SEFI
European Society for Engineering Education

IACEE

Continuing Engineering Education: Internationalising the 2024 European Perspective

SEFI@work session – 24th October 2024

Host and Facilitator: Dr Chris Smith

Christopher.Smith@gcu.ac.uk

Outline

- Welcome
- Focus and ethos for today's webinar
- Snapshot of key topics from SEFI 2024 Conference
- Discussions
- Next steps

Société Européenne pour la Formation des Ingénieurs
European Society for Engineering Education

- Non governmental non-for-profit association
- Focused on Higher Engineering Education
- Established by 21 Rectors in 1973
- Biggest network of this type in Europe:
  - 41 countries
  - 270 members
  - 105 member institutions

SEFI – 13 Special Interest Groups

- Attractiveness
- Capacity Building
- **Continuing Engineering Education and Lifelong Learning**
- Curriculum Development
- Digital Learning
- Diversity, Equity and Inclusion

- Engineering Education Research
- Engineering Skills
- Ethics
- Mathematics
- Quality Assurance and Accreditation
- Physics
- Sustainability

Supporting Lifelong Learning for Engineers
since 1989, formed from a UNESCO Working Group

IACEE Membership as of today…

- **324** members
- **30** countries represented
- 3 Regional founding organizations
- 2 professional organizations & societies
- 14 industrial organizations & companies
- 59 academic institutions (+110) members
- 106 individual members

IACEE – Three Main Initiatives

2 Sustainability Education and Research in Action
Database

1 World Conferences and Symposia
Events

3 Quality Program for Continuing Education
Benchmarking with Peers

Today's focus and ethos

Share, Connect and Partner

Internationalising the European CEE perspetive

- SEFI 2024 Conference was in Lausanne (2nd-5th September): https://sefi2024.eu/
  - >550 attendees
  - 40 countries represented
  - Program available: https://sefi2024.eu/conference/program/
  - Formal proceedings to be published shortly
- A number of topics/presentations/posters around CEE and LLL

Key topics/people

- Keynotes (Anikó Kalman, Budapest University of Technology and Economics)

- CEE Taxonomy (Patricia Caratozzolo, Tecnológico de Monterrey)

- CEE Educator Framework (Sonia Gomez, TU Eindhoven)

- Retrieval-Augmented Generation (Matias Urenda Moris, Uppsala University)

- Building Lifelong Learning Competences - EngPDP (Darren Carthy, Engineers Ireland)

- SEFI workshop highlights (Heli Väätäjä, Lapland University of Applied Sciences)

Donna Riley: **Topic**:   **Engaging Moral Imagination in Engineering Ethics Education**

(In a world rife with attacks on principles once widely held in common and erosion of social institutions which sustain them**, we need a deeper engineering ethics** to **actively engage public values in professional life**. We must **critically a**nd **reflexively consider** the *codes, oaths, case studies* and accreditation regimes that have so far **formed the** basis of engineering ethics, reaching beyond them to a space of moral imagination **that empowers engineers to dream the world** as it could be otherwise, and **engage creative, ethical action throughout the engineering profession to advance an aspirational social good.)**
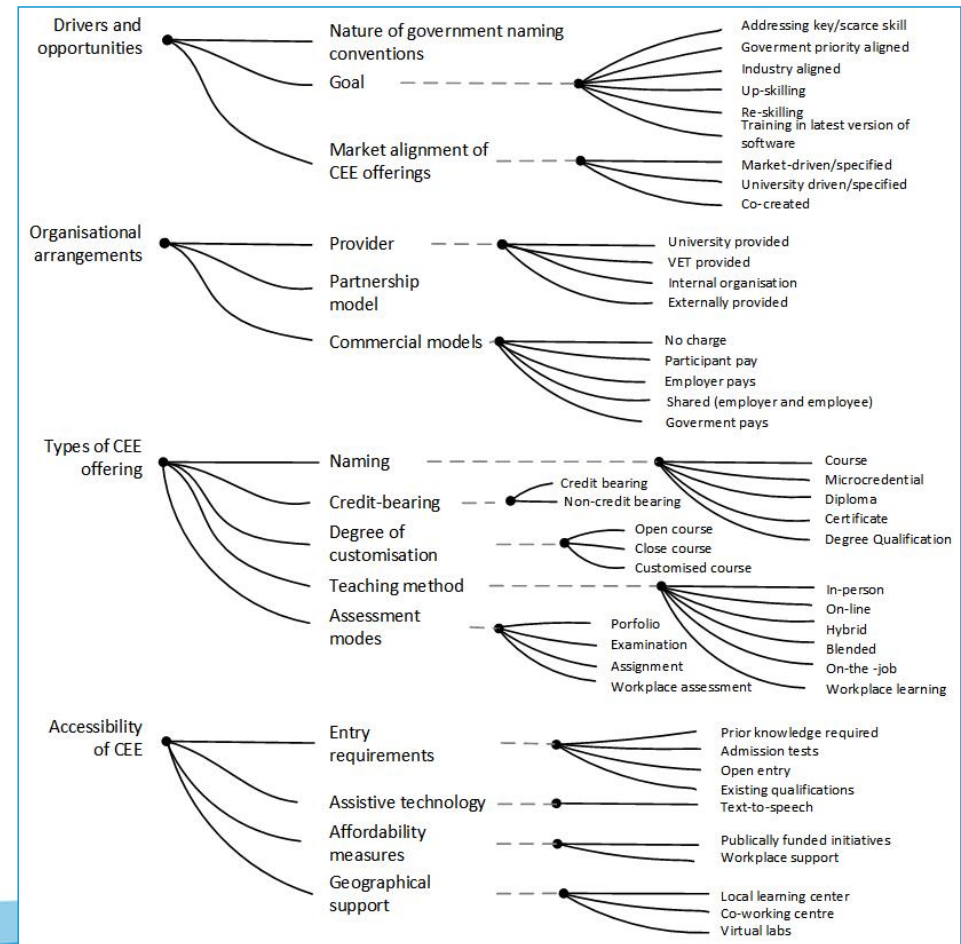
Margarita Boenig-Liptsin: **Topic: Computing Education, Cultures of Responsibility**

