Module 2. Capacity-Building for academics

UAL, IPC

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Unit 2.1. Embedding circular economy into teaching

Curriculum design

To craft curricular designs for a course across all levels of teaching, we need to construct a comprehensive **program that encompasses the following elements**:

1. **Duration** (Hours/Week/month);

2. **Work hours** by type of class (theoretical, practical, project, seminar, or other);

3. **Credits**;

4. **Title** of the curricular unit;

5. **Learning outcomes** and their compatibility with the teaching method (knowledge, skills, and competencies to be developed by students);

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Curriculum design

To craft curricular designs for a course across all levels of teaching, we need to construct a comprehensive **program that encompasses the following elements**:

6. Syllabus;

7. Demonstration of the syllabus coherence with the learning objectives;

8. Teaching and learning methodologies;

9. Assessment;

10. Demonstration of the coherence of teaching and evaluation methodologies with the learning objectives.

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Curriculum design

1. Duration (Hours/Week/month);

2. Work hours by type of class (theoretical, practical, project, seminar, or other);

3. Credits;

Credits are the volume of learning based on the defined learning outcomes and their associated workload that will define the value of this course in the academic path.

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Curriculum design

4 . **Title** of the curricular unit;

Clarity;

Relevance;

Engagement;

Accessibility

Innovation;

Alignment;

Considering these issues, you can create a title that effectively communicates the essence of the course while attracting and engaging students interested in circular economics.

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Curriculum design

5. Learning outcomes and their compatibility with the teaching method (knowledge, skills, and competencies to be developed by students);

- *Clarity of Goals;*
- *Selection of appropriate teaching methods to achieve learning outcomes;*
- *Adaptation to Students' Needs;*
- *Assessment Alignment*

Objective: create a cohesive and purposeful educational experience where the instructional approach is intentionally designed to support the achievement of desired learning outcomes.

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Curriculum design

6. Syllabus;

> roadmap that details the <u>topics, content, objectives and assessment</u> for the duration of the course;

7. Demonstration of the syllabus coherence with the learning objectives;

> showing <u>how the content and structure of a syllabus align with the learning outcomes</u> within a curriculum

Unit 2.1. Embedding circular economy into teaching

Curriculum design

9. Assessment

- *Written Assignments;*
- *Presentations;*
- *Problem-Solving Exercises;*
- *Exams;*
- *Projects;*
- *Peer Review;*
- *Portfolios;*
- *Discussions and Debates;*

By using a combination of these assessment methods, instructors can evaluate students' knowledge, skills, and competencies in the field of CE effectively.

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The curriculum for CE and social innovation should incorporate **essential features of both** concepts:

Holistic Understanding;

Critic Thinking;

Resource Efficiency;

Collaborative Models;

Inclusive Design;

Regenerative Practices;

Entrepreneurial skills;

Ethical Considerations;

Lifelong Learning;

Sharing Platforms;

Closed-loop Systems;

Product Life Extension

Students can develop the necessary knowledge, skills, and attitudes to drive positive change toward a more circular and socially innovative attitude.

Circular

Unit 2.1. Embedding circular economy into teaching

Circular economy principles can contribute significantly to achieving the **Sustainable Development Goals (SDGs)** outlined by the United Nations.

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Syllabus for Curriculum Design

Any curriculum of a course on CE should incorporate the **differences between linear and circular economies**. We will introduce some key concepts (i.e., resource usage, waste management, and sustainability)

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Practical activity 1 - Circular Economy differs from the Linear Economy

- Each group (totalling 5 groups) must indicate, using the Padlet QR code, **how the Circular Economy differs from the Linear Economy in their respective topic**.

- They will have <u>15 minutes</u> to answer and at the end each group must present their conclusions.

1 - Product Design
2 - Waste Management System
3 - Transport and Logistics
4 - Energy Production and Consumption
5 - Conscious Consumption

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Syllabus for Curriculum Design

Practical activity 2 - Impacts of Linear and Circular Economy

- For the next <u>10 minutes</u>, each participant must access each of the 2 QR codes Mentimeter presented and answer the questions **in one word**.

- They can answer as many times as they like.

1 - In what ways does the linear model contribute to environmental harm?

