WEEK OF EDUCATION

THE HEARTBEAT OF LEARNING

UNIVERSITY OF TWENTE.

WEEK OF EDUCATION 2025

Start the show

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Innovative Programme Design

Humanitarian Engineering MSc programme

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WHY A NEW MASTER HUMANITARIAN ENGINEERING?

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MOTIVATION

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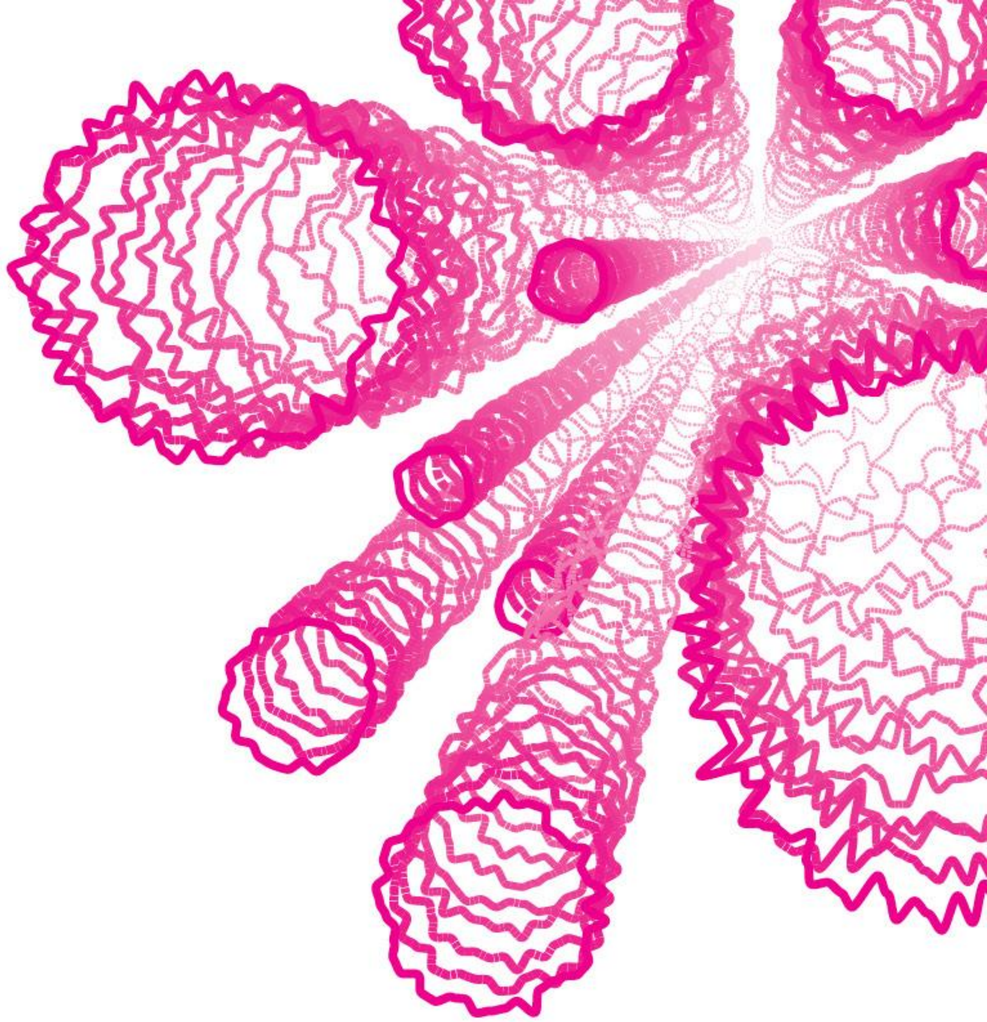
HE VISION

To address inequality in the world and to contribute to towards creating equity

Underserved and marginalized communities

Trandisciplinary actions, sustainable technology, socio-technological interventions

