



Collaboration in Higher Education for Digital  
Transformation in European Business

<http://www.chedteb.eu>

## Intellectual output 4 – curriculum Background and comments



Co-funded by the  
Erasmus+ Programme  
of the European Union



**FH Bielefeld**  
University of  
Applied Sciences

# **Joint Degree**

## **Digital Transformation of Corporate Business**

**Intellectual Output 4 – curriculum**

**Learning outcomes, learning organization,  
learning design**

Proposed models

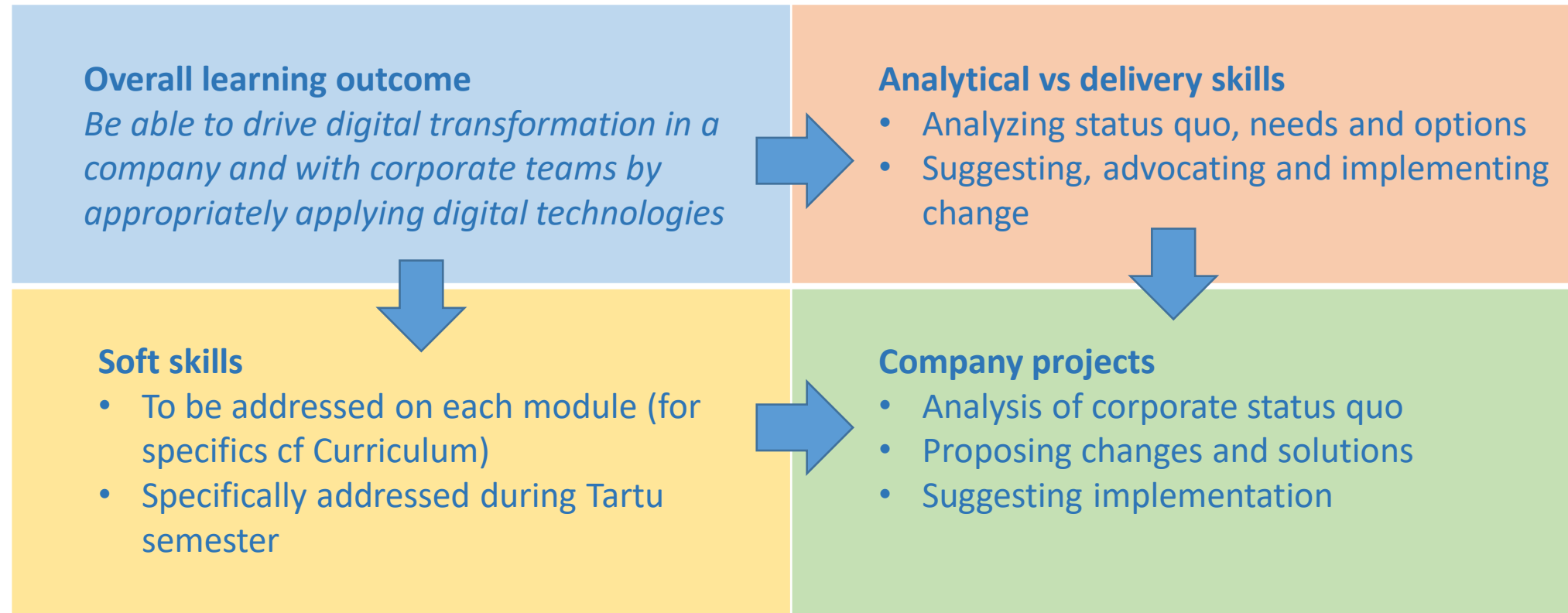
## Context

- 5 intellectual outputs under CHEDTEB project [www.chedteb.eu](http://www.chedteb.eu)
- Intellectual output 4 – curriculum of a future Joint Master's degree on Digital Transformation
- Curriculum – Learning outcomes, subjects, modules, methodology/ learning design, skills mix
- *Here*: learning outcomes, program organization, rotation, syllabus sequencing, learning design – all complementing content side

