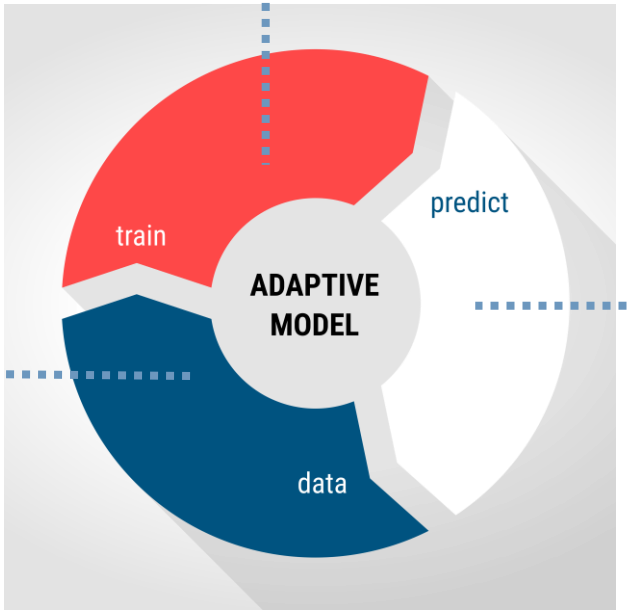
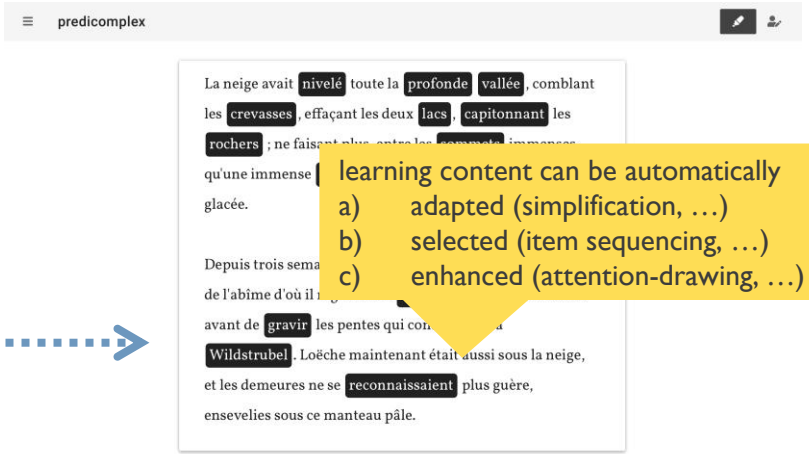
Adapt to what? language competence as a cognitive parameter



new learning materials:
make **personalized predictions** of **difficulty** for the learner







learner data: e.g., which words are *difficult* (unknown) for a specific learner

Anaïs Tack
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2.1.2 AI-based open-ended tasks

Complex **task generation** through **conversational AI** in chatbots

Serge Bibauw
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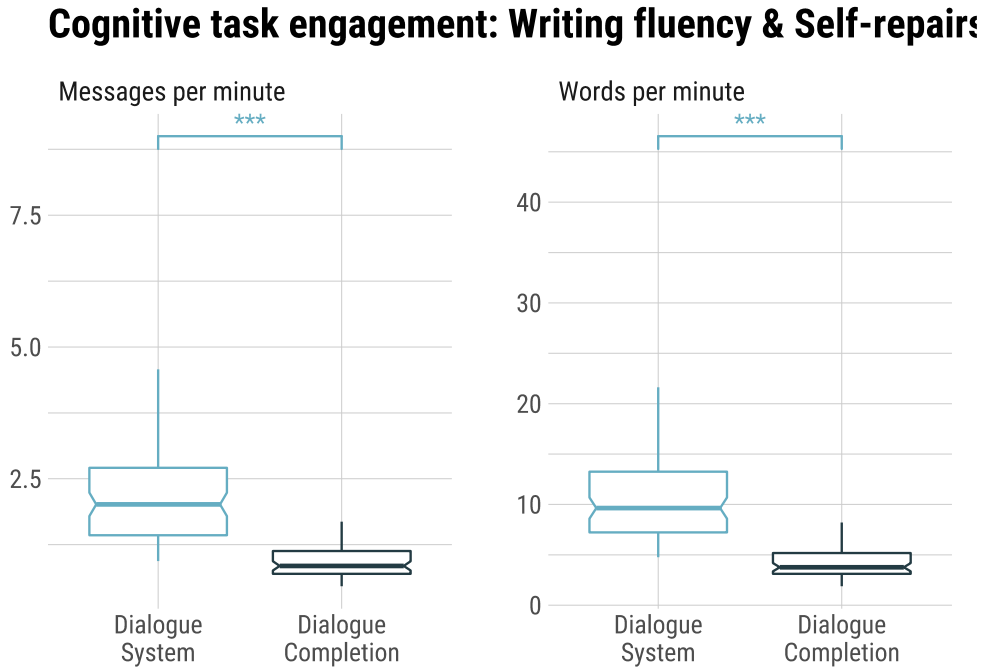
Using conversational AI to **generate open-ended tasks** to:

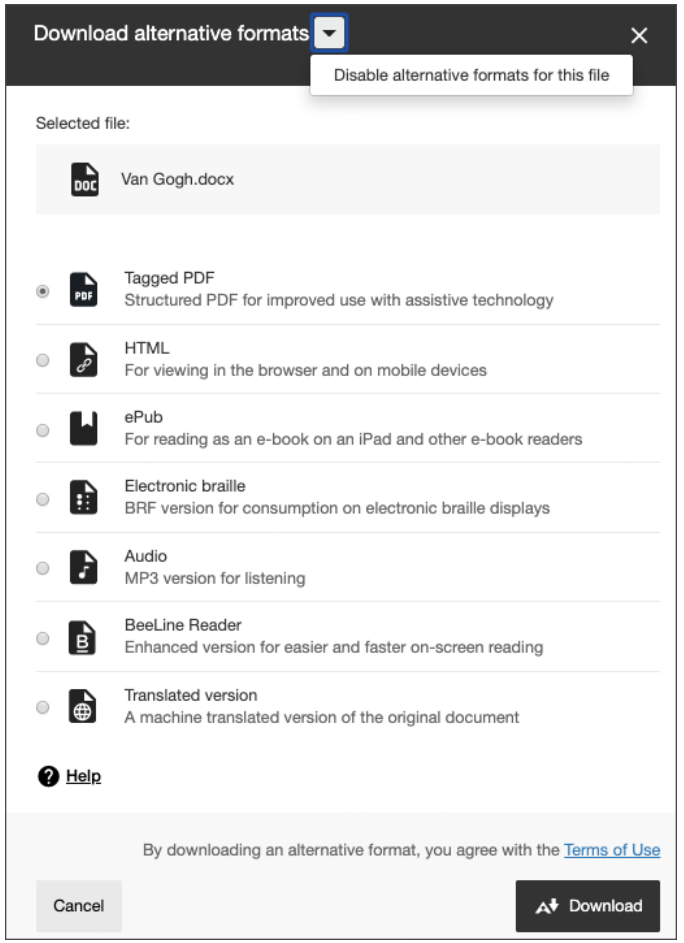
- Determine **right level of challenge**
  (e.g. new structures/words in input, new tasks in output)
- Provide just-in-time, more **useful interactions**
  (e.g. intensify cognitive task engagement)
- **Intensify the effectivity** of the learning proces
  (e.g. writing fluency & self-repairs)



2.1.3 AI-based learner support

AI-based **generation of alternative formats**
to optimise the **accessibility** for learners with disabilities

