CHALLENGING
CONVENTIONAL
THINKING

ECIU university

**Challenge-Based Learning –
short overview and
introduction**

May 17th 2024

Dr. Dorothea Ellinger (TUHH)

ECIU
university

Co-funded by
the European Union

Definition and origin of Challenge-Based Learning

Challenge-based learning still an emergent educational model in europe
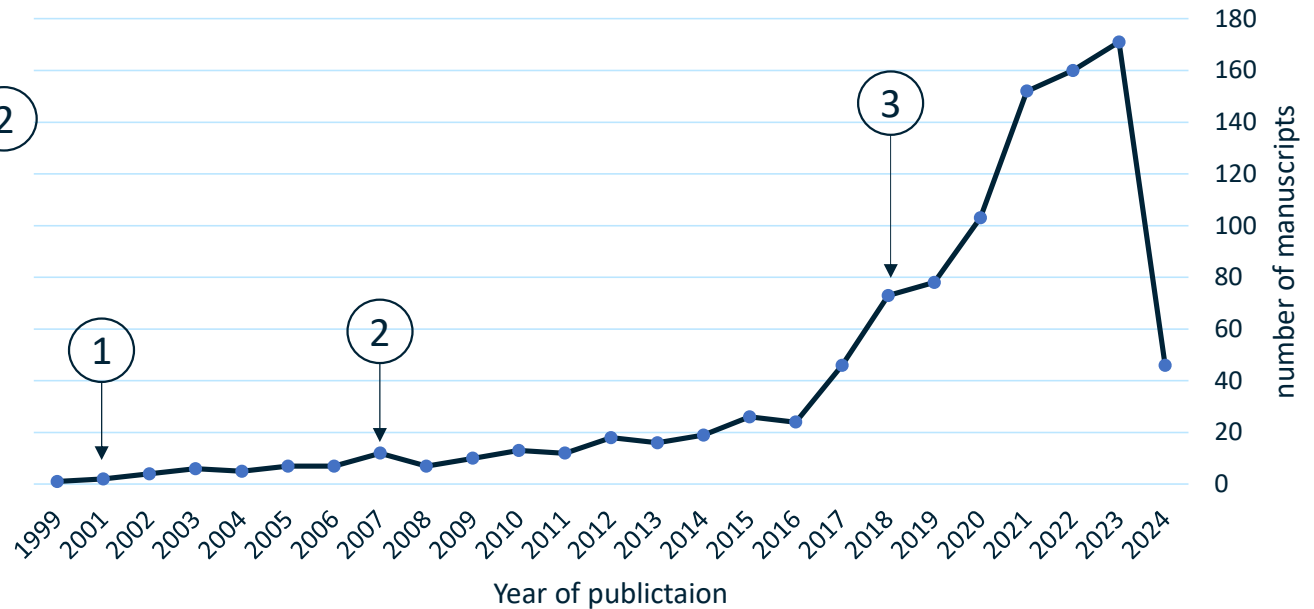
ORIGIN:

- STAR-Legacy Cycle ①
- Future of teaching and learning (Apple Classroom of Tomorrow) ②
- ERASMUS+-Strategic partnership + „Grand challenges" of UN SDG Initiative ③

→ **Does not ground on learning theories or empiric findings**
→ **Come along with groundbreaking changes in HE in europe**

CBL manuscripts indexed in Scopus (2024-05-07)

Year of publictaion

Manuscripts published and indexed on Challenge-Based Learning (Title, Abdtract, Keywords) from 1999 to May 7 2024 (hhtp://www.scopus.com)