## Part A

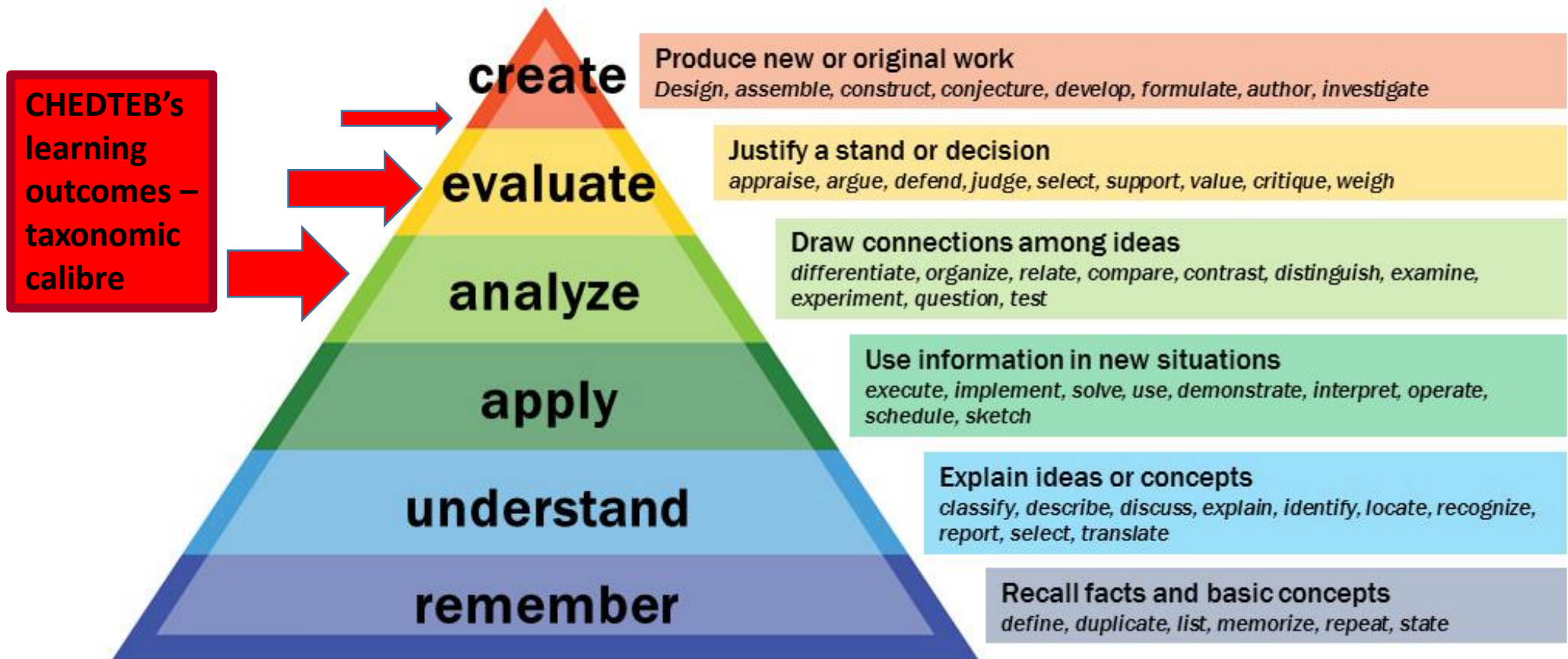
### **Learning outcomes**

# The CHEDTEB degree - learning outcomes and objectives



# Taxonomy – CHEDTEB's skills levels<sup>1</sup>

## Bloom's Taxonomy



# The CHEDTEB degree – content areas (overview)<sup>2</sup>

Semester 1	Semester 2	Semester 3	Semester 4
5 study modules 1 project module	4 study modules 1 project module	4 study modules 1 project module	Master thesis project

## Part B

### **Learning organization**

- **Cohort rotation**
- **Syllabus sequencing**



# Organizational requirements and constraints

- **3 locations**
- **Maximum of mobilities**
- **Manageability**
- **No or low tuition fees**

## Rotation model 1: Starting/enrolling at one location, full cohort rotation

Joint degree platform of A/B/C universities -> international marketing of degree  
and annual intake of 30 students

Location A, term 1 (winter)	Mod- ule 1	2	3	4	5
Location B, term 2 (summer)	6	7	8	9	10
Location C, term 3 (winter)	11	12	13	14	15
Location A or B or C, term 4 (summer)	Master thesis				

Capacity required from each university - 5 modules once a year;

Problem: If program starts at A – will only A students apply? Diversity of students in class?

Students study in three locations, blended learning/training and virtual collaboration may ease rotation.

## Rotation model 2: Starting/enrolling at two locations at the same time

Joint degree platform of A/B/C universities -> International marketing of degree  
and annual intake of 60 students

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Term 1 (winter)

**Location A**/30 students  
Modules 1,2,3,4,5

**Location B**/30 students  
Modules 6,7,8,9,10

Term 2 (summer)

**Location B**/30 students  
Modules 6,7,8,9,10

**Location A**/30 students  
Modules 1,2,3,4,5

Term 3 (winter)

**Location C**/30 students  
Modules 11,12,13,14,15

**Location C**/30 students  
Modules 11,12,13,14,15

Term 4 (summer)

**Location A or B or C** / 60 students  
Master thesis

- 60 ECTS in capacity required from each university – A and B offer 2 identical sets of 5 modules over two terms; C offers 2 identical sets of 5 modules in one term
- Term 2: 1-2 modules could be taught as blended learning classes to train collaboration
- Problem: If A/B start, will only A/B students apply?
- Students study in three locations.

### Rotation model 3: Starting/enrolling at two locations at the same time, but only one change of location

Joint degree platform of A/B/C -> international marketing of degree and annual intake of 60 students		
Term 1 (winter)	<b>Location A</b> /30 students Modules 1,2,3,4,5	<b>Location B</b> /30 students Modules 1,2,3,4,5
Term 2 (summer)	<b>Location A</b> /30 students Modules 6,7,8,9,10	<b>Location B</b> /30 students Modules 6,7,8,9,10
Term 3 (winter)	<b>Location C</b> /30 students Modules 11,12,13,14,15	<b>Location C</b> /30 students Modules 11,12,13,14,15
Term 4 (summer)	Location A or B or C / 60 students Master thesis	

- 60 ECTS in capacity required from each university – A and B offer 2 distinct sets of 5 modules over two terms; C offers 2 identical sets of 5 modules in one term
- Term 2: 1-2 modules could be taught as blended learning classes to train collaboration
- Problem: If two semesters run at A or B, will only A/B students apply? Will this make C a minor partner?
- Students study in only two locations.

## Rotation model 4: Starting/enrolling at one location, then two changes of location

Joint degree platform of A/B/C -> international marketing of degree  
and annual intake of 60 students

Term 1 (winter)

**Location A/30 students**  
Modules 1,2,3,4,5

**Location A/30 students**  
Modules 1,2,3,4,5

Term 2 (summer)

**Location B/30 students**  
Modules 6,7,8,9,10

**Location C/30 students**  
Modules 11,12,13,14,15

Term 3 (winter)

**Location C/30 students**  
Modules 11,12,13,14,15

**Location B/30 students**  
Modules 6,7,8,9,10

Term 4 (summer)

Location A or B or C / 60 students  
Master thesis

- 60 ECTS in capacity required from each university – A runs 2 identical sets of 5 modules in same term, B and C offer 2 identical sets of 5 over two terms
- Term 2: 1-2 modules could be taught as blended learning classes to train collaboration
- Problem: If A is the only entry gate, will mostly A students apply?
- Students study in three locations.