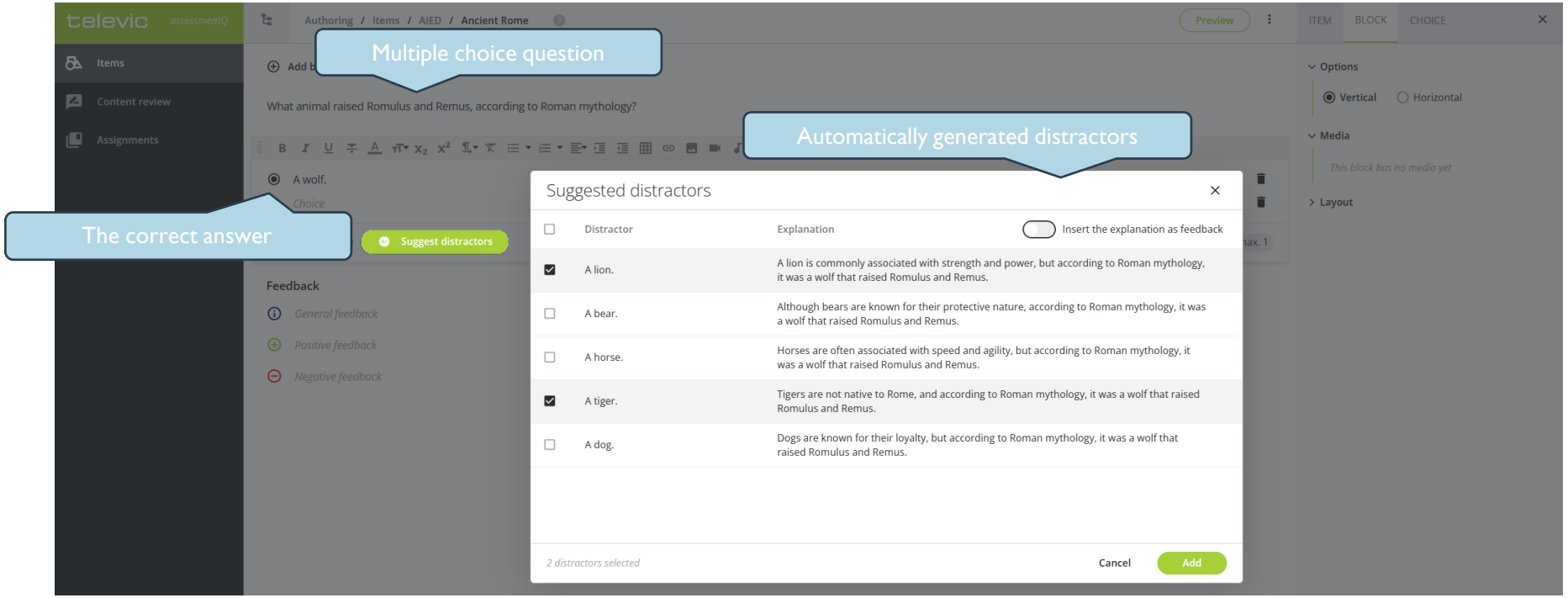
generate alternative accessible formats
using advanced Machine Learning algorithms



Teacher

2.2. Teacher-focused AIED
2.2.1 AI-based content creation

Automatic **distractor generation** in multiple choice questions with predictive prompting and large language models



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Quantifying knowledge

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AI-driven e-assessment
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2.2.2 AI-based content recommendation

Sohum Bhatt
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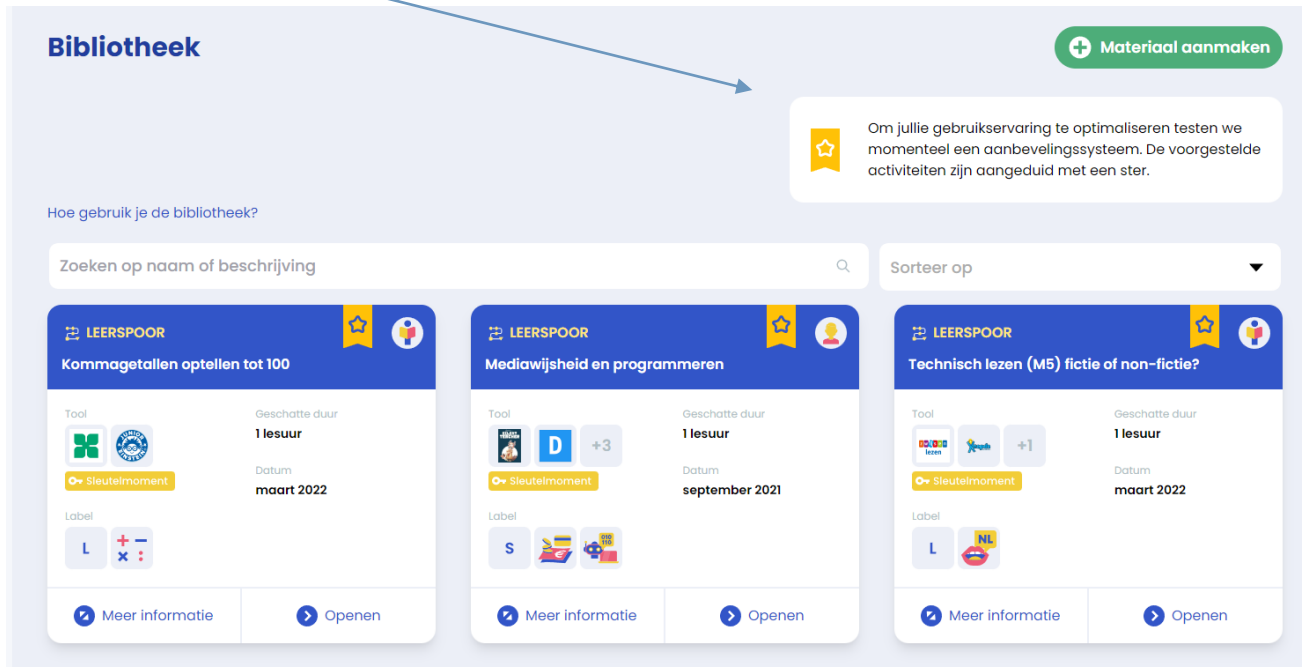
Recommender engine for **content curation/creation** by teachers

