EU-CONEXUS European University for Smart Urban Coastal Sustainability

A Critical Review: Designing Sustainability-Focused Micro-Credentials: Enhancing Lifelong Learning Through Pedagogical Innovation

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1. How familiar are you with the concept of micro-credentials in higher education?

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Transparent & Portable Certification - metadata, digital verification, and alignment with qualification frameworks (e.g., EQF, ECTS, Europass).

An MC is a certification or credential that validates competency in a specific skill or set of skills.

Assessment Based on Skills Demonstration - practical assessments, portfolios, or real-world application.

WHAT IS THE DIFFERENCE BETWEEN A MODULE AND A MICRO CREDENITAL?

A module is a distinct unit or component of a course or programme

Co-design and stakeholder involvement – MCs should be developed with industry input

An MC has Clear Competency-Based Focus – specific skills in mind.

MCs are independent learning pathways – stand-alone

EU Mandatory Elements of MC

b) the European standard elements to describe a micro-credential (as described in Annex I) including the following mandatory elements:

i) identification of the learner

ii) title of the micro-credential

iii) country(ies)/region(s) of the issuer

iv) awarding body(ies)

v) date of issuing

vi) learning outcomes

vii) notional workload needed to achieve the learning outcomes (in European Credit Transfer and Accumulation System – ECTS, wherever possible)

viii) level (and cycle, if applicable) of the learning experience leading to the micro-credential (European Qualifications Framework, Qualifications Frameworks in the European Higher Education Area), if applicable

ix) type of assessment

x) form of participation in the learning activity

xi) type of quality assurance used to underpin the micro-credential

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If you could design a micro-credential on any topic (no limits!), what would it be?

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Research Aim

Rationale:

Micro-credentials in Higher Education are gaining momentum, with EU and UNESCO advocating for their recognition as tools for lifelong learning.

SETU's Initiative:

Develop sustainability-focused micro-credentials in partnership with EU-CONEXUS Alliance Members.

Research Aim:

This critical review analyses the rationale behind the unique design process integrating instructional design frameworks (ADDIE, ABC-LD) and GreenComp – The European Sustainability Competence Framework.