Challenge-Based Learning: one framework, multiple definitions

Challenged-Based-Learning is an approach defined by:
- student-centred
- the multidisciplinary, collaborative, and real-world problem-solving aspects
- teachers are coaches and facilitators
- engaging learners in authentic, socially relevant, and technology-integrated educational experiences
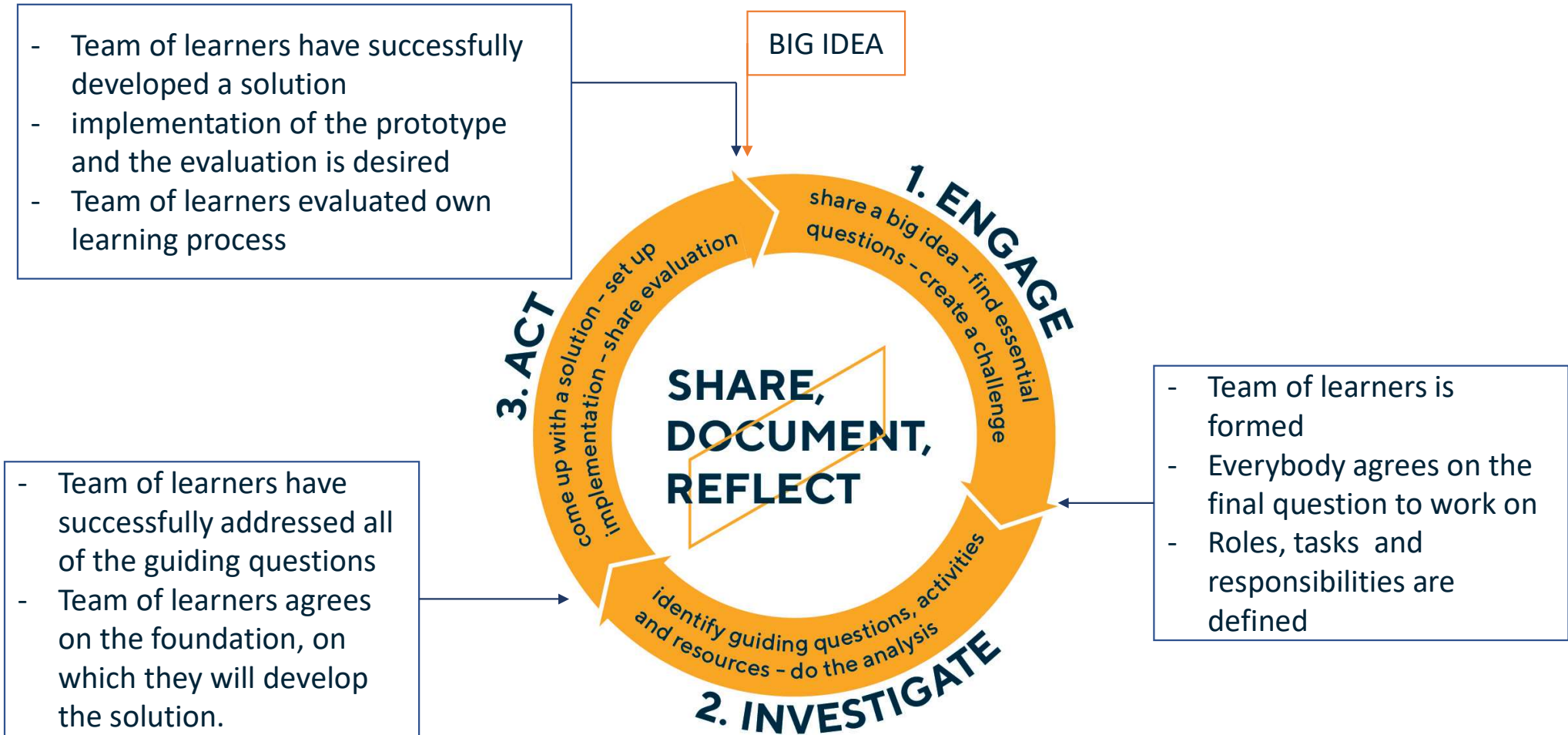
→ Marie Leijon et al 2021
→ Gallaghaer & Savage 2020
→ The Emerald Handbook of Challenge Based Learning (2022)
    https://www.emerald.com/insight/publication/doi/10.1108/9781801174909