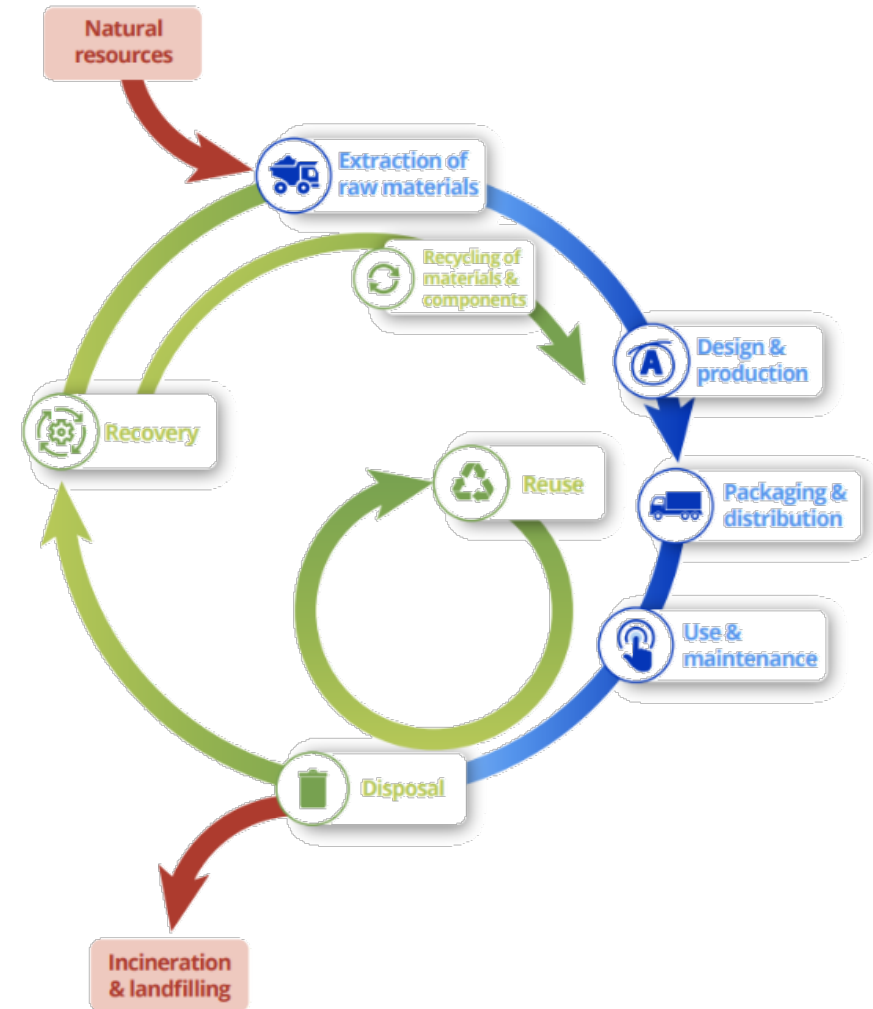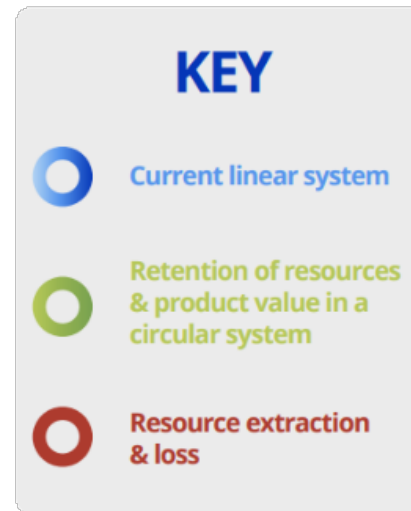2 - How does the concept of the circular economy contribute to combating climate change?

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Syllabus for Curriculum Design

Product life cycle:

➢ Design for Longevity;

➢ Resource Efficiency;

➢ Usage and Maintenance;

➢ End-of-Life Management.

KEY

- Current linear system

- Retention of resources & product value in a circular system

- Resource extraction & loss

Natural resources

Extraction of raw materials

Recycling of materials & components

Design & production

Recovery

Reuse

Packaging & distribution

Use & maintenance

Disposal

Incineration & landfilling

Circular

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Syllabus for Curriculum Design