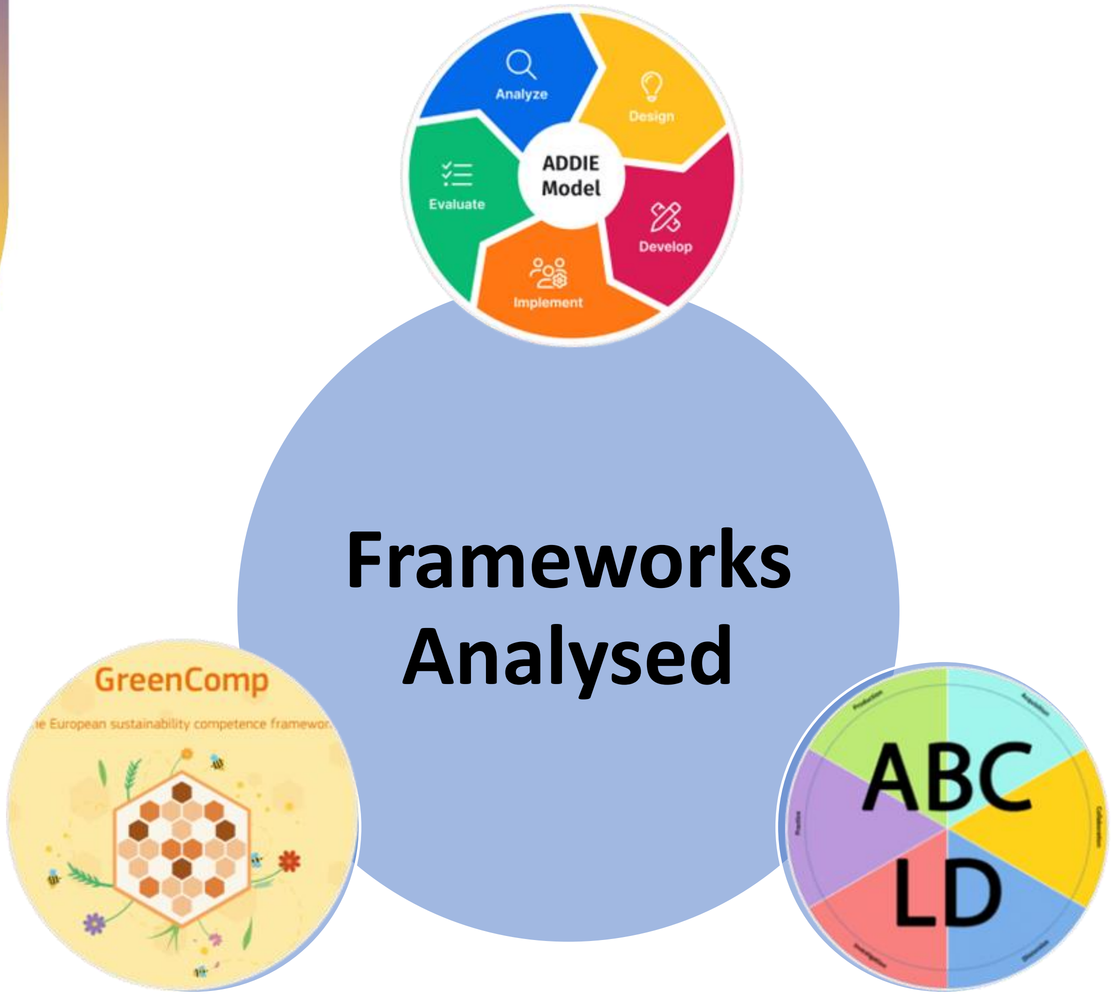
European Alliance Micro-credentials

Offered to students coming from institutions within the alliance – some alliances offer micro-credentials to the general public.

Recognition of micro-credentials is nearly entirely within the alliances.

Many institutions see micro-credentials as Erasmus-lite an alternative or complement to mobility experiences, or as a mechanism to facilitate joint awards.

Methodology – Critical Review



Key Focus Areas:

- **Pedagogical** quality and learning experience **design.**
- Strategic curriculum integration aligned **with sustainability education**
- Robust **learning outcomes, activities and assessments** tailored to address **sustainability challenges and enhance sustainability competencies.**

So Why Design?

- Need to be engaging for the learner, facilitate **ease of access**, have distinct outcomes and be intentionally designed.
- Micro-credentials that lack transparency on learning outcomes, **assessment methods**, and **the criteria** for earning the credential can lead to confusion and skepticism among learners and employers

So why design?

By using an established instructional design framework, course developers can save time and resources by leveraging existing best practices and avoiding common mistakes.

Masters Level Micro-credentials in SmUCS – The Bottom-up Micro-credential Design process

Needs analysis

- Adopt ID model ADDIE
- European-wide skills survey across 11 sectors
- Stakeholder interviews
- Student focus groups model

Blueprint

- Identify MCs thematic areas
- Confirm participation of subject matter experts
- Establish interdisciplinary and multi-disciplinary groups
- Content drafting and knowledge sharing

Persona Building

- Identify students and student needs
- Promote student centeredness
- Identify key areas for learning - knowledge, skills and attitude area