A Challenge is:
- chosen and defined by the students instead of pre-defined
- an activity, task or situation representing an incentive and a obstacle to overcome with multiple possible perspectives and solutions
- real-life and authentic, linking global issues with local realities
- nowadays, often derived from societal issues or UN SDG
- focus of the evaluation is not the final result, but the development of students' competences

Challenge-Based Learning Cycle – and learner activities

- Team of learners have successfully developed a solution
- implementation of the prototype and the evaluation is desired
- Team of learners evaluated own learning process

BIG IDEA

1. ENGAGE
share a big idea - find essential questions - create a challenge

3. ACT
come up with a solution - set up implementation - share evaluation

SHARE, DOCUMENT, REFLECT

2. INVESTIGATE
identify guiding questions, activities and resources - do the analysis

- Team of learners is formed
- Everybody agrees on the final question to work on
- Roles, tasks and responsibilities are defined

- Team of learners have successfully addressed all of the guiding questions
- Team of learners agrees on the foundation, on which they will develop the solution.

CHALLENGING
CONVENTIONAL
THINKING

ECIU
university

Co-funded by
the European Union

CBL and traditional educational formats

CBL and traditional educational formats:

Supplementary to Traditional Curriculum
- CBL as extracurricular courses, in summer schools or PhD Grad Schools

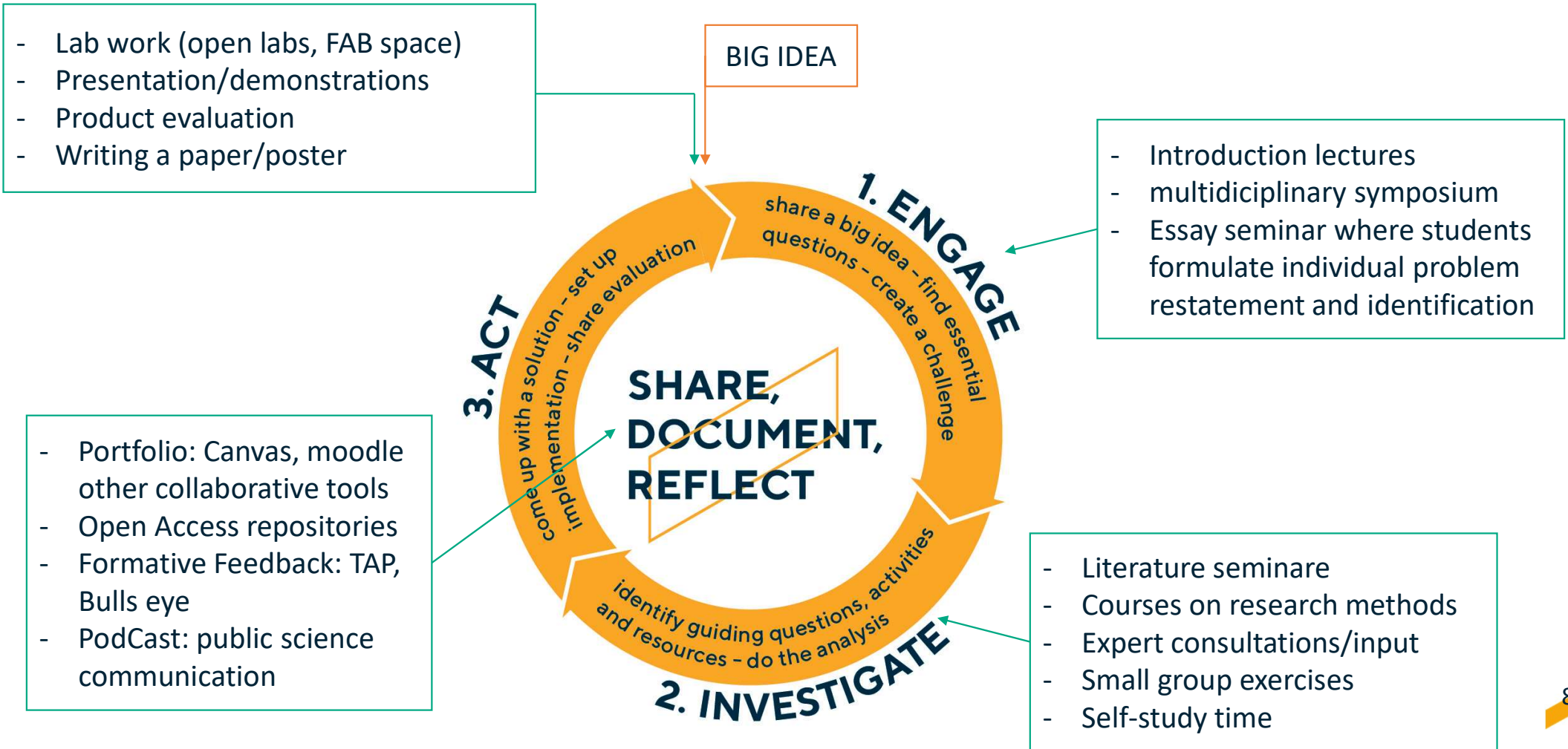**Periphery of Curriculum**
- CBL as elective courses