(We are **grappling today** with pervasive questions about how **humans and machines** should complement one another's best qualities and capacities to build more inclusive and just societies. It is important in this context **to remember a time when the utility of computers to people was a question mark just beginning to be explored**. Then, as now, computing education was seen as a key part of answering this question. In this talk, He discuss visions **of computer literacy and culture of the 1970s and 1980s** and draw lessons that thinking with history offers for the pursuit of responsible engineering education in today's digital societies.)

Johanna Lönngren, **Topic**. **Emotions in Engineering Education. The emergence of a new field of research.** an Associate Professor in Science and Engineering Education at Umeå University, **leads research on the role of emotions** in engineering education. Her work **is fascinating and highly relevant** , as it **explores how emotions can be better understood and integrated into the field.**

CEE Taxonomy

- Recognition that to effectively share knowledge then we need a standard way to communicate;
  - Codification and standardised language
- Paper coming out in Frontiers in Education soon – version 2.1.
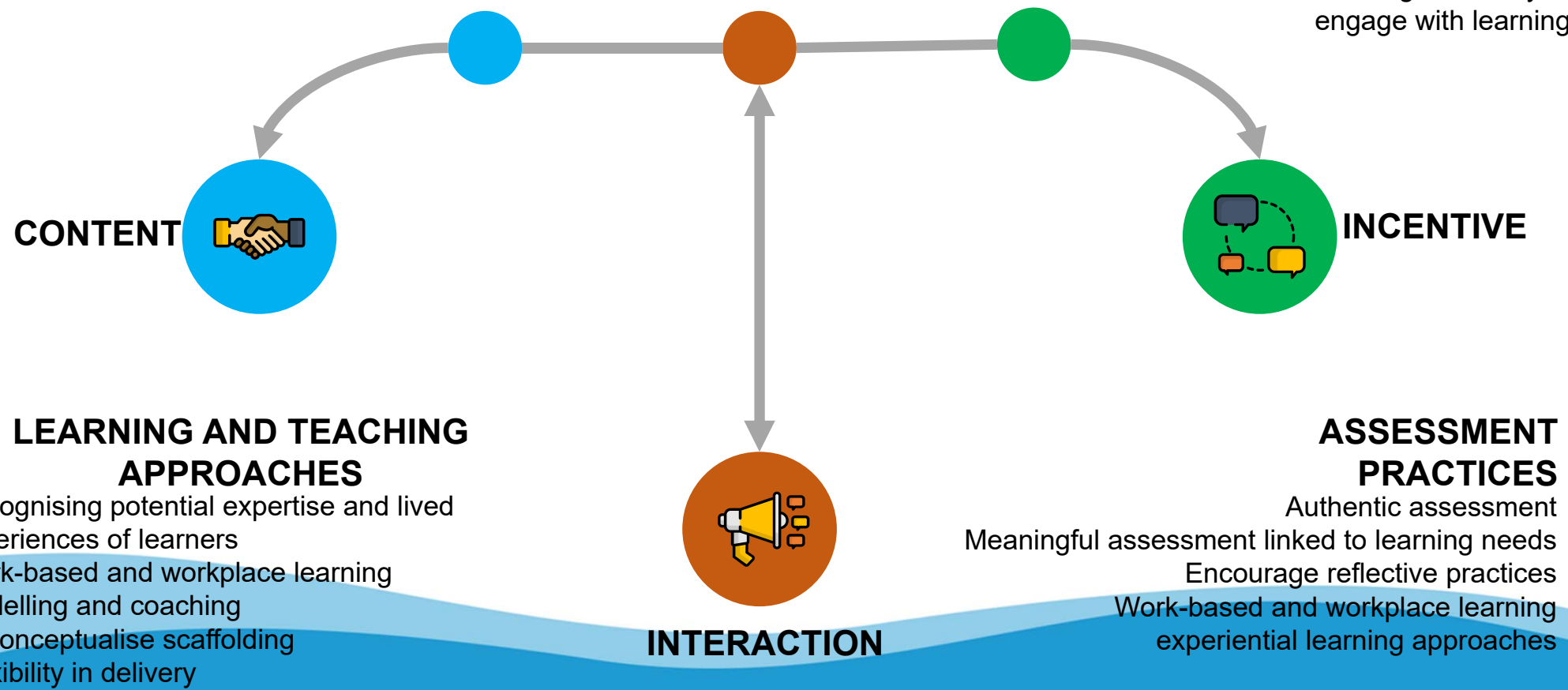- Want to review/discuss with wider range of stakeholders;