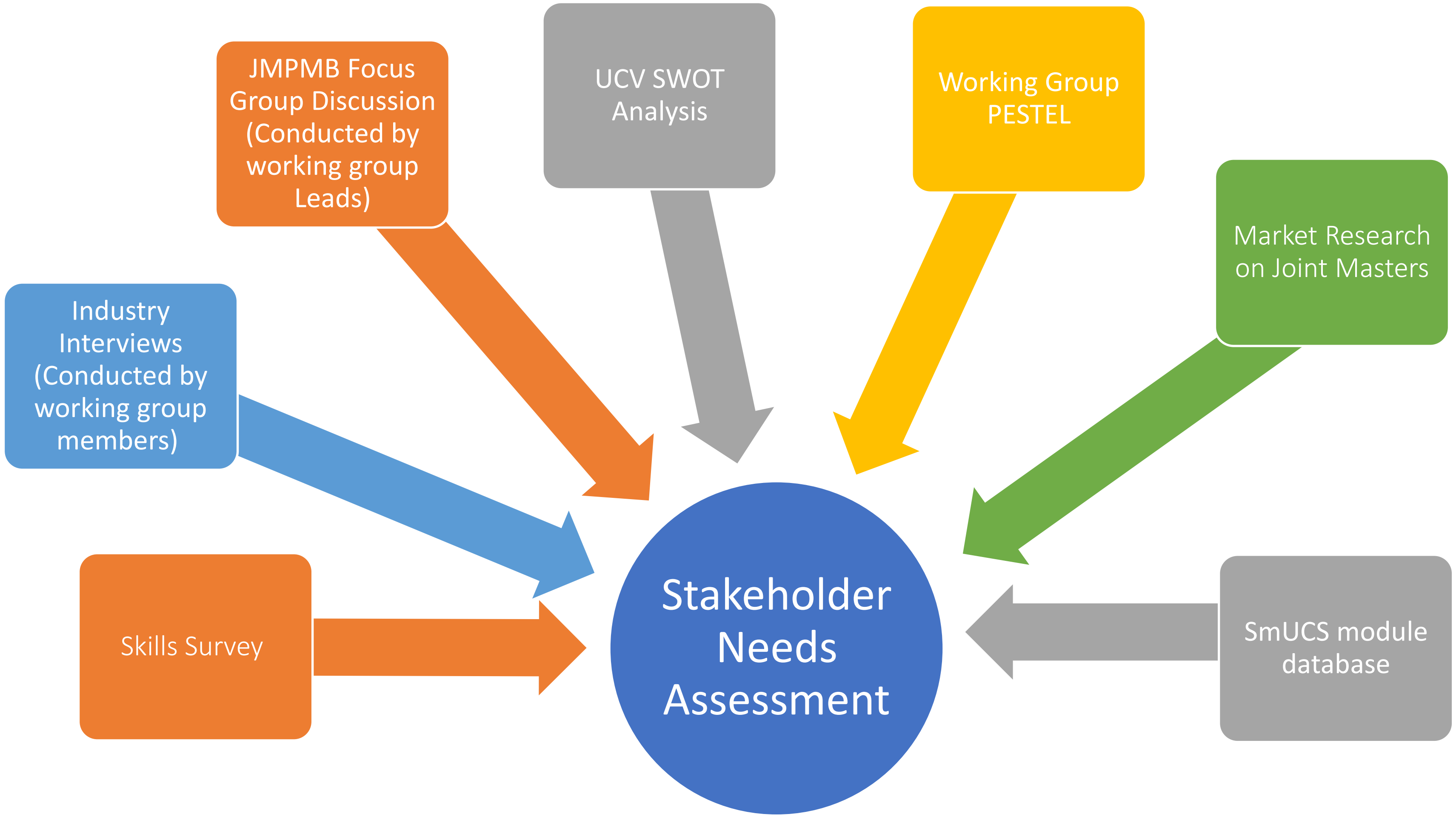
Storyboard

- Content redrafting, LO development, green competency layering
- Use the ABC-LD model to develop engaging learning sequence

Develop

- Create descriptors
- Proceed to validate
- Teaching logistics

Needs Analysis
Mixed-method Data Collection



EU-CONEXUS Needs Analysis Outcomes

Pan European Skills survey redesigned for all 9 partner countries, modified launched in Spring 2023