CBL study programms
- Tec de Monterrey, TU/e

Barriers to Integration:

- inertia of existing teaching practices
- need for faculty development and support
- Requirements and criteria of quality assurance, formal reporting to government and accreditations
- aligning CBL activities with the logistical and assessment frameworks of conventional higher education courses

Challenge-Based Learning Cycle – and teaching organisation

Lab work (open labs, FAB space)
- Presentation/demonstrations
- Product evaluation
- Writing a paper/poster

BIG IDEA

- Introduction lectures
- multidiciplinary symposium
- Essay seminar where students formulate individual problem restatement and identification

1. ENGAGE
share a big idea – find essential questions – create a challenge

3. ACT
come up with a solution - set up implementation – share evaluation

SHARE, DOCUMENT, REFLECT

- Portfolio: Canvas, moodle other collaborative tools
- Open Access repositories
- Formative Feedback: TAP, Bulls eye
- PodCast: public science communication

identify guiding questions, activities and resources – do the analysis

2. INVESTIGATE

- Literature seminare
- Courses on research methods
- Expert consultations/input
- Small group exercises
- Self-study time

8

CHALLENGING
CONVENTIONAL
THINKING

ECIU university

Co-funded by
the European Union

Impact of Challenge-Based Learning

CBL has the potential to foster disciplinary and transversal competencies

Disciplinary competencies

- Improved Understanding and Application of Knowledge
- Enhancement of Technical and Problem-solving Skills

transversal competencies

- Improved Collaboration, Creativity, Problem-solving, and Communication skills
- Development of Soft Skills and Entrepreneurial Mindset
- Positive Impact on Multidisciplinary Teamwork and Industry Networking:

Increased Student Engagement and Motivation:

- for contribution to the improvement of teacher-student relations
- motivation to continue study program