Positive social and sustainable impact



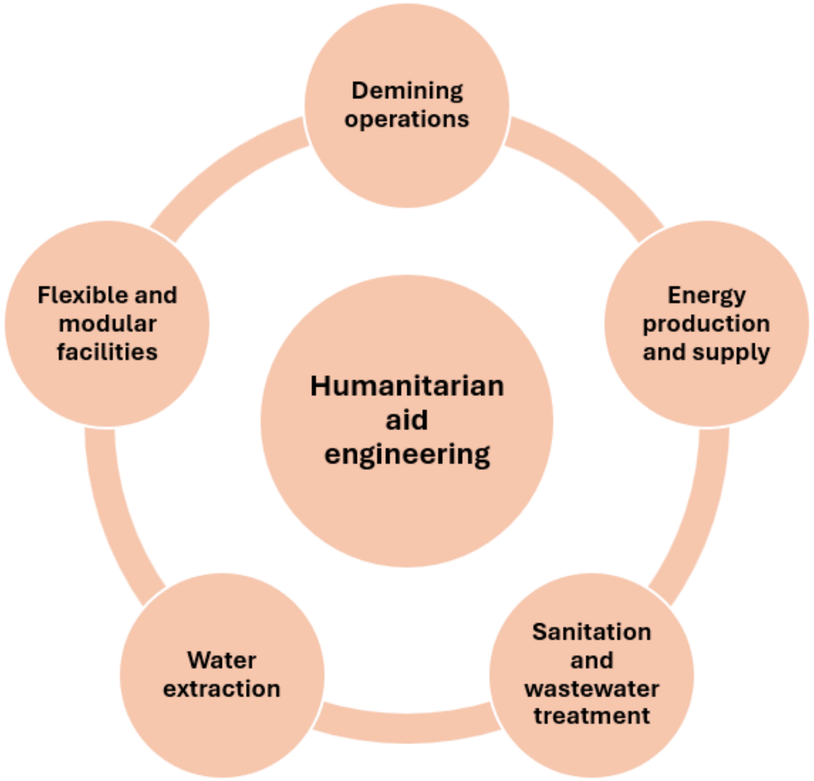
“AIM TO IMPROVE THE WELL-BEING OF UNDERSERVED AND MARGINALIZED COMMUNITIES BY DEVELOPING AFFORDABLE, SUSTAINABLE AND APPROPRIATE TECHNOLOGICAL SOLUTIONS THAT ARE BASED ON LOCAL RESOURCES AND - COMMUNITY NEEDS.”

TRADITIONAL- VS.
HUMANITARIAN ENGINEER

Focus on (societal) challenges through development & application of technology.

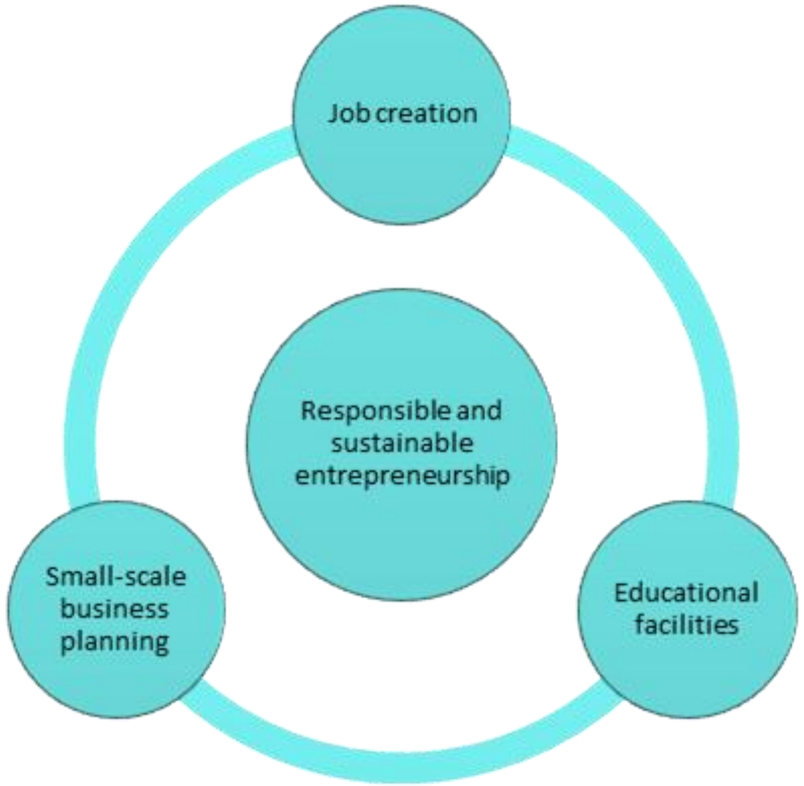
Development of socio-technological solutions tailored to the challenges of vulnerable and marginalized communities globally.