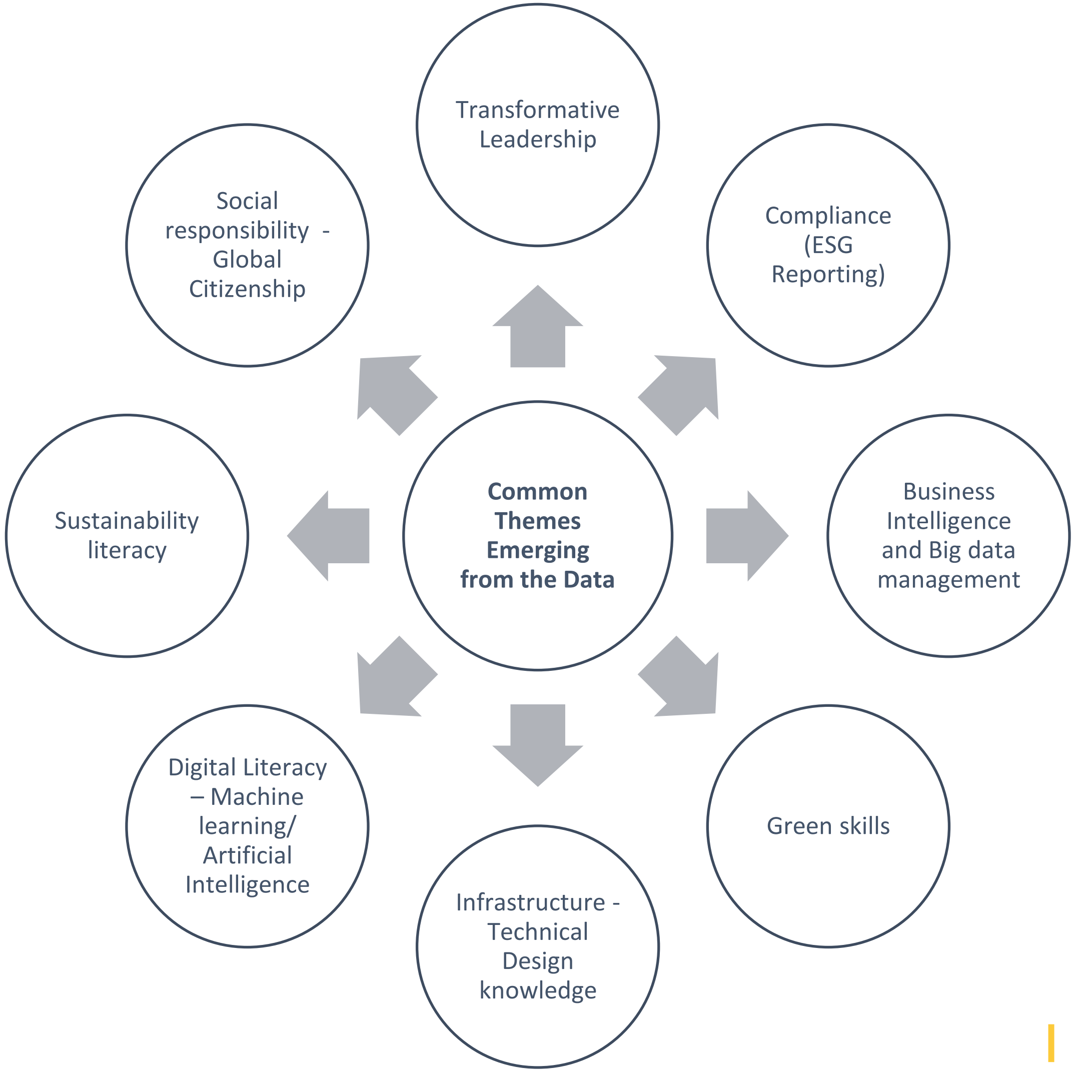
New sections focussing on Transversal skills and Sustainability skills/competencies included

537 respondents, 263 valid responses

Within the cohort of 537 respondents, **88 individuals provided open-ended responses**, incorporated into a qualitative analysis framework, enriching the survey

Survey thematic analysis in WP3 produced MC thematic areas and titles, brainstorming and 3 x focussed online workshops to date

Industry and policy informed. ESD to 2030 informed, Environ conference, GHG emissions policy, net zero