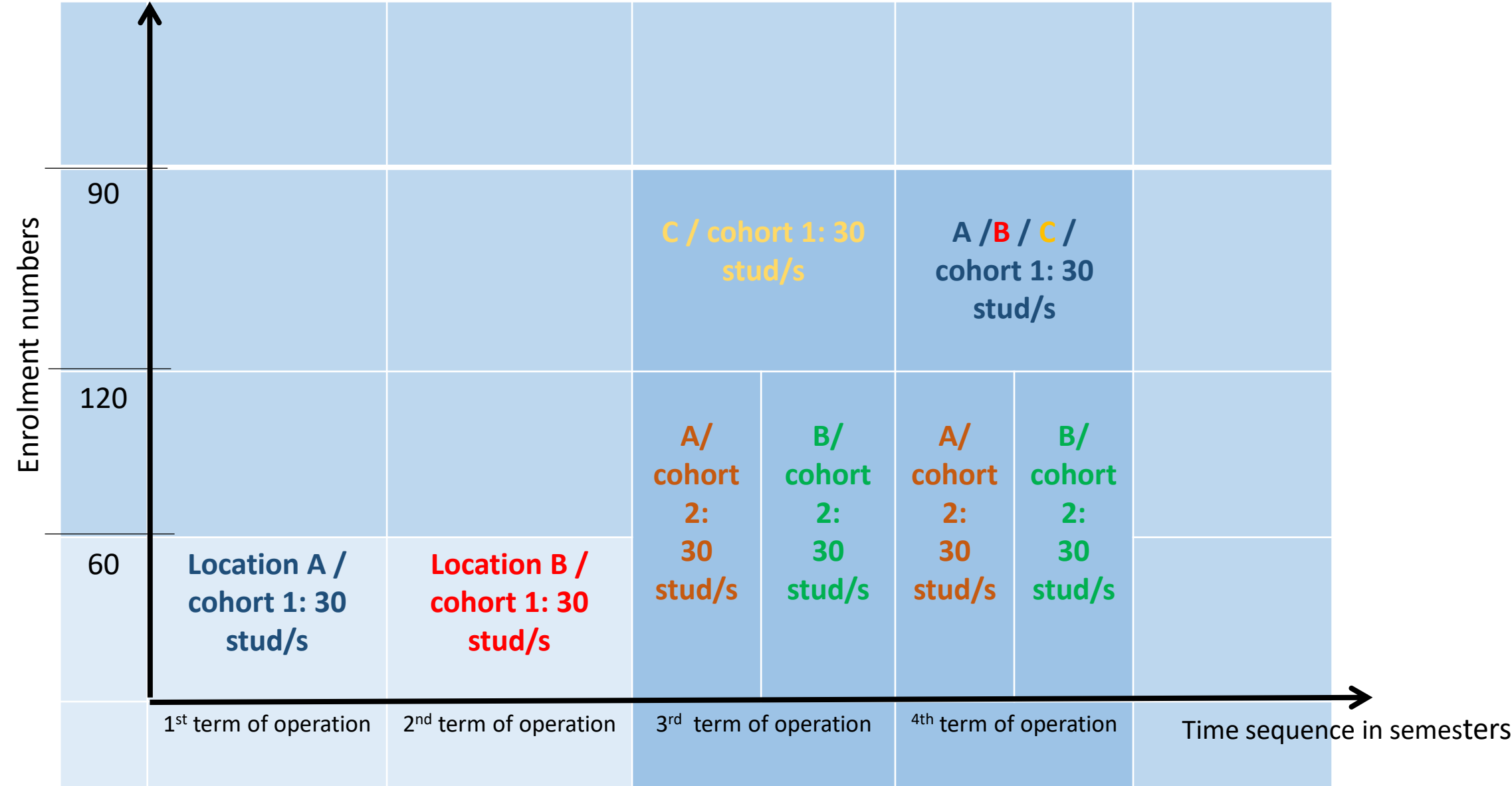
### Rotation model 5: Starting/enrolling at three locations at the same time

Joint degree platform of A/B/C universities -> international marketing of degree  
and annual intake of 60 students

Term 1 (winter)	<b>Location A</b> /20 students Modules 1,2,3,4,5	<b>Location B</b> /20 students Modules 6,7,8,9,10	<b>Location C</b> /20 students Modules 11,12,13,14,15
Term 2 (summer)	<b>Location B</b> /20 students Modules 6,7,8,9,10	<b>Location C</b> /20 students Modules 11,12,13,14,15	<b>Location A</b> /20 students Modules 1,2,3,4,5
Terms 3/1 (winter)	<b>Location C</b> /20 + 20 stud/s Modules 11,12,13,14,15	<b>Location A</b> /20 + 20 stud/s Modules 1,2,3,4,5	<b>Location B</b> /20 + 20 stud/s Modules 6,7,8,9,10
Term 4 (summer)	<b>Location A or B or C</b> /60 students Master thesis		

- Capacity required from each university: two sets of 5 modules over a year; each university runs identical modules each term;
- Terms 2 and 3: 1 to 2 modules to be taught as blended learning classes to train collaboration.
- Students study in three locations.

# Option 3 scenario: building up enrolment over a time sequence



## Overview of rotation models

	Model 1 (3 locations, annual intake of 30 students)	Model 2 (3 locations but annual intake of 2x30 students)	Model 3 (2 locations, annual intake of 2x30 students)	Model 4 (3 locations, annual intake of 3 x 20 students)	Model 5 (3 locations, entire cohort starts at A, annual intake of 3 x 20 students)
pros	<ul style="list-style-type: none"> <li>• Low risk, easy to grasp, low planning expenditure</li> <li>• Low teaching capacity requirements</li> <li>• Low cost to unis</li> <li>• High mobility</li> <li>• Unis can specialize</li> </ul>	<ul style="list-style-type: none"> <li>• 3 study locations, high mobility</li> <li>• Partner C can start one year later</li> <li>• Gradual unfolding</li> <li>• Unis can specialize</li> </ul>	<ul style="list-style-type: none"> <li>• Lower rotation, lower cost to students</li> <li>• Probably easier integration esp for non-European students</li> <li>• A and B <u>can</u> cover wide range of subjects</li> </ul>	<ul style="list-style-type: none"> <li>• Easy to grasp</li> <li>• Freedom of sequencing choices for students</li> <li>• High mobility</li> </ul>	<ul style="list-style-type: none"> <li>• Rather easy to grasp</li> <li>• Compromise of clarity and choice for students</li> <li>• High mobility</li> <li>• Simpler 1<sup>st</sup> term enrolment</li> <li>• Cohort spirit easier to achieve</li> </ul>
cons	<ul style="list-style-type: none"> <li>• Student mix leaning towards term 1 location.</li> <li>• Each partner must offer same 5 modules each term.</li> <li>• High rotation creates high admin/org workload for unis and students</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity strain if taking in 60 from launch on.</li> <li>• Student mix leaning towards term 1 location.</li> <li>• Each partner must offer same 5 modules each term.</li> <li>• High rotation creates high admin/org workload for unis and students</li> </ul>	<ul style="list-style-type: none"> <li>• Encourages 'homestays' for one year, i.e. minimal mobility.</li> <li>• Student mix leaning towards terms 1+2 location.</li> <li>• Partner C may be reduced to minor position, but forced to run at double capacity in term 3.</li> <li>• A and B <u>must</u> cover wide range of subjects</li> </ul>	<ul style="list-style-type: none"> <li>• High risk.</li> <li>• Each partner must offer same 5 modules each term</li> <li>• Free sequencing requires highly flexible curriculum</li> <li>• Free sequencing makes service planning (housing) more unpredictable</li> </ul>	<ul style="list-style-type: none"> <li>• Strain on A's teaching capacity in term 1</li> <li>• Free sequencing of terms 2 and 3 requires good counselling</li> <li>• Service planning (housing) more unpredictable in terms 2+3</li> <li>• Uncertainty of terms 2 and 3 location planning for students</li> </ul>