DOMAINS OF HUMANITARIAN ENGINEERING



Humanitarian Aid Engineering

Resilience Engineering



Responsible and Sustainable Entrepreneurship

CBL APPROACH

STUDENT TEAM
(You)

Challenge leader
Self-directed learning
Interdisciplinary collaboration

TUTOR
(Nina, Salomé, Zikambiyani)

Process knowledge
Asks guiding questions
Learning supervisor and guide

CHALLENGE PROVIDER
(SEP)

Content knowledge
Co-creates solutions
Access to various stakeholders

Source: ECIU (2021)

MINOR CHALLENGE 2024

Big idea: Irrigation for female smallholders

Challenge:

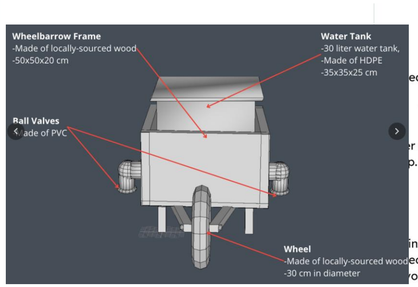
- To explore how irrigation practices can be improved in ways that respond to the needs, knowledge, and daily realities of women smallholder farmers in MacDonald, Sierra Leone.

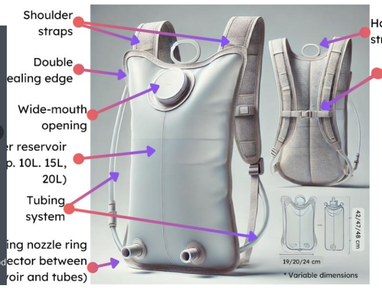
CBL WITH COMMUNITIES

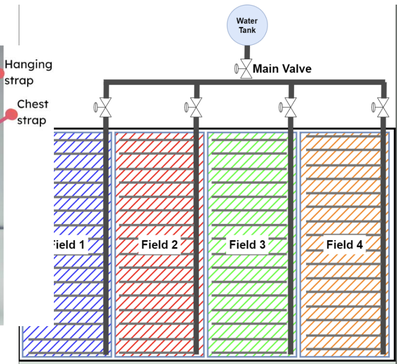
Engage: 5-Why; Interviews with CSO (SEP); Narrative videos

Investigate: Talk show simulation to investigate the different viewpoints of various stakeholders of the farming and irrigation system.

Act: Engineering solution design process. Evaluating concepts with challenge provider.







REFLECTIONS

- Distance between the student teams and the communities.
  - SEP representative as part of the challenge team
- Involvement of community members
  - Collaboration with a locally rooted social enterprise where community members play an essential role in the organization's structure and activities (CSO).
- Gaining insight into the lived realities of communities that differ significantly from one's own context
  - Through immersive learning experiences such as talk show simulations and the serious game "Voices of the community"