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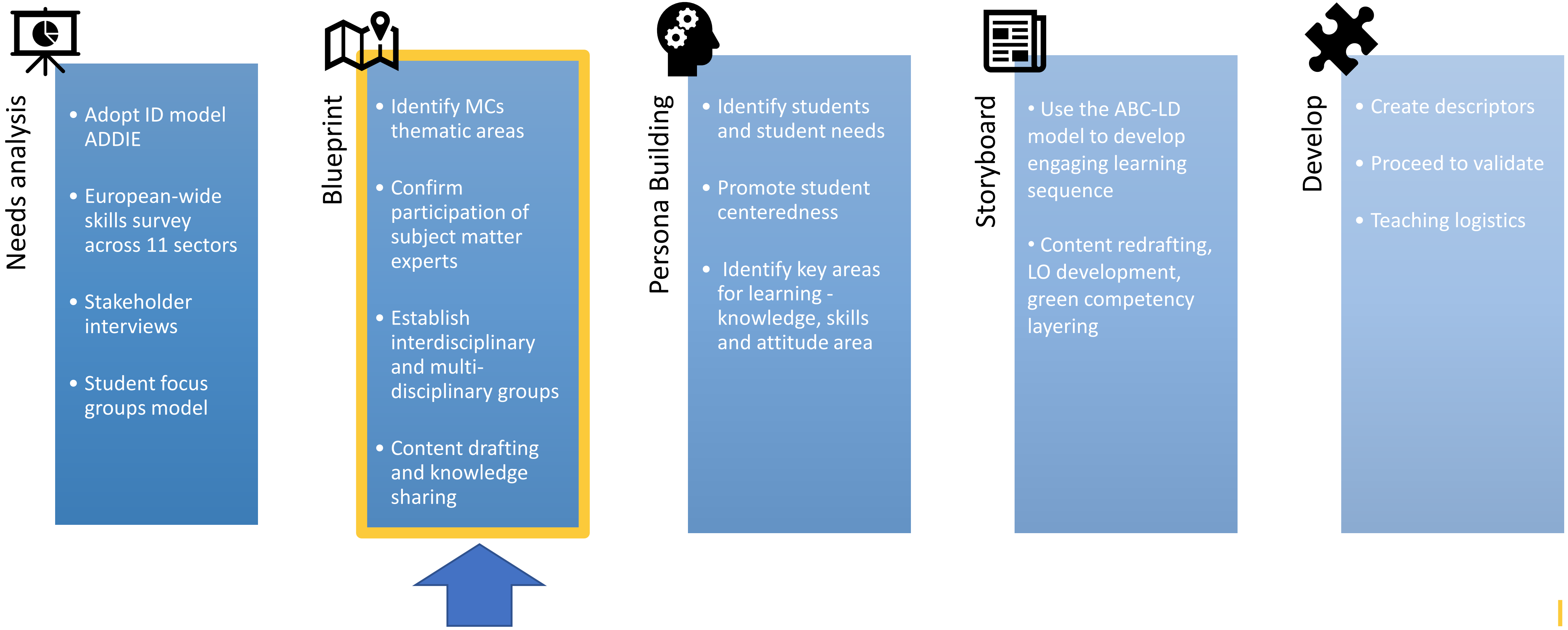
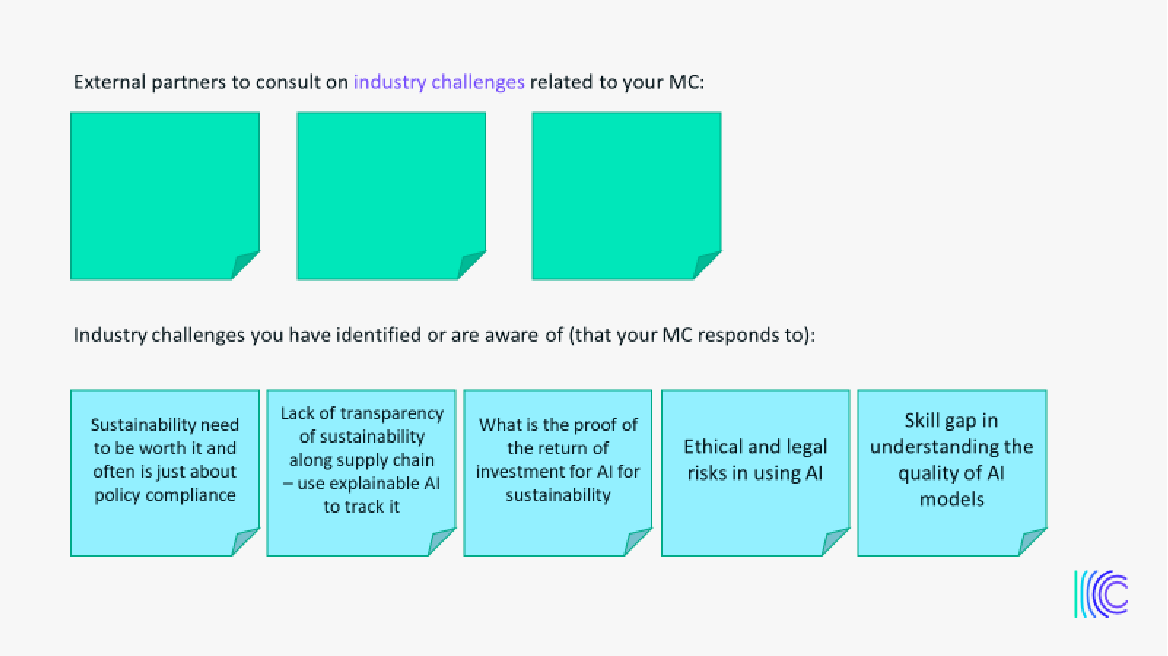