- Recommender system for content curation/creation by teachers based on a similarity score of prior interactions
  - Recommended activities
  - Recommended tracks

Recommendations



Flanders
imagination works

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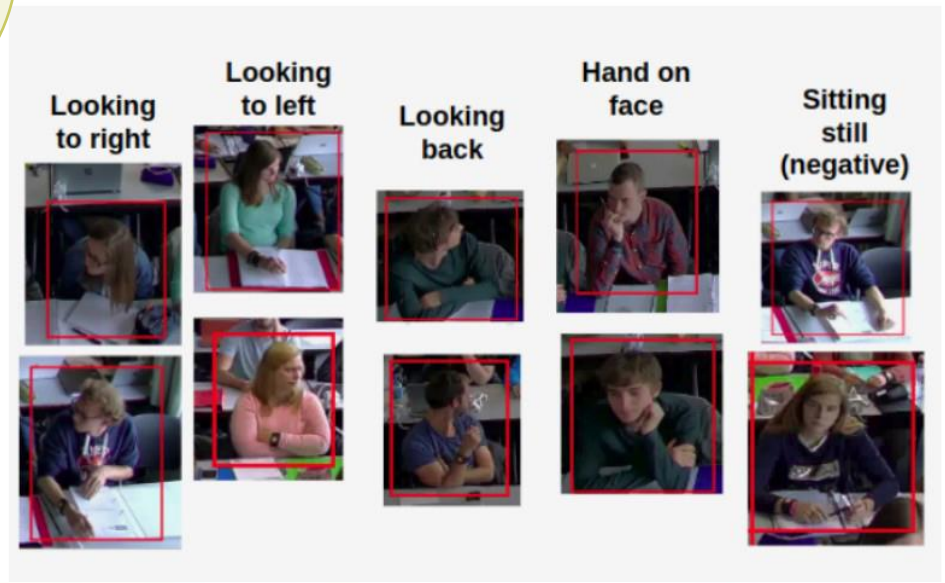
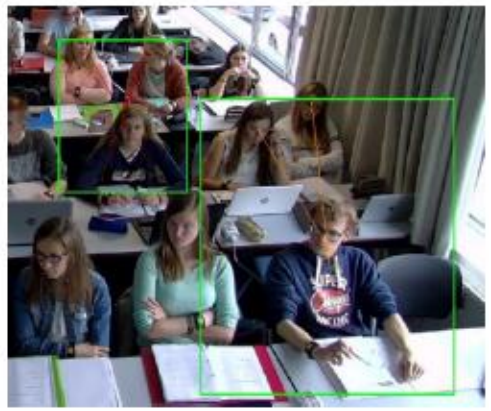
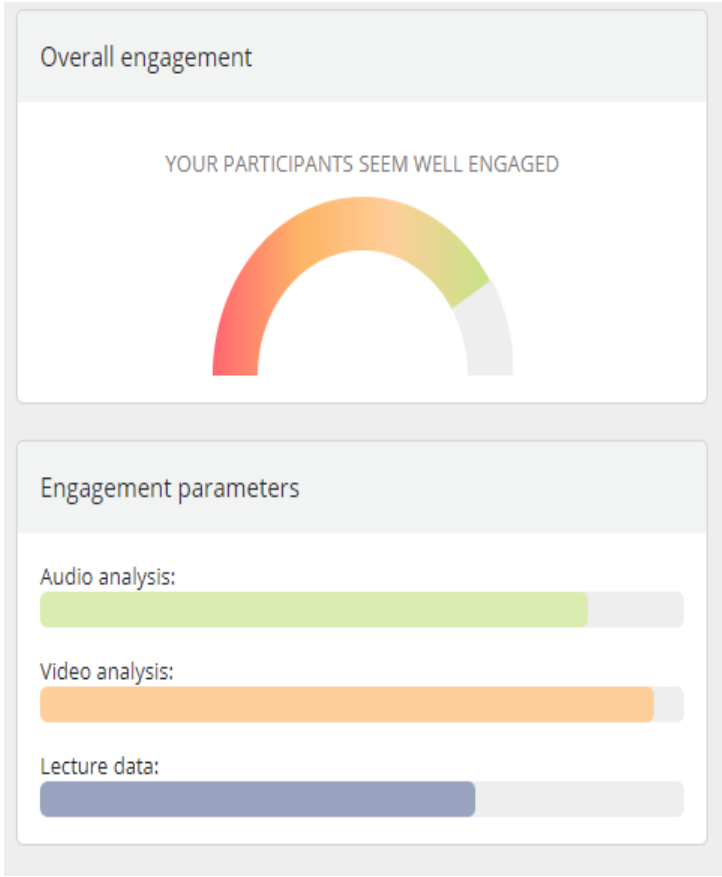
2.2.3 AI-based classroom monitoring