Transformation of Educational Environments

Perna, S., Recke M.P. & Nichols, M.H. (2023). Challenge Based Learning: A Comprehensive Survey of the Literature. The Challenge Institute.
https://www.challengeinstitute.org/CBL_Literature_Survey.pdf
Sukackė, V., Guerra, A.O.P.D.C., Ellinger, D., Carlos, V., Petronienė, S., Gaižiūnienė, L., Blanch, S., Marbà-Tallada, A. and Brose, A. (2022). Towards active evidence-based learning in engineering education: a systematic literature review of PBL, PjBL, and CBL. Sustainability, 14(21), p. 13955.
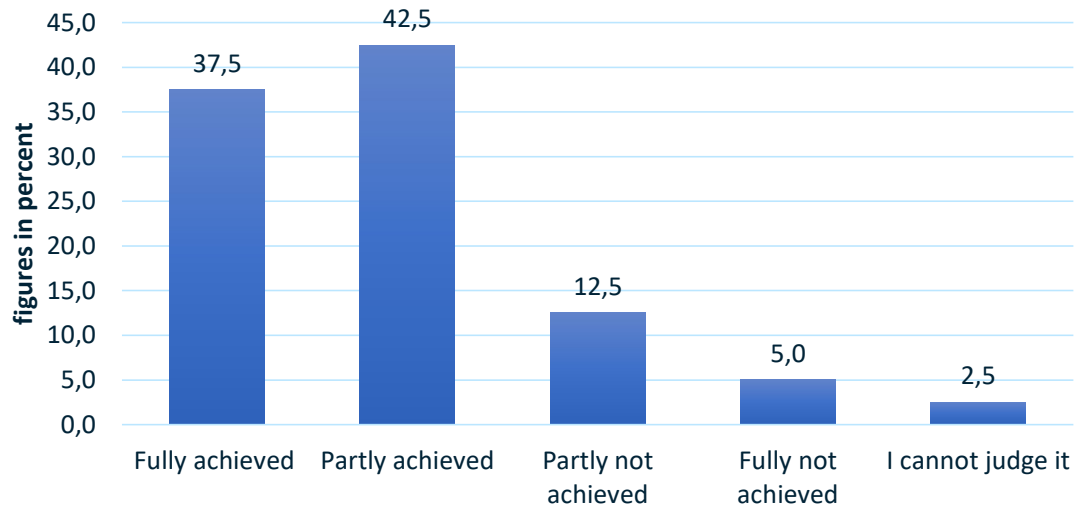
Initial motivation: Interest in…

- topic, subject knowledge
- multi-disciplinary perspectives
- international experience
- real-world challenge, learning "not just from the books"

Personal learning goal (open answer)
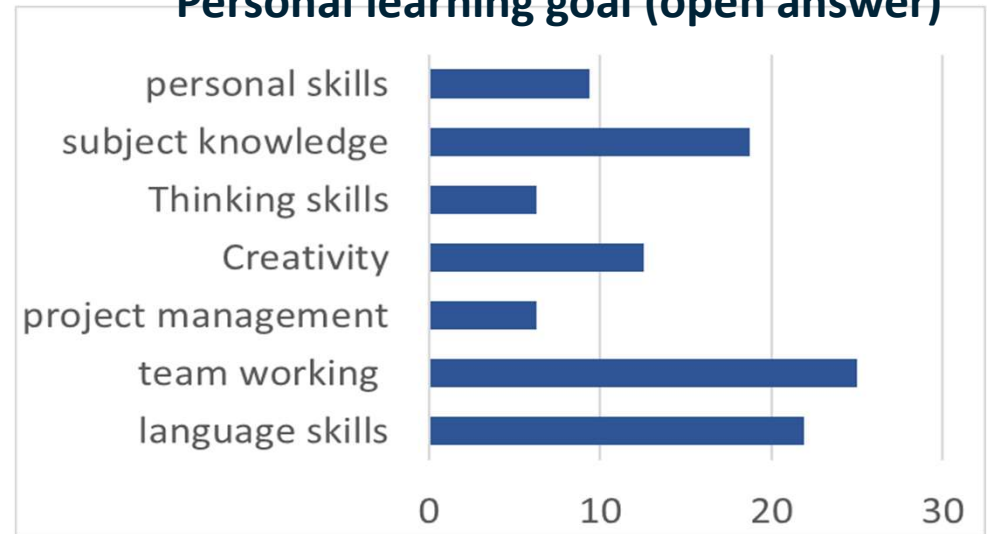
Reached personal learning goal?

- **Challenges do not always meet initial expectation/goal (to gain disciplinary / subject knowledge)**
- **Instead: unexpected personal and social gains and benefits (self-organization, collaboration in heterogeneous team, new contacts and friends)**

11

Learning outcomes are key to designing the learning process – but each student in your course might have its own.

Give them space!

Enable your students to have an authentic and socially or personal relevant educational experiences.

The ECIU University is an EU-funded initiative that creates a ground-breaking and innovative educational model on a European scale.

www.eciu.org