Biomimetics draws inspiration from nature's designs and processes to design products, processes, and systems that are inherently restorative and regenerative.
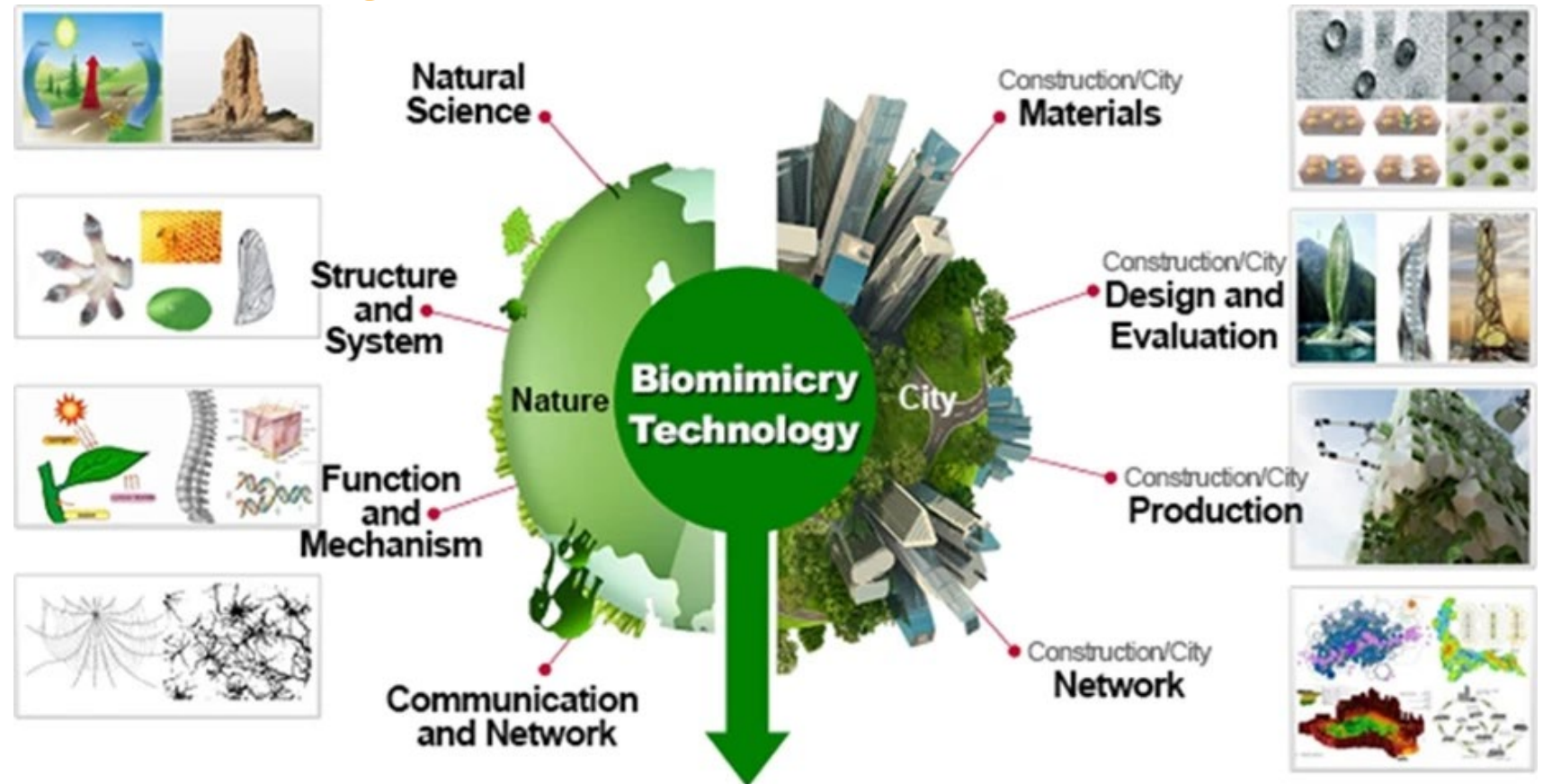
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Syllabus for Curriculum Design

Circular

Higher Education

Analyse the demands and trends of the job market

identifying the skills and competencies

understanding technological changes,

regulatory requirements,

employer demands...

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Syllabus for Curriculum Design

Preschool and School Education

- Simplicity and Clarity;

- Emphasis on Fundamental Concepts;

- Practical and Experiential Activities;

- Integration with School Curriculum;

- Development of Critical Awareness.