## Overview of sequencing options

	Option 1 Any model imposing <b>strict sequence</b> of terms (rotation models 1, 2)	Option 2 Any model allowing for <b>free choice</b> of term sequence (rotation models 3, 4, 5)
pros	<ul style="list-style-type: none"> <li>• Clear, predictable for students and unis</li> <li>• Cohort spirit may emerge more easily due to full cohort rotation</li> <li>• Low transaction cost to unis</li> <li>• Soft skills learning curve easier to monitor</li> <li>• Easier diagnosing of individual or general deficits</li> </ul>	<ul style="list-style-type: none"> <li>• Free choice for students while ensuring high mobility</li> <li>• Individual options for constructing pathways</li> <li>• Encourages initiative</li> </ul>
cons	<ul style="list-style-type: none"> <li>• Future expansion of numbers difficult</li> <li>• 'Oversignposting' may lead to passiveness</li> <li>• Rigidity may stand in the way of opportunities (corporate projects, specific assignments, local events)</li> </ul>	<ul style="list-style-type: none"> <li>• Uncertainty for unis in planning incomers for terms 2 and 3</li> <li>• General learning progress harder to track</li> <li>• Students may lack foundations (or may find out late they do)</li> <li>• Need to highly synchronize teaching of same modules in different locations</li> <li>• 'Cohort' management impossible</li> <li>• Requires high competence in online learning, management, and admin (with students and unis)</li> </ul>

# CHEDTEB's choice: simplicity and manageability

After weighing the options, the consortium decided to adopt **model 1** as the most suitable option on the basis of these considerations:

- As of now, the consortium members don't feel they have enough experience and capacity to sustain more ambitious models (3, 4 or 5).
- Main decision-making factors should be **clarity** and **student guidance**, which are best addressed by mapping out a linear and universal pathway.
- Variations offering more choices may be introduced at a later stage.
- Response from capacity planners and deans at our faculties has shown that we should communicate clear capacity requirements especially at launch stage. As any capacity burden is scrutinized and checked against other priorities, the workload and curriculum message sent should be clear and readable. More complex design should wait till the program has proved to be successful and manageable.

## Part C

### **Background - Decision factors in selecting the CHEDTEB learning design\***

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\*All sources to appear as endnotes

# Demand – how is learning to be organized?

The CHEDTEB consortium has, through original and desktop research, recorded high demand expressed by companies for **change-driving staff** educated in open and innovative learning environments.

This has produced two typical reactions at university / faculty level:

- Churning out (often paid-for) Digital Transformation degrees that reproduce the **old classroom learning** patterns but equipped with glossy materials and occasional case-based / problem-based approaches<sup>3</sup>
- ‘Digitization’ of mainstream Business degrees where digital ‘extensions’ (logistics, marketing, HR) are built into established business function subjects that continue to survive in the old ‘**silo**’ logic

This reflects a ‘wash me but don’t wet me’ attitude as a German saying goes. Universities are still hesitant about fully embracing developments that will force them to overthrow compartmented teaching/learning routines.<sup>4</sup>

This corresponds, at least at the current stage, to most SMEs’ stance deferring major adjustments and significant reforms in structure and core processes to the mid-term future, and making ‘digestable’ adjustments.<sup>5</sup>

# Public university coming under pressure

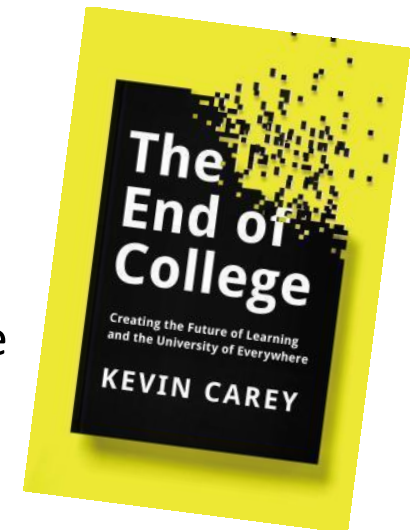
A number of (mainly external) factors may, in the mid-term, speed up the reform of learning organization at universities:

- Increased **competition** from **private providers** and universities: Khan's Academy, Udemy and others as pacemakers. Service: specific, affordable and user-friendly online education. Private universities – outside the Ivy League eco-system – 'sell' managed degrees and proximity to private sector that is said to provide better employment opportunities.
- Increased international **competition** from **gamechanging** universities. Mobility, especially for Master's programs, has increased dramatically.
- Increased pressure from **private sector** and thinktanks influencing educational policies
- Challenges brought forward for universities to open up to **industry's and society's** demands
- The success of supposedly '**integrated**' / industrial degrees
- The penetration of **MOOCs** into mainstream Higher Education and universal access to knowledge