CEE Educator Framework

SEFI

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Depends on need (so no specifics detailed as part of this framework)

The learner needs to see a reason for learning (focused);
Different factors affecting the ability to engage with learning

CONTENT

INCENTIVE

LEARNING AND TEACHING APPROACHES
Recognising potential expertise and lived experiences of learners
Work-based and workplace learning
Modelling and coaching
Reconceptualise scaffolding
Flexibility in delivery

ASSESSMENT PRACTICES
Authentic assessment
Meaningful assessment linked to learning needs
Encourage reflective practices
Work-based and workplace learning
experiential learning approaches

INTERACTION
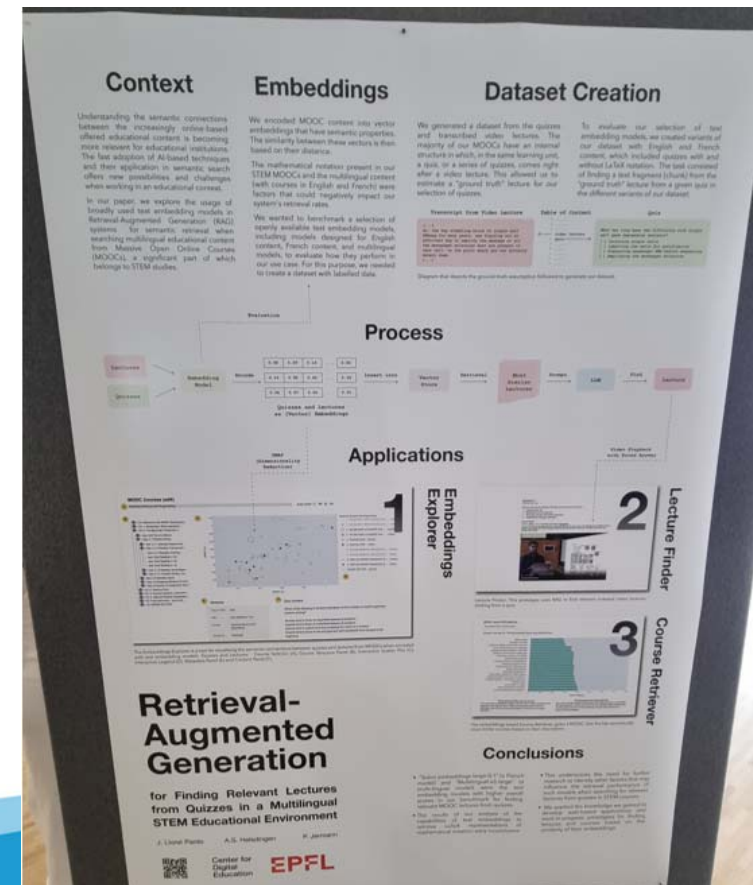
CEE Educator current actions and next steps