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Extracurricular activities

- **Development of Complementary Skills**

- **Exploration of Interests and Passions**

- **Experiential and Practical Learning**

- **Development of Networking**
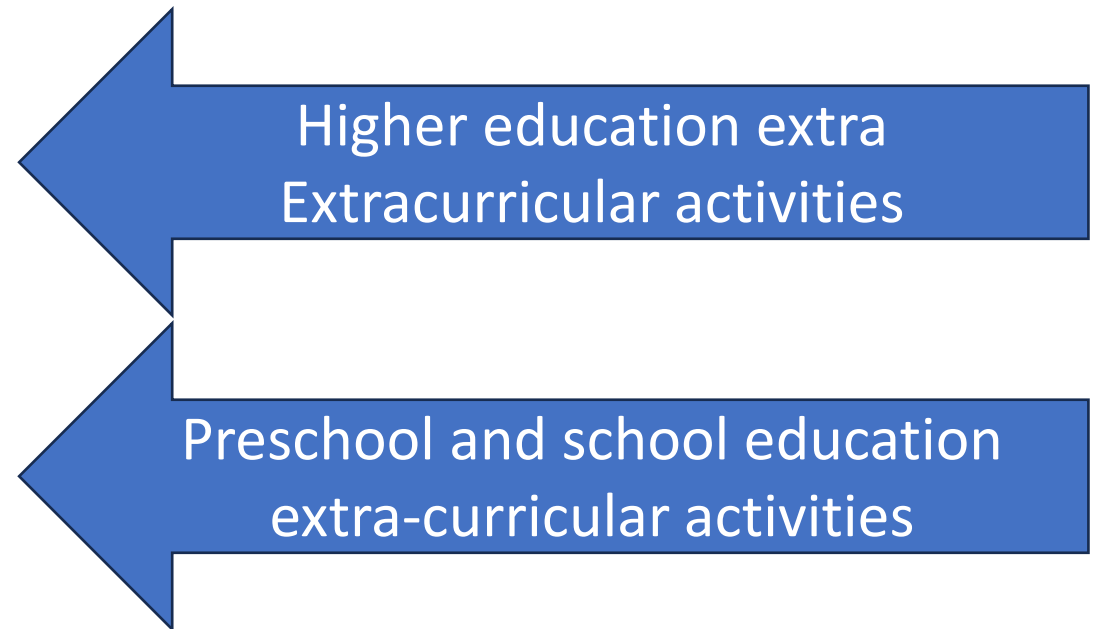
Higher education extra Extracurricular activities

Preschool and school education extra-curricular activities

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Syllabus for Curriculum Design - Extracurricular activities
(Higher Education)
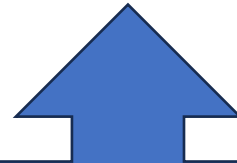
Circular

Seminars and Conferences

Dual Scholarships

Company Internships

Master's Programs

Mobility Programs

Summer Courses

Provide students with valuable opportunities to engage with the CE, developing practical skills

Unit 2.1. Embedding circular economy into teaching

Extracurricular activities (Preschool and school education)

- Science Fairs

- Clubs and Study Groups

- Field Trips

- Academic Competitions

Unit 2.1. Embedding circular economy into teaching

Syllabus for Curriculum Design

Practical activity 3 - Examples on extracurricular activities

- Divided into **5 groups**, each will have to <u>present an example of an extracurricular activity</u> that could be applied at each <u>level of education</u>.

- They will have <u>15 minutes </u>to prepare and present the activity.

1. 1st cycle
2. 2nd cycle
3. 3rd cycle
4. Secondary Education
5. Higher education