AI-based **analysis of multimedia input** to measure **engagement**







ICON-project **LECTURE+**
https://www.imec-int.com/en/what-we-offer/research-portfolio/lecture

2.3. Institution-focused AIED
2.3.1 AI-based monitoring of students at risk

GHENT UNIVERSITY

Pass/fail prediction in programming courses at UGent

Pass/Fail Prediction in Programming Courses

Charlotte Van Petegem [1], Louise Deconinck [1,2], Dieter Mourisse [1], Rien Maertens [1], Niko Strijbol [1], Bart Dhoedt [3], Bram De Wever [4], Peter Dawyndt [1], and Bart Mesuere [1]

Abstract

We present a privacy-friendly early-detection framework to identify students at risk of failing in introductory programming courses at university. The framework was validated for two different courses with annual editions taken by higher education students (N = 2 080) and was found to be highly accurate and robust against variation in course structures, teaching and learning styles, programming exercises and classification algorithms. By using interpretable machine learning techniques, the framework also provides insight into what aspects of practising programming skills promote or inhibit learning or have no or minor effect on the learning process. Findings showed that the framework was capable of predicting students' future success already early on in the semester.

Institution

2.3.2 AI-based student coaching

Tinne De Laet
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LISSA – **L**earning dashboard for **I**nsights and **S**upport during **S**tudy **A**dvice

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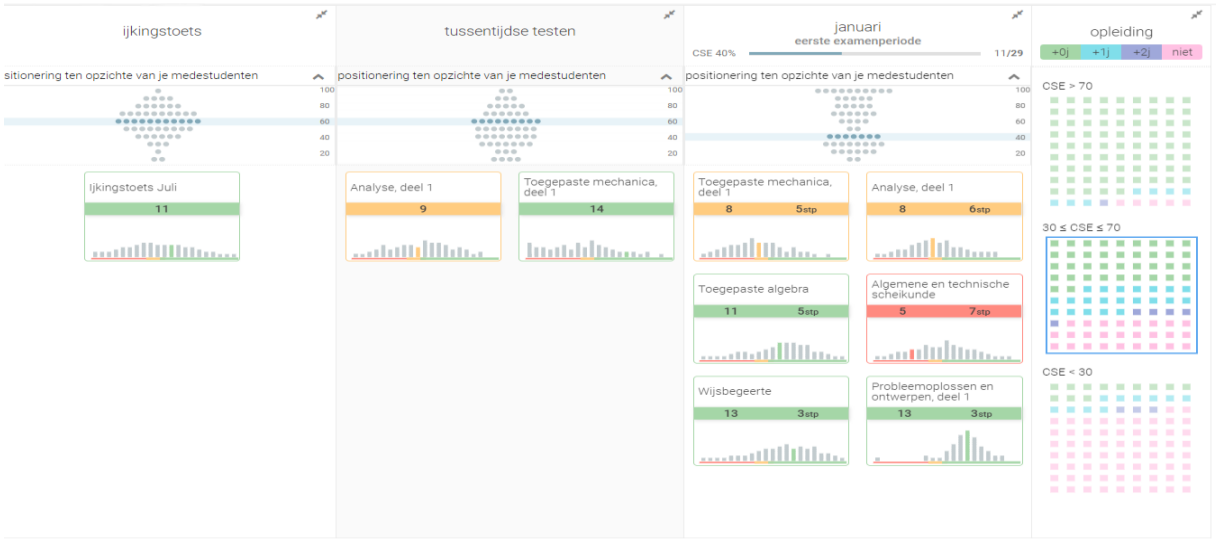