Online pre-master with CBL

The case for Spatial Engineering

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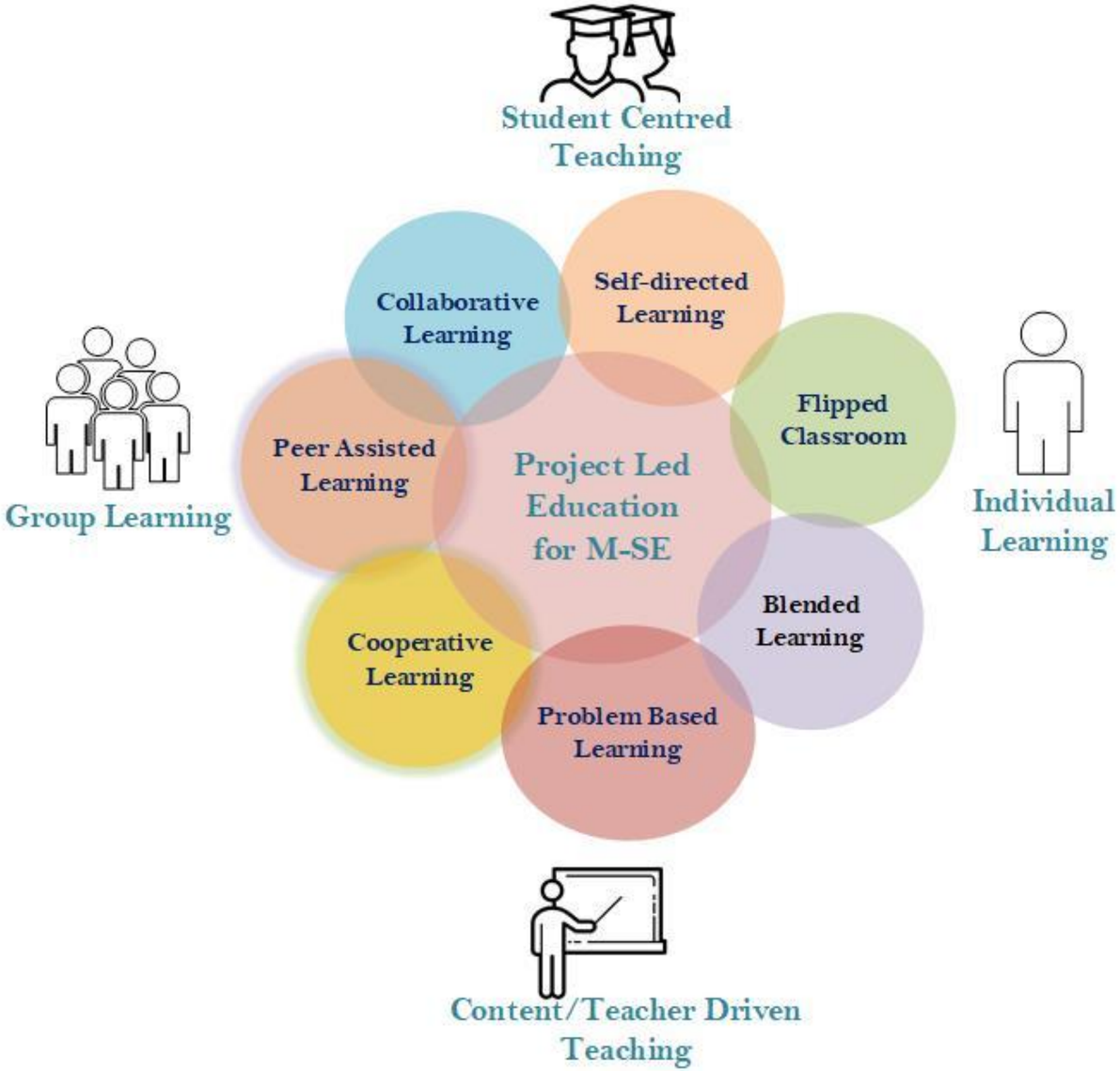
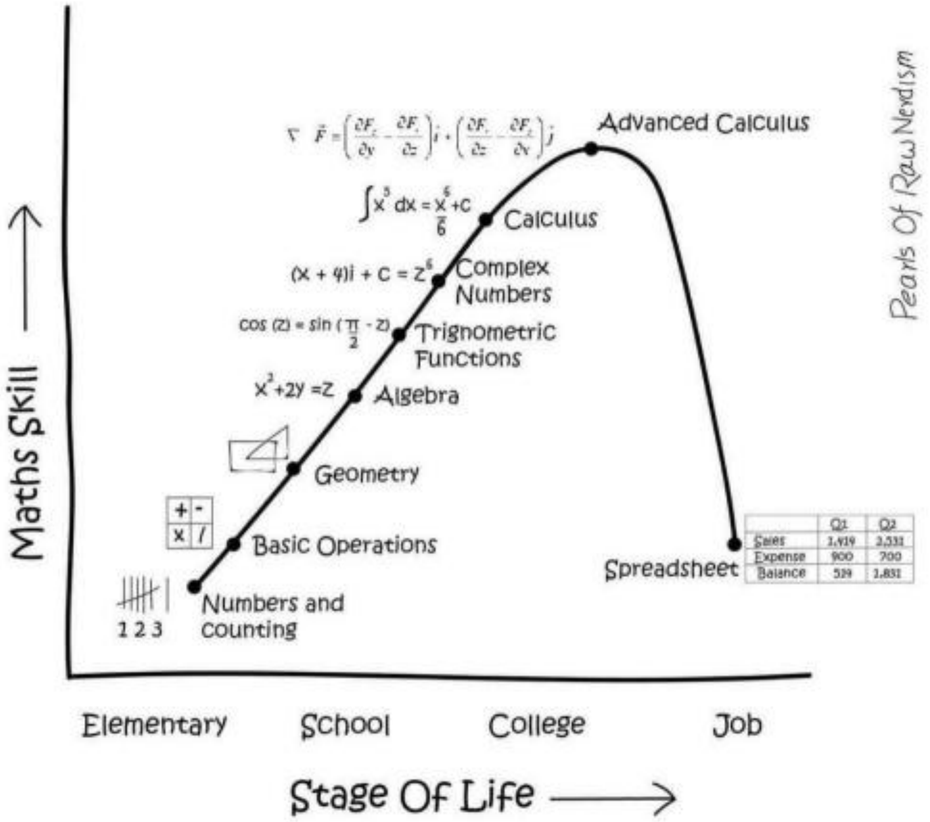
Spatail Engineering approach