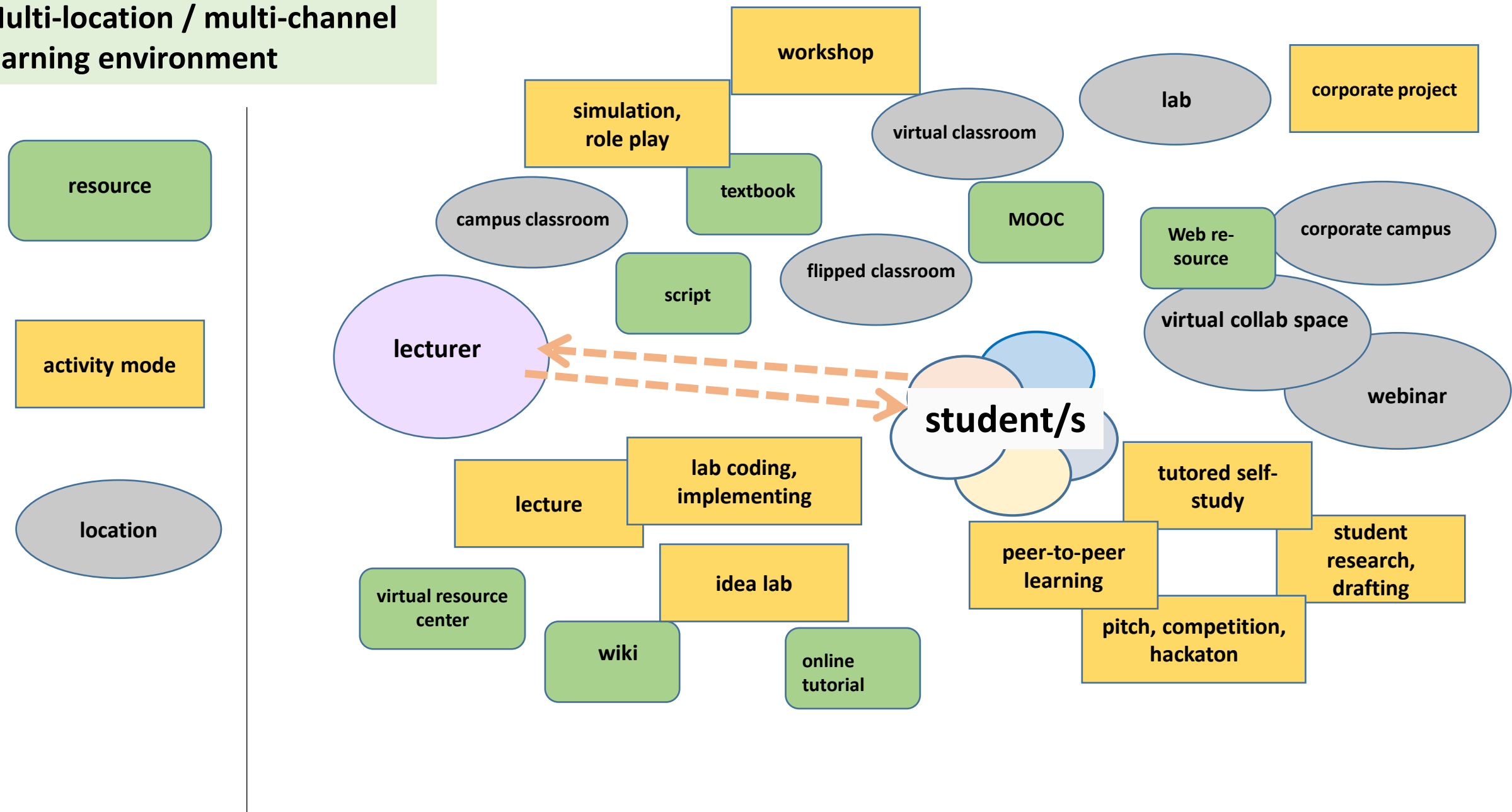
# Imminent changes in teaching/learning at public universities

Changes appearing on the horizon:<sup>6</sup>

- Committing to **societal needs** and organizing **opening** of learning.
- Universal use of MOOCs and digital content designed for **self-access** learning, consequently change of role of lecturers (content providers vs moderators/coaches).
- Self-paced student learning inside or outside classrooms. Reduced role of 'cohort learning', **multi-location** learning (campus, internships, assignments, exploration, home study). Campus losing status as single location of learning.
- Diversification of **individual learning pathways**, pressure to flexibilize curricula. Open and customizable curricula, a-la-carte syllabi.
- Role of lecturers massively shifting towards **moderation, mentoring** and **coaching**.
- Battle among **teaching faculty** over new learning culture.
- **Universities** as the historical center of debate and idea building opening up to private sector and seeking role in **delivering** change.



# Multi-location / multi-channel learning environment



# Popular current 'integrated' learning environments

Trend: **integrate** with business, industry and societal organizations – make it '**practical**' and '**hands-on**'

Origin: mainly in German-speaking countries (background: job-based vocational training), characteristics of new types of degrees:

- Multitude of terms: 'industrial degrees', 'alternance' (Fr), 'apprenticeships', 'professional degree', 'immersion program', 'dual programs', 'professional degree', 'integrated degree', ...<sup>7</sup>
- On and off-campus, certain immersion with real-world work environments, but learning processes kept (mostly) separate with little actual integration (hence 'alternating')
- Certain to high involvement of private stakeholders in governance and recruitment, public-private partnership
- Students mostly under employment contract (working hours, pay, covered by collective agreements)
- Good job opportunities for graduates, high job security motivation
- On-campus learning mostly conventional classroom instruction, on-the-job component with numerous variations and less formalized learning environments
- Education as a marketable commodity
- Mainly BSc and BA level, little to no integration with campus research, 'streamlined' and compact academic curricula, trend towards 'pattern-recipe-checklist' (termed 'practical') teaching



# Discussion: Private vs public? 'Bildung' vs training? Knowledge vs skills? Meaning vs commodity? ... vs ...?<sup>8</sup>

CHEDTEB in search of an integrated learning environment for a Master's in Digital Transformation

	Yes / no	Yes but ...
Involvement of private business in degree delivery	Yes	Joint, negotiated and consensual decisionmaking
Integrated (academic-industrial) curriculum	Yes	Agreed processes for integrated teaching and learning
Corporate immersion of students	Yes	Co-affiliation of students
Research element in learning design	Yes	Deep learning and result orientation
'Bildung' (Humboldt) and training combined	Yes	Ethics, values, responsibility and sustainability
Self-paced and problem-based learning, individualized learning pathways and open curricula	Yes	On and off-campus
Multitude of learning locations and environments	Yes	No exclusive 'ownership' of students
Open campus and corporate premises	Yes	Student access to tutoring, hierarchies and data
Collaborative and transnational learning environments	Yes	Collaboration across teams and national borders
Students under employee status	No	Strong focus on learner autonomy combined with commitment and loyalty