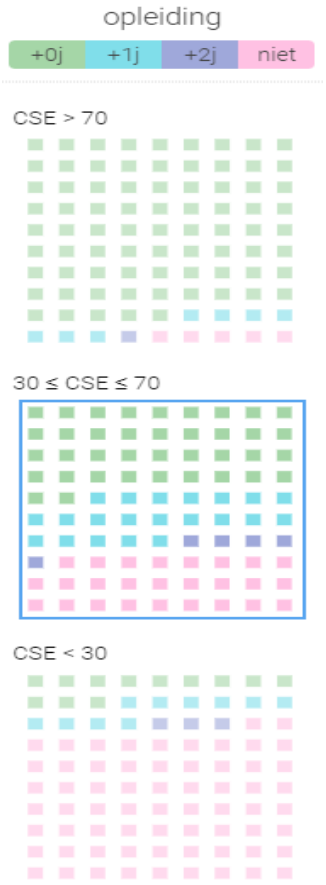

Prediction of progress in coming years

https://wms.cs.kuleuven.be/cs/onderzoek/augment/LISSA

Institution

2.3.3 AI-based administrative processes

Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 164 (2019) 56–63

Procedia Computer Science

www.elsevier.com/locate/procedia

CENTERIS - International Conference on ENTERprise Information Systems / ProjMAN - International Conference on Project MANagement / HCist - International Conference on Health and Social Care Information Systems and Technologies

Question Answering System to Support University Students' Orientation, Recruitment and Retention

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[b] *Higher Institution of computer science and communication techniques University of Sousse, Tunisia.*

[c] *Faculty of science & fine Arts, Arts, Sciences & technology university, Beirut, Lebanon*

Intelligent Assistants in Higher-Education Environments: The FIT-EBot, a Chatbot for Administrative and Learning Support

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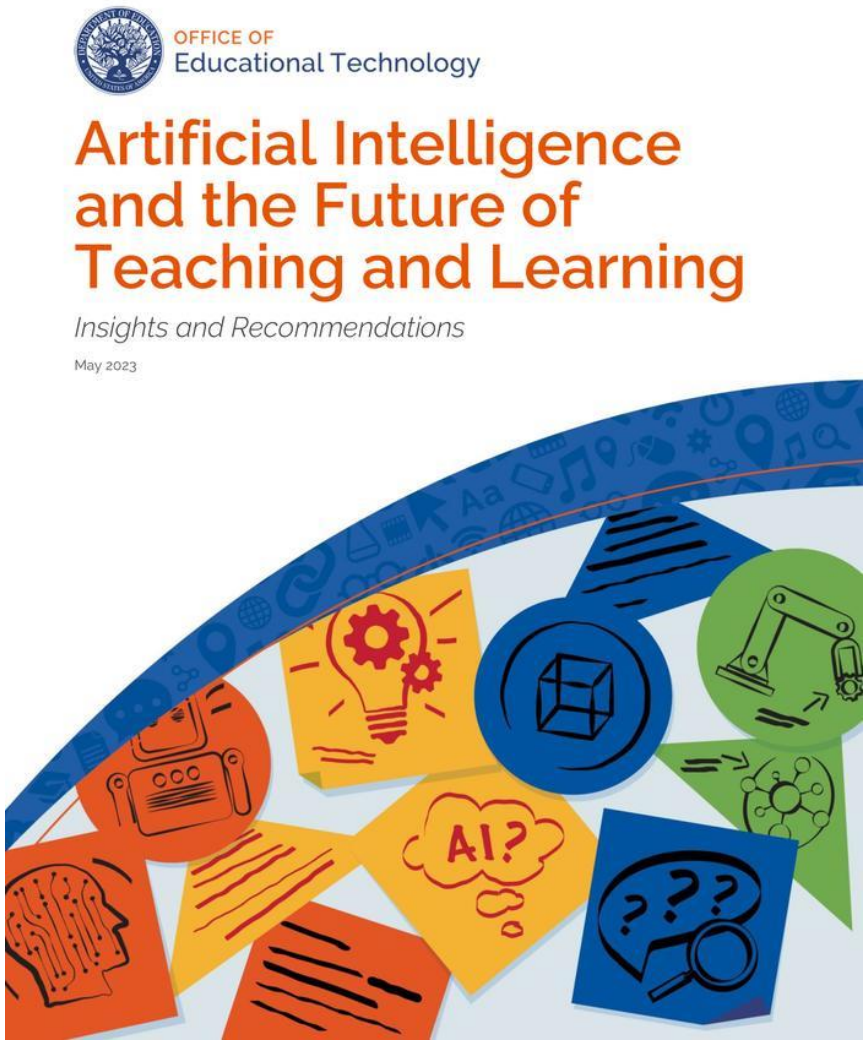
Ho Thao Hien, Pham-Nguyen Cuong, Le Nguyen Hoai Nam, Ho Le Thi Kim Nhung and Le Dinh Thang. 2018.
Intelligent Assistants in HigherEducation Environments:The FIT-EBot, a Chatbot for Administrative and Learning Support.
In SoICT' 18: Ninth International Symposium on Information and Communication Technology, December 6–7, 2018, Da Nang City,Viet Nam.ACM, New York, NY, USA
https://doi.org/10.1145/3287921.3287937