Pre-master of Spatial Engineering before 2023

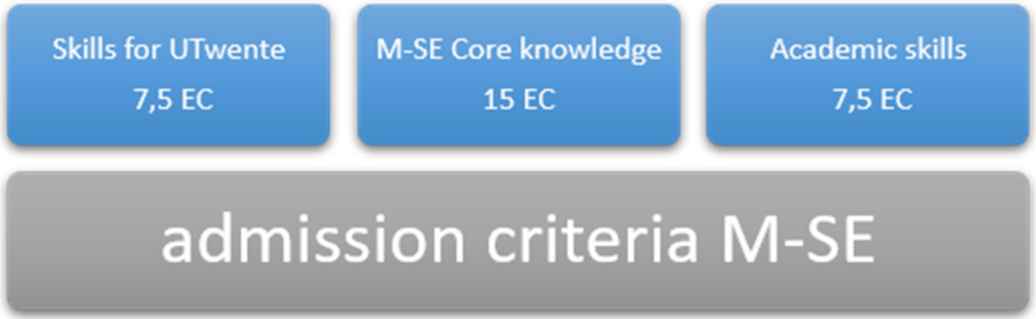
- On campus

- Calculus (7.5 EC)
- Academic and Research Skills (7.5 EC)
- HTHT minors GIS or Remote Sensing (15 EC)



personalized learning paths

- Skills for Utwente
  - Bachelors from the UT have an advantage as the have been educated with TOM model which means they have communication and teamwork skills. They have also all done the same calculus courses and their language level was assessed for the BSc level.
  - Options: Calculus, English Language, skills for personal development
- Mandatory: Academic skills
- M-SE Core Knowledge
  - No single bachelor programme prepares for M-SE
  - ILO's for GIS, Remote Sensing, Spatial Planning for Governance, Technical Engineering

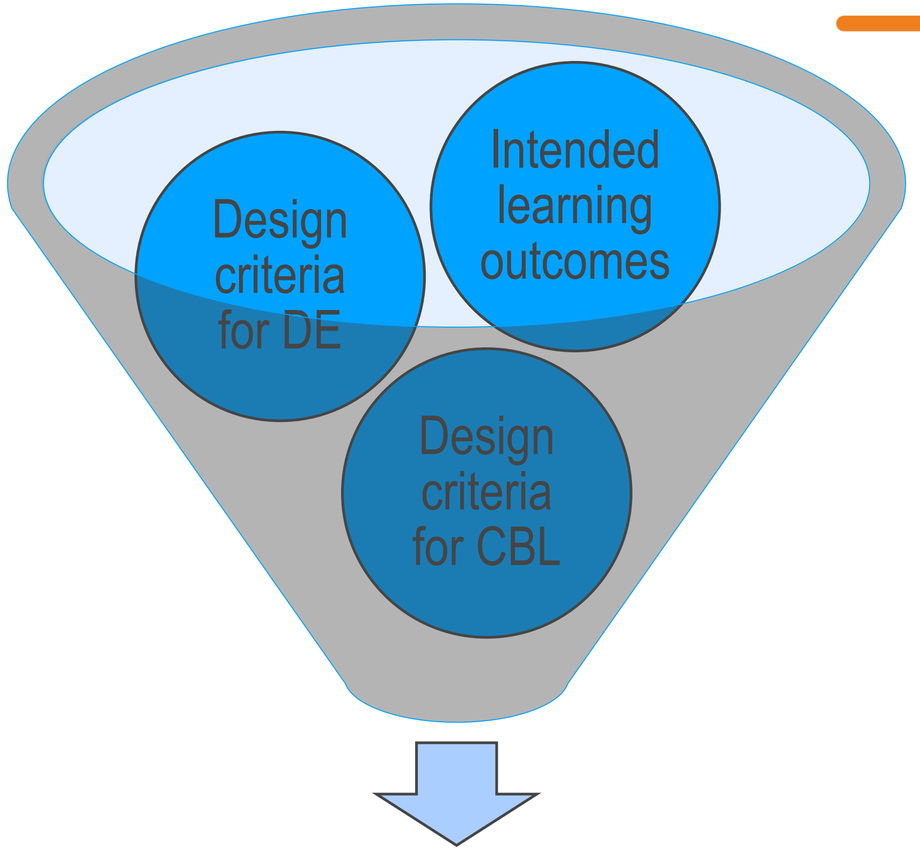


Grants to develop CBL courseware

Aim

Apply CBL in a distance premaster programme to:

- be inclusive
- create a multi-disciplinary and international classroom
- prepare for way of learning applied in M-SE



Course development

Main outcomes

- Distance course is what we are going to do to ensure accessibility for everyone (inclusivity).
- Core knowledge course content needs to be delivered in a non-integrated focused way.
- A basic statistics course and the academic and research skills courses are mandatory for all students.
- Climate adaptation is chosen as the challenge for both individuals and groups to integrate, activate and apply knowledge gained.
- Innovative ways of assessment are going to be used.

Main outcomes

We do not intent to implement all UT fundamentals into the premaster. We focus on:
- Authentic 'problems' / real world challenges by including a challenge in the premaster.
- Self-directed student learning by including reflection, documentation and sharing.
- Stakeholder involvement by including an intended learning outcome (ILO) on contacting stakeholders.

Main outcomes

- Constructive alignment starts with the outcomes we intend students to learn, and align teaching and assessment to those outcomes.
- The masters programme aims for societal impact. Which means that communication, teamwork, negotiation and student centered learning skills need to be learned and assessed during the premaster.
- The assessment will be differentiated as each of the elements will be assessed separately using its own intermediate formative and final summative assessments.
- Usage of a personal development plan and portfolio including the use of concept mapping (living textbook).

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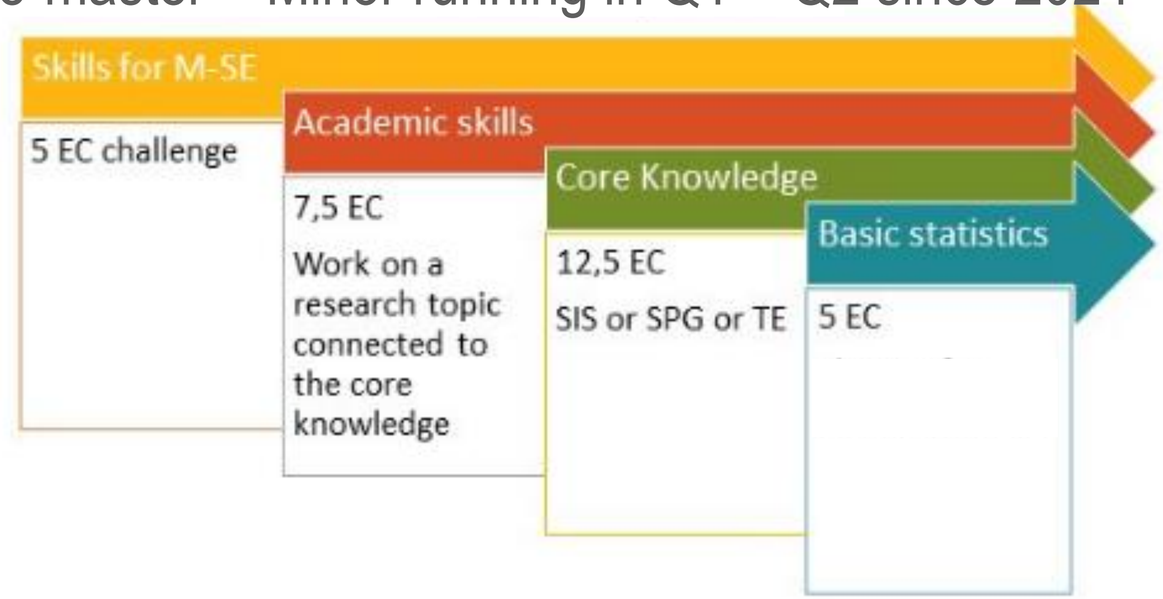
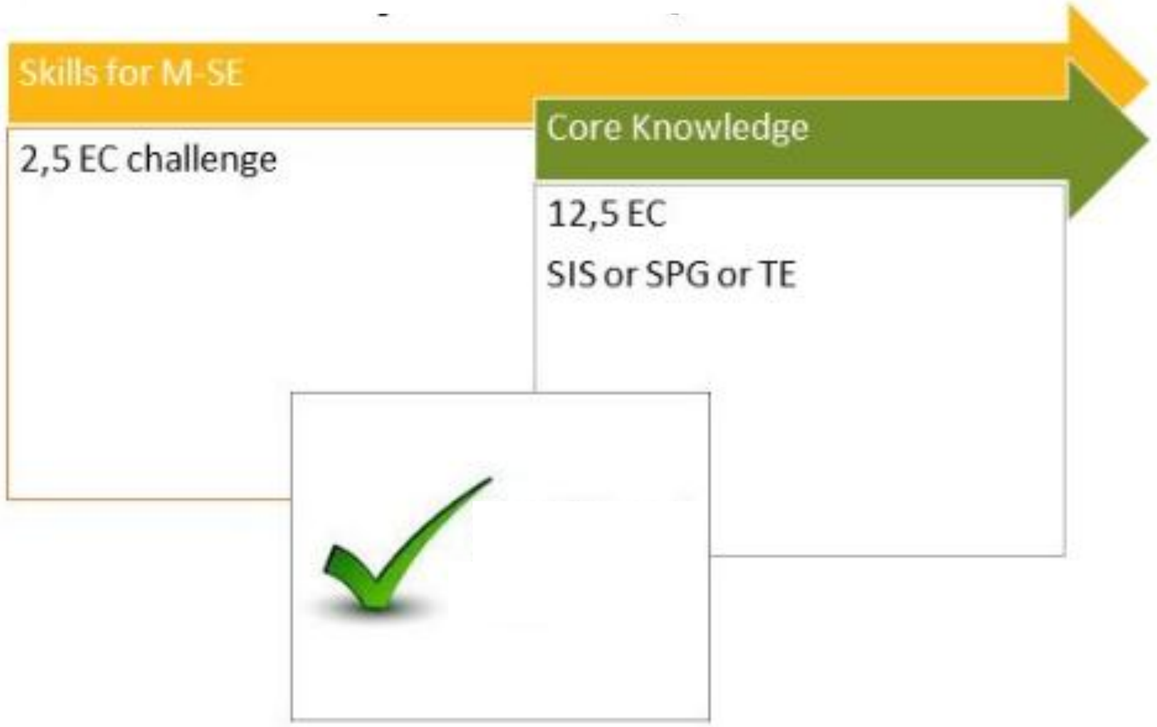
Outcome