Unit 2.2. Educational methodologies

Active methodologies for learning

active learning

critical thinking

practical application
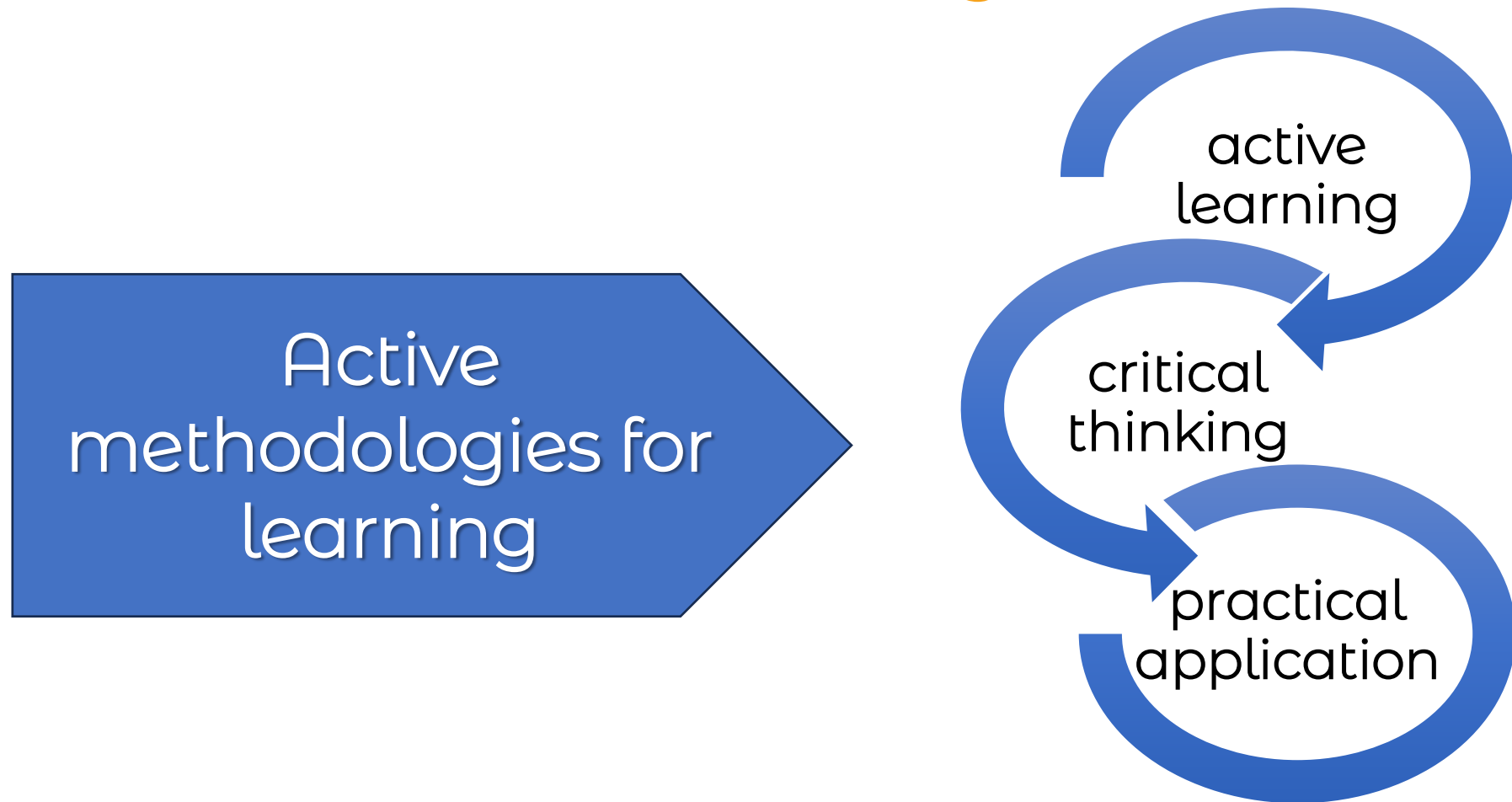
Unit 2.2. Educational methodologies

Active methodologies for learning

Problem-Based Learning (PBL): solving real-world problems related to the CE. Example: a case study of a company struggling with waste management issues.

Project-Based Learning: Similar to PBL, but using projects. Example: design a product using principles of the CE.

Case Studies: real-world examples of CE initiatives, challenges and best practices. Example: case studies of companies that have successfully implemented CE strategies. Group discussions on the key strategies employed, challenges faced, and lessons learned.

Experiential Learning: i.e. field trips or site visits.

Simulation Games: such as role-playing exercises or interactive simulations, simulating decision-making processes related to the CE.

Circular

Unit 2.2. Educational methodologies

Active methodologies for learning

Design Thinking: adopting a <u>human-centred perspective to problem-solving</u> in the CE. Through empathizing with stakeholders, defining problems, ideating solutions, prototyping designs, and testing iterations, students develop innovative and user-centric solutions that address real-world needs and challenges.

Interdisciplinary Collaboration: bringing together <u>students from different disciplines</u>, such as engineering, business, design, and environmental science, to explore CE concepts from diverse perspectives.

Action Research: conducting <u>research projects that contribute to advancing knowledge and practice</u> in the field of CE. Students identify research questions, collect data, analyse findings, and propose recommendations.

Online Learning Platforms: <u>interactive modules, multimedia content, and virtual labs</u>. These platforms provide students with opportunities for self-paced learning, and online discussions.

Unit 2.2. Educational methodologies

Active methodologies for learning

Practical activity 4 - Examples of active methodology for learning

- Divided into 5 <u>groups</u>, each group must **choose an active methodology for learning and present an example of an activity that they could apply in their classes**, indicating the <u>objective of the activity, target audience and the description of the activity</u> itself.

- They will have <u>15 minutes </u>to prepare and present the activity.

Thank you for your attention!