- CEE Education Framework was presented in SEFI 2024 in EPFL (Lausanne) by SEFI-SIG CEE

- Interest by participants to keep working on the 'CEE educator' space

- Ideas for further actions:
  - Important to take the international perspective and make 'useful' the CEE educator framework for educational practitioners and industry coaches
  - CEE educator framework translation in a training program, approaches and methods for work-place learning
  - SEFI2025 in Tampere (Finland) – (1) Paper; (2) CEE educator skills – Handbook; (3) ??

Retrieval-Augmented Generation for Finding Relevant Lectures from Quizzes in a Multilingual STEM Educational Environment

Javier Lloret Pardo & colleagues at EPFL, Lausanne.

- The system uses a Retrieval Augmented Generation (RAG) that can improve the efficiency of LLM.

- The use of LLM injected with "our organizational material is used for searching for the right information"

- Prompts – including text chuck from Quizzes to find a relevant lecture covering the topic

- Similar search tools for university libraries are being developed at the University of Oslo and Uppsala University

Session – reflection, Metacognition, and Life Long Learning;
Workshop - TrainengPDP

TRAINengPDP has **three objectives**:

- Engage and motivate engineering students in their personal development process;
  - **e-portfolio for students to log CPD activities**

- Motivate and train lecturers to engage in the students' personal development process;
  - Tool kits developed in Finland, Ireland and Belgium

- Increase awareness about the competencies for LLL that are needed in engineering education & practice

SEFI CEE/LLL SIG workshop

1. how to determine needs of learners and opportunities of sufficient scale to make CEE offerings viable and valuable for learners;

2. need for greater guidance for universities on how to approach developing CEE offerings, which is linked to

3. the need to provide educator training and support to be able to deliver CEE offerings

4. AI and other technologies have potential benefit to educators and students alike to personalise, which

5. can help better align to learners' motivations and it is important for those offering CEE courses to understand these appropriately.

Discussions

Please raise your hand

Next steps

SEFI CEE/LLL SIG – focus areas 2024/25

- CEE Taxonomy – Patricia (pcaratozzolo@tec.mx)
- CEE Educator Framework – Sonia (S.M.Gomez.Puente@tue.nl)
- Microcredentials – TBC
- Enhancing lifelong learning guidance (accreditation) – Darren (dcarthy@engineersireland.ie)
- LLL Competences (with Engineering Skills & Capacity Building SIG)
- CEE models - Chris, Matias and Kostas (Christopher.Smith@gcu.ac.uk)
- Strengthening and building partnerships with other organisations (Chris and Anikó)
- [IACEE is leading webinars and activities around AI]

Lifelong Learning Competences Survey (practising engineers and educators)

- As technology evolves and the labour market shifts, the need for lifelong learning has never been more critical. Join our SEFI SIG collaborative survey and share your insights on lifelong learning (LLL) practices of educators and practising engineers.

- Your response will inform how LLL can shape the future of engineering education and practice and to a broader understanding of how engineering educators and professionals perceive and engage with LLL opportunities.

- Further information here

IACEE Symposium 2025
Purdue University

3-4 April, 2025
West Lafayette, Indiana, USA

SEFI Conference 2025

SEFI Annual Conference 2025

15-18 September 2025
Tampere University, City centre campus, Main building

- Hoping there will be a focused afternoon on CEE – watch out for announcements.

Upcoming SEFI@work sessions

- 6th November, 14:00 CET: Building Scholarship of Teaching and Learning with Exploratory Data Analysis;

- 25th November, 16:00 CET: Contemporary Approaches to Assessment of Engineering Competencies for Diverse Learners

- 12th December 2024, 12:00 CET: A Selective Review of Computing Education Research

- 10th February 2025, 13:00 CET: The Good, the Bad and the Unethical: AI in engineering education

- Series based on selected chapters from [International Handbook of Engineering Education Research](#) will also be happening – further details coming soon.

More details here: https://www.sefi.be/activities/events/

Where to find more information

SEFI

🏠 www.sefi.be

in SEFI

✕ @SEFI_HQ

✉ office@sefi.be

IACEE

🏠 www.iacee.org

in IACEE

✉ Enquiry Form