3. What's next?

3.1 Increase the empowerment of learners/teachers & institutions



https://www.tonybates.ca/2018/12/02/another-perspective-on-ai-in-higher-education/

https://digital.library.unt.edu/ark:/67531/metadc2114121/m2/1/high_res_d/ai-report.pdf

3.2 Monitor risks

- Privacy & data protection (cf. GDPR)

- Need for Explainable AI (X-AI)
- Authorship & IP

- Ethics !
- Carbon footprint of AI (cf. Energy consumption)
- Geographical spread of data centers

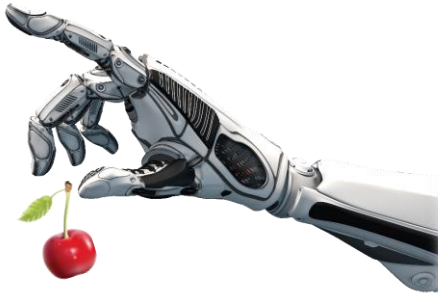
3.3 Realism

No naive expectations → no replacement

No fear nor scepticism → no banning

Sound realism → more augmentation and empowerment

Cherry on the cake



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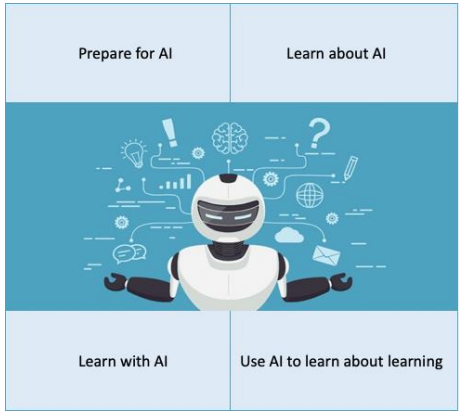
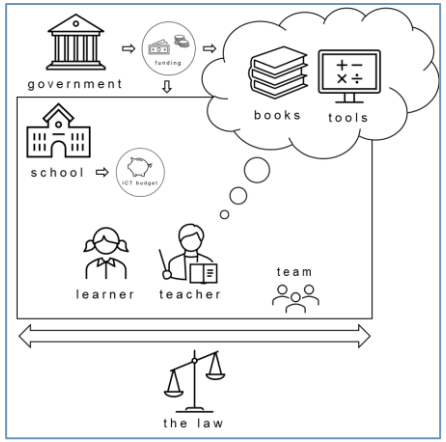
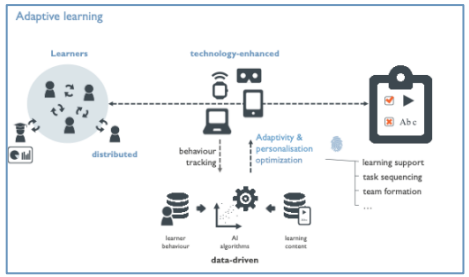
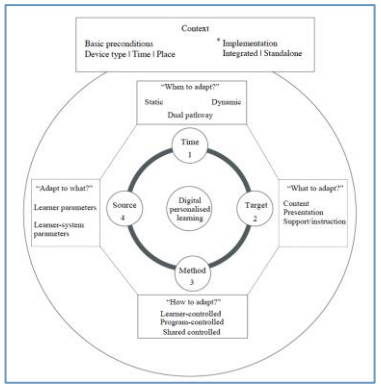
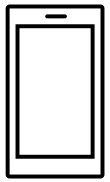
interactive online course