# Farewell to the universal and standardized curriculum

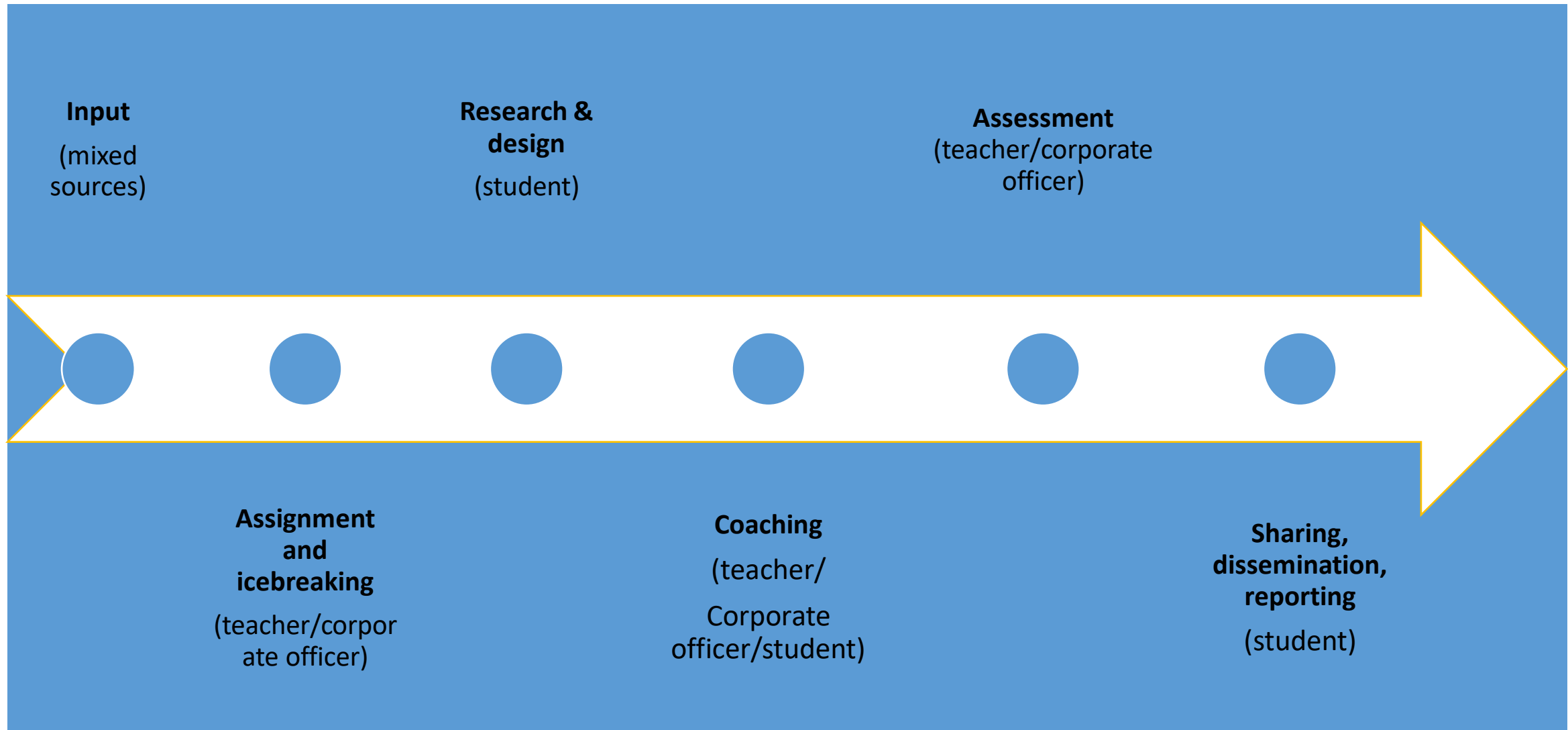
Individualizing learning pathways on the CHEDTEB degree

- **'Agile' curricula:** high content turnover, focus on cross-functional and soft skills
- **'Mass customization'** of degree profile: underneath level of core content areas (modules of semesters 1 to 4) large playing field for student to self-design learning agenda (partly digital content resources, teambuilding, assignments for problem-based studies, collaborative infrastructure, coaching by lecturer)
- Regular **re-design** of module topics and content in interaction with corporate partners
- Content of **modules** to be applied in one corporate project per semester, project with academic and industrial focus, **project** assignment to be negotiated between student teams, academic and corporate partners
- Cross-faculty/cross-border **teambuilding** of students
- Problem of accreditation: conventional accreditation cycles heavy-weighted and lengthy, **systemic accreditation** to be sought for facilitating fluidity
- Problem of **assessment**: Reduced standardization of content requires **individualized** exam formats and deliverables. Comparability to be ensured by focus on results as operationalized indicators of skills and learning outcomes.