Pre-master + Minor running in Q1 + Q2 since 2024



Minor running in Q2 since 2023

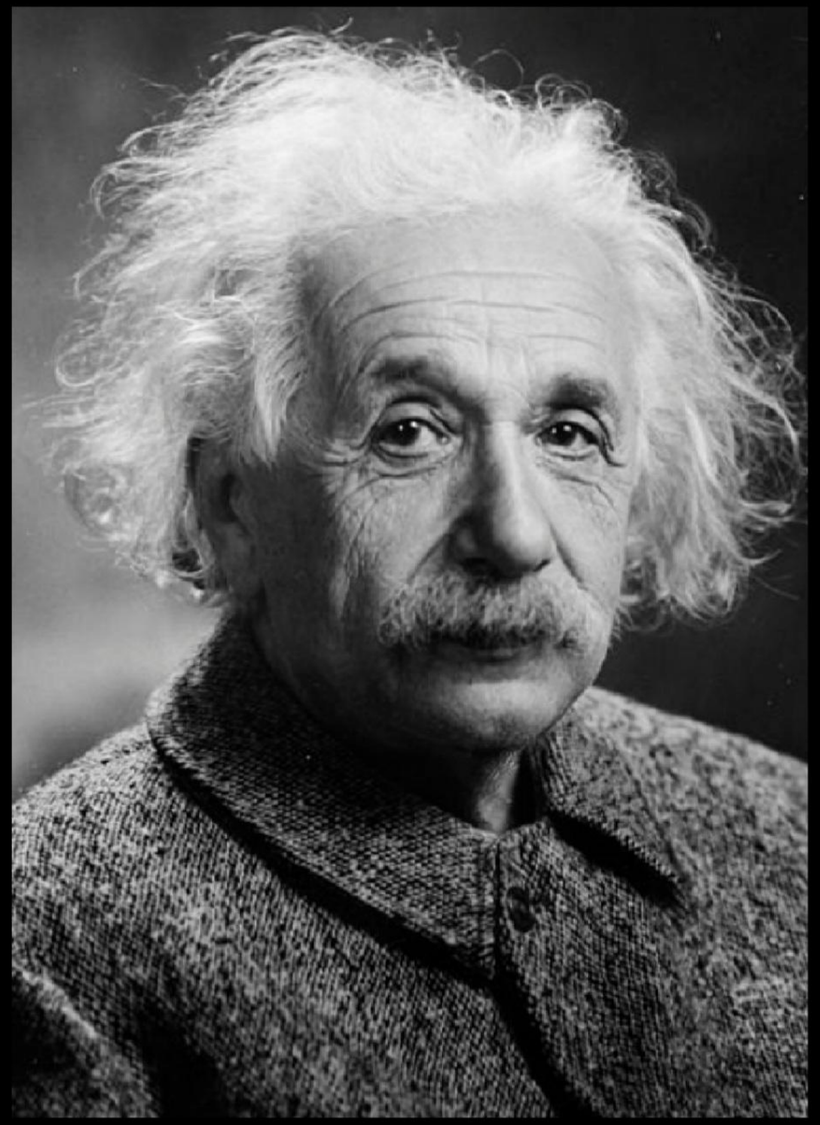


YOUR TURN

- Challenge-base learning framework
  - Stage 1: Engage
    - Big Idea, Essential questions, Challenge
  - Stage 2: Investigate Phase
    - Develop Guiding Questions, Activities, Resources, Analysis
  - Stage 3: Act Phase
    - Identifying the Solution, Publishing Results and Reflections, Evaluation

If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask. For once I know the proper question, I could solve the problem in less than 5 minutes.

- Albert Einstein



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YOUR TURN

- Challenge-base learning framework
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ESSENTIAL QUESTIONS

- Identification of questions that have personal meaning to the group.
- Why is this important to me?
- Where does this concept intersect with my world

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EXAMPLES OF ESSENTIAL QUESTIONS

- **Big Idea:** Sustainability of water
  - **Essential Question:** What is the impact of my water consumption on my community?
- **Big Idea:** Climate change and its effect on the planet
  - **Essential Question:** What is the impact of my use of fossil fuels on my planet?
- **Big Idea:** Public health threats such as pandemics
  - **Essential Question:** How does my personal access to healthcare affect global disease
- **Big Idea:** Health and wellness
  - **Essential Question:** How do my personal food choices affect the health and wellness of my community?

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YOUR ESSENTIAL QUESTIONS

Examples of Essential Questions on Innovative Education

1. What is the purpose of education in the 21st century?
2. How can curriculum design be more responsive to the needs of all learners?
3. What does it mean for a curriculum to be truly innovative?
4. How can student voice and choice be integrated into curriculum development?
5. In what ways can technology enhance or hinder innovative curriculum design?
6. How do we ensure equity and inclusivity in a redesigned curriculum?
7. What role should real-world problems and community involvement play in curriculum design?
8. How can assessment practices be transformed to support innovation in learning?
9. What are the barriers to implementing innovative curriculum models, and how can they be overcome
10. How can interdisciplinary learning strengthen innovation in curriculum design?
11. What evidence do we use to evaluate the success of an innovative curriculum?
12. How can educators be supported and empowered to design and implement innovative curricula?

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CHALLENGE

- Developing a local solution to a global problem which is **actionable**
- If the challenge is **too broad** or vague, it will not work
- If it is **too narrow**, you will not be able to develop the skills that CBL cultivates.
- It has to **be real and meaningfu**l to all team members
- You have to personally **connect with Challenge** to fully engage in the process

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Your Challenge

Example Challenge 1: Rethink learning for relevance

Essential Question: *How can curriculum design be more responsive to the needs of all learners?*

Challenge:

Redesign a part of the existing curriculum to make it more relevant, engaging, and applicable to students' lives and future opportunities.

This challenge encourages students, educators, or curriculum designers to analyze existing curricula, identify gaps in relevance, and co-create updated content, methods, or learning experiences that connect with real-world contexts.

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Example Challenge 2: Make Innovation the Norm, not the Exception

Essential Question: *What does it mean for a curriculum to be truly innovative?*
Challenge:
Create a model for an innovative curriculum that breaks traditional boundaries and prepares learners for the future.
Explore interdisciplinary design, project-based approaches, tech integration, or community collaboration — ultimately developing a prototype curriculum module or framework that can be shared and tested.

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Any Feedback, Insight or Observation