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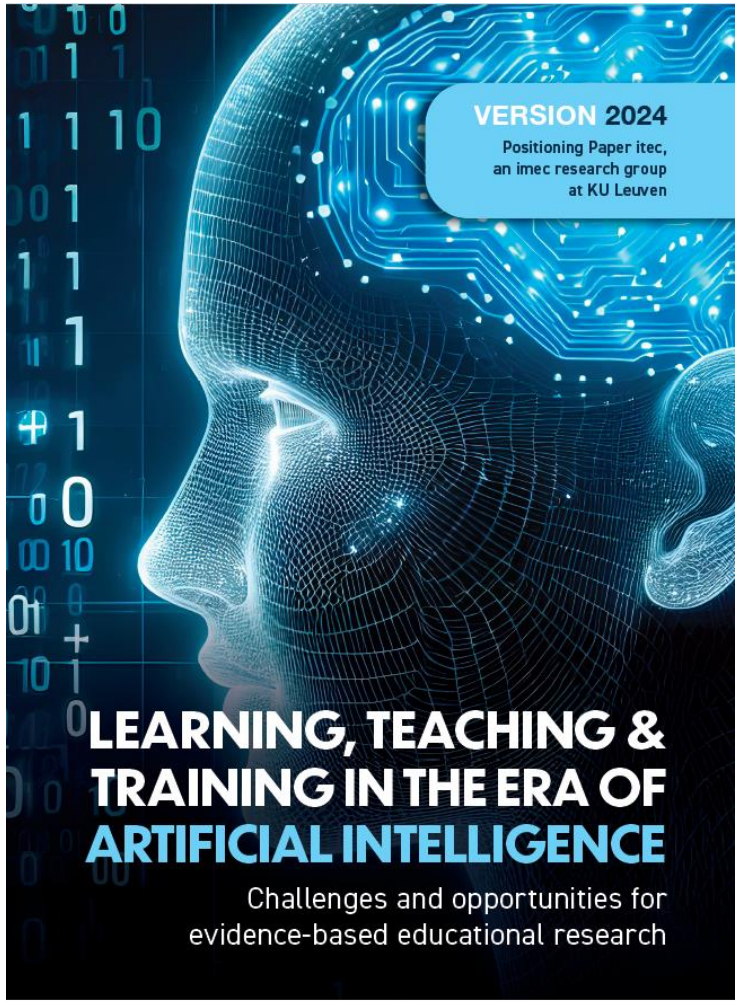
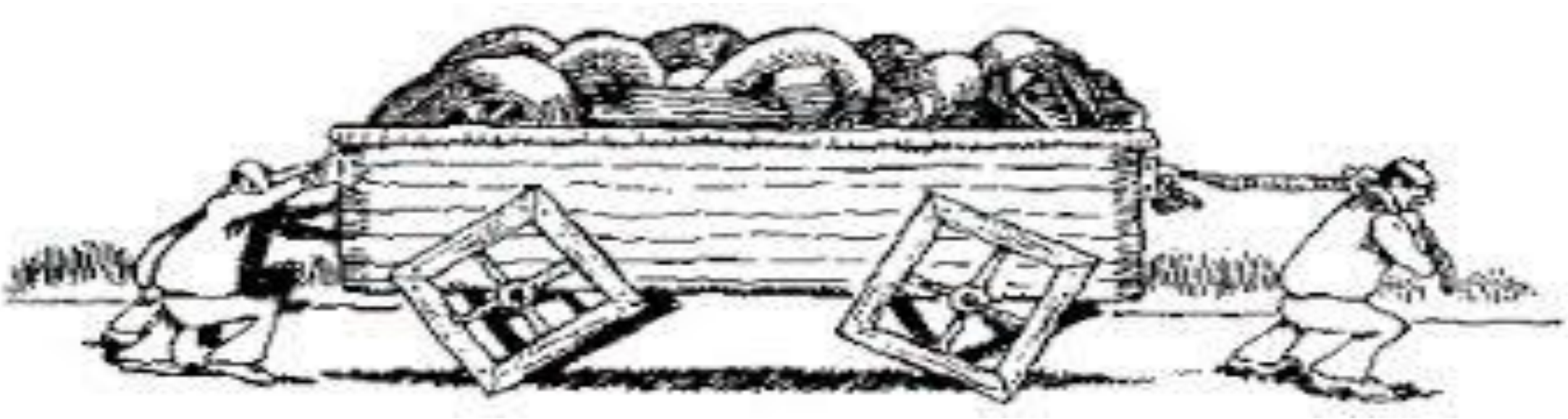


Let the wheels do the walking…



http://ayende.com/blog/2421/when-does-it-make-sense-to-reinvent-the-wheel


Wisdom is knowing what to do next, skill is knowing how to do it, and virtue is doing it.
- David Starr

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