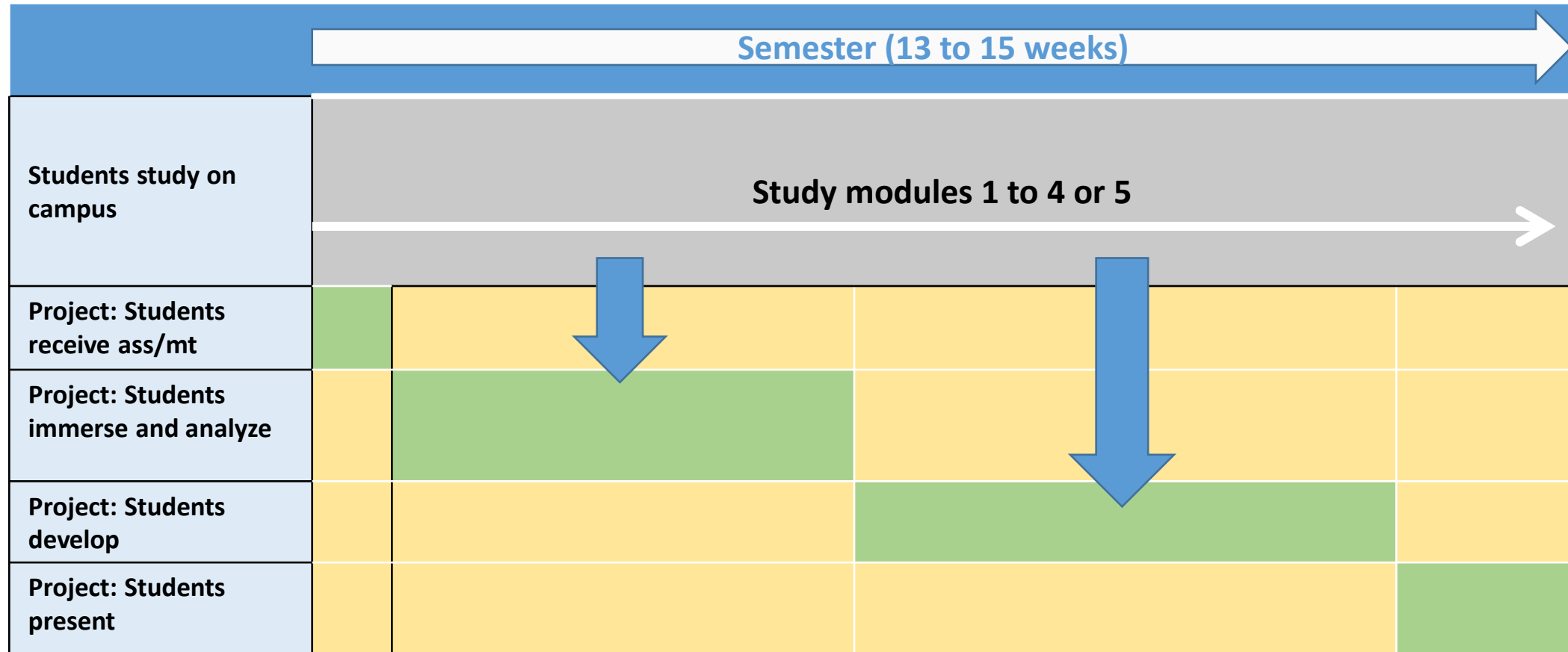
# Project-based learning on the CHEDTEB degree

- **Function** of project modules: apply and practice skills acquired during the (four) semester modules
- Project module requires **briefing and debriefing format, agreements** with companies (legal issues, assessment, credits, responsibilities and duties, deadlines, finance a.o.) and a **module leader**
- Semester projects **co-assigned** by **academic** and **corporate** partners to groups of c. 4 students and negotiated with student teams, assignment to be based on semester's study modules but may have reduced focus
- **No 'handovers'** of students like in alternator mode
- **Integration** with semester content and corporate agenda in a number of ways, options:
  - Ongoing: student groups are assigned tasks at start of term and work on them parallel to attending study modules
  - Blockwise: student groups work on assignments for one block period during term
- Student teams: local or cross-university if feasible
- Integrated **tutoring** teams (academic and corporate partner), integration of **corporate lecturers** on semester's module pathway
- Creditable teaching workload of the project module should be 6 ECTS, **study modules** calibrated flexibly, e.g. 6 ECTS, 10 ECTS, 12 ECTS, but standard should be 6 ECTS
- **Technical delivery** of the project module to be defined locally and flexibly by each partner
- **Collaboration** framework required: small project support groups (lecturer/s, corporate coach, occasionally HR officer, customer if applicable) and consultation council (academic program director, corporate HR, student representative)

## Study pattern of the semester project

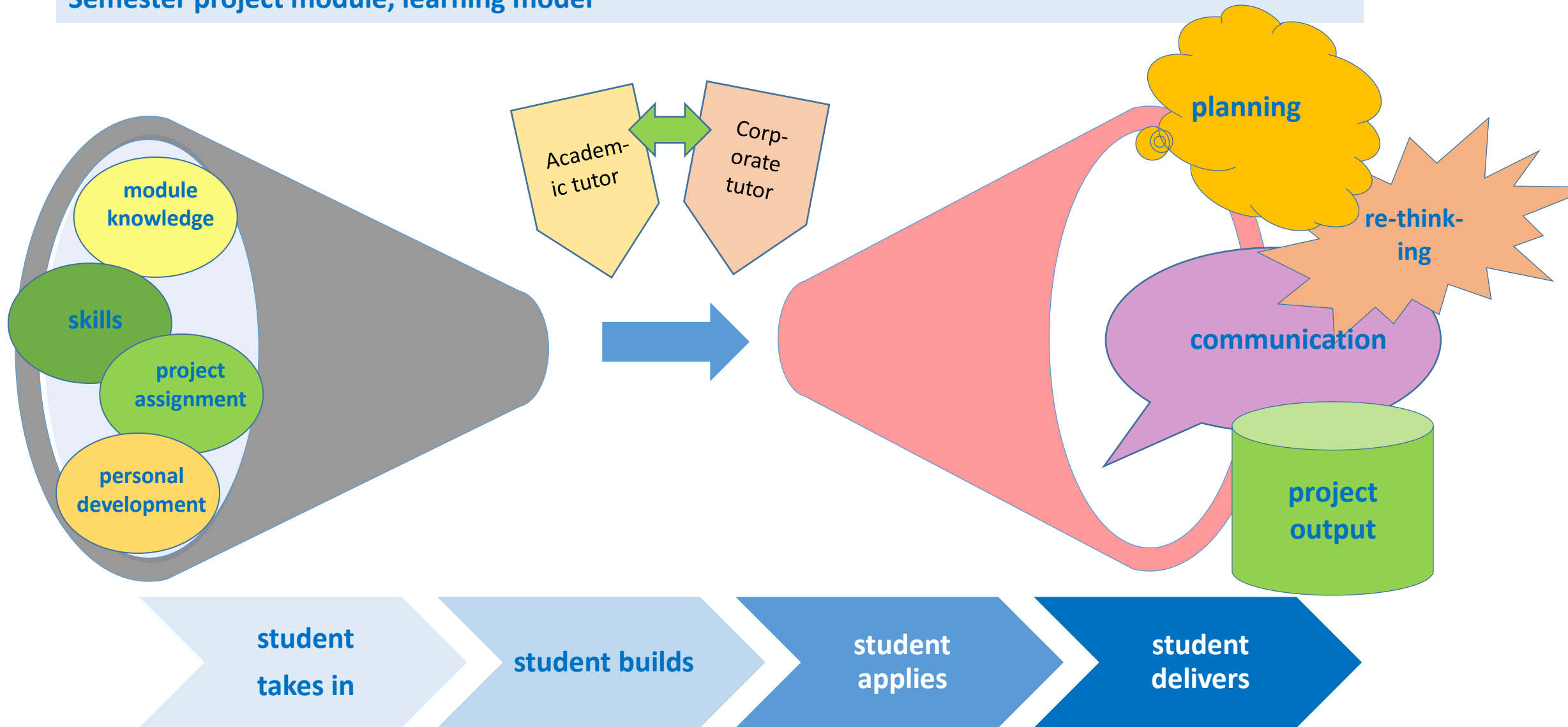


One corporate project module per semester, four or more campus modules



**Reads:** student group is assigned topic and data; students immerse (whilst pursuing modules in parallel) and analyze problem and status quo; students develop solution; students present results.

## Semester project module, learning model



# Challenges of open curriculum and learning issues

- Motivating **corporate partners** to invest in sustainable co-operation (coaching and tutoring framework, reconciling academic and corporate agendas)
- How to organize **blending** of conventional **instruction** into **self-paced** learning on modules
- Initiating, mainstreaming, implementing and sharing an **agile learning culture** with students, lecturers and consortium partners
- Systematically reconciling **student initiative** and **curriculum** requirements (choice of topics, specializations, teams)
- How to ensure **values** and **ethical issues** become an integral part of assignments
- Securing an adequate level of **analysis** and **reflection** whilst demanding full student commitment to **delivery** of results on projects
- How to ensure transnational **systemic accreditation** (cf above, EU-wide process for 'ordinary' degrees in place but only initial experience and not for systemic accreditation)
- How to maintain **fluidity** mode in systemic accreditation (content updates, learning pathways, quality assurance of external co-operation)

# Future skills

## Main trends:

- Technological innovation entering all aspects of life and work.
- Need for constant adaptation, change and learning<sup>9</sup>
- Increasing demand for soft and personal skills<sup>10</sup>.



## Technical skills (examples)

- Digital technology awareness and constant updating
- Data awareness and savvyness

## Performance skills (examples)

- Adaptability and change
- Learning and developmental skills
- Teambuilding and process building skills

## Communication and collaboration skills (examples)

- Customer orientation, understanding and communication
- Sharing and sourcing
- Judgmental skills on ethical and values issues

## Personal skills (examples)

- Empathy
- Mobility
- Learning and developmental skills
- Cross-cultural skills



# References

1. We are following Bloom's long-proven approach. Bloom, Benjamin, Taxonomy of Educational Objectives. New York 1956. Diagram retrieved from <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>
2. For a complete curriculum overview, cf [www.chedteb.eu](http://www.chedteb.eu), Intellectual Output 4 / Curriculum
3. Rather than discussing problem-based learning in general here, we refer to Fruchter, Renate; Lewis, Sarah, Mentoring Models in Support of P5 BL in Architecture/Engineering/Construction Global Teamwork, <https://www.ijee.ie/articles/Vol19-5/IJEE1438.pdf>, <https://www.maastrichtuniversity.nl/education/why-um/problem-based-learning>
4. Cf an overview of recent Digital Transformation degrees compiled by a student project at Bielefeld UAS in 2018, in-house, unpublished, available on demand
5. Cf case studies produced under Intellectual Outputs 3 and 5 of the CHEDTEB project, [www.chedteb.eu](http://www.chedteb.eu), deep links subject to change
6. Examples of forecasts on future learning: <https://www.munich-business-school.de/insights/en/2017/learning-era-digital-transformation/> or Bellanca, James; Brandt, Ron, 21<sup>st</sup> century skills – rethinking how students learn. Bloomington 2010
7. Cf high growth rates of so-called *dual studies* in the German-speaking countries: <https://www.wegweiser-duales-studium.de/infos/entwicklung-geschichte-statistik/#statistiken>
8. The current debate on skills for Digital Transformation seems to either fall short of this basic dichotomy or tries to dissolve it in a supposed amalgamation of private and public intervention. More attention is generally given to re-mapping the skills landscape and to cataloguing and calibrating new technological skills. Cf
  - Bakhshi, Hasan; Downing, Jonathan M.; Osborne, Michael A.; Schneider, Philippe, The future of skills - employment in 2030. Retrieved from <https://futureskills.pearson.com/research/>
  - European Commission, DigComp 2.1 - The Digital Competence Framework for Citizens. <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use>
  - Fitzgerald, Michael; Kruschwitz, Nina; Bonnet, Didier and Welch, Michael, Embracing Digital Technology. Retrieved from <https://sloanreview.mit.edu/projects/embracing-digital-technology/>
9. [https://www.daad.de/medien/veranstaltungen/workshop/experts\\_on\\_digitalisation\\_in\\_higher\\_education\\_and\\_research\\_for\\_sustainability\\_dec2018.pdf](https://www.daad.de/medien/veranstaltungen/workshop/experts_on_digitalisation_in_higher_education_and_research_for_sustainability_dec2018.pdf)

# References ctd

10. A multitude of surveys can be found in a.o.

- Hoberg, Patrick; Krcmar, Helmut; Welz, Bernd, Skills for Digital Transformation. Research Report 2017, [https://www.i17.in.tum.de/uploads/media/IDT-Survey\\_Report\\_2017\\_final.pdf](https://www.i17.in.tum.de/uploads/media/IDT-Survey_Report_2017_final.pdf)
- Price-Waterhouse-Cooper, Industry 4.0: Building the digital enterprise. [www.pwc.com/industry4.0](http://www.pwc.com/industry4.0)
- Davies, Anna; Fidler, Devin; Gorbis, Marina, FutureWork Skills 2020, <http://www.iftf.org/futureworkskills/>

The most extensive mapping effort seems to have been made by

- Erpenbeck, John; von Rosenstiel, Lutz; Grote, Sven, Kompetenzmodelle von Unternehmen. Stuttgart 2013
- Erpenbeck, John, Kompetenzdiagnostik und Entwicklung KODE®. Retrieved from [https://www.bibb.de/dokumente/pdf/a45\\_fachtagung\\_informelles-lernen\\_03\\_erpenbeck\\_kode.pdf](https://www.bibb.de/dokumente/pdf/a45_fachtagung_informelles-lernen_03_erpenbeck_kode.pdf)