EU-CONEXUS Micro-credential Thematic Areas
Bottom-up Micro-credentials

Renewable energies and storage	Sustainable Smart Urban Infrastructure (transport)	AI for Sustainable Business	Green sustainable and regenerative tourism practice/ Sustainable tourism development
Sustainability literacy and systems thinking in urban and coastal regions.	Sustainable Leadership for innovative transformative change in urban and coastal regions.	Sustainable regulation - European and international policy for industries of urban and coastal regions.	Green and social entrepreneurship

Micro-credential Design Workshops
Building our The MC Blueprint

1. EU-CONEXUS representatives and **leads identify thematic learning areas from needs assessment**
2. Each University representative sourced potential collaborators and **subject experts across the alliance**
3. Initiate contact and carry out individual meetings to exchange information, set out clear the expectancy, and explain the WP goals
4. Establish expert engagement in MC development and assign to identified MCs
5. 3 x 90 mins online workshop and 2 x Day Face-to-face event at SETU



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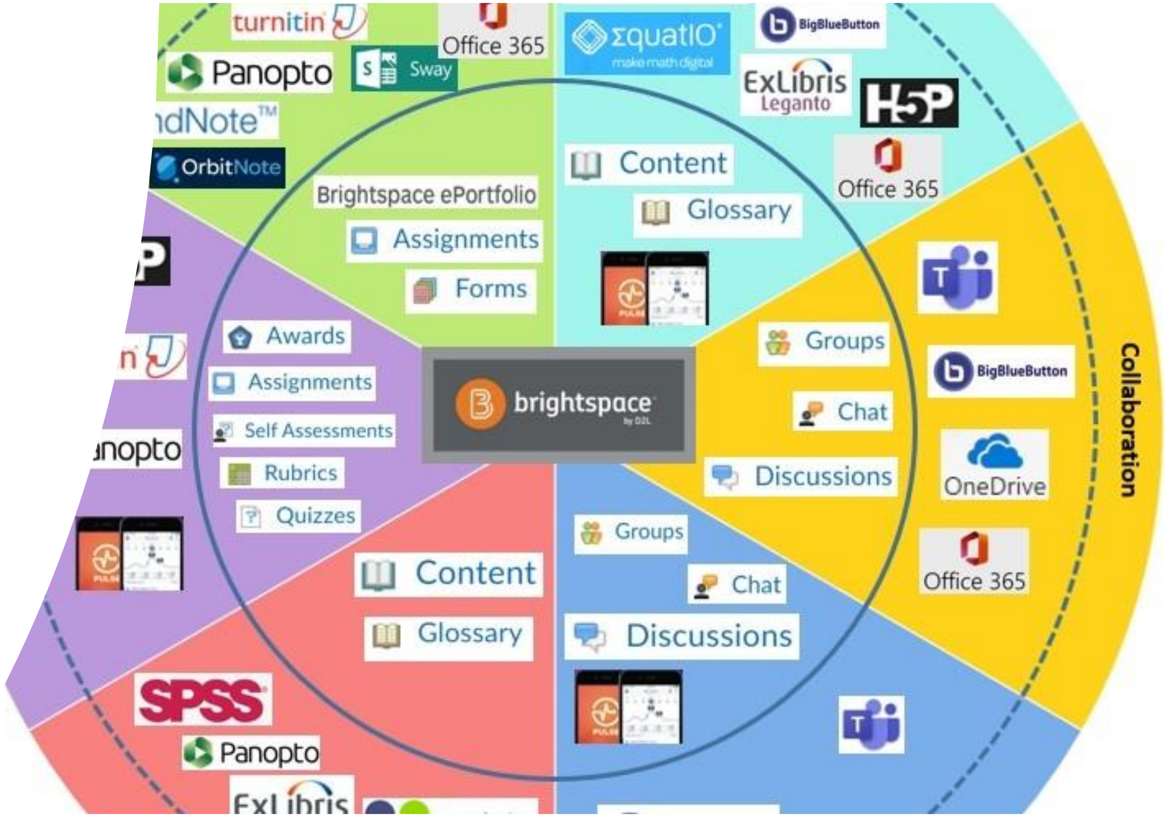
Persona Building

1. To accurately envision the way real people will interact with the course.

2. The end result is more relevant and engaging training, resulting in improved outcomes.

3. Brings added focus to the design process keeping the development on the right track

4. Promotes learner centred design leading to effective and engaging courses



Persona Template

Personal Data

Name: **Priya Patel**

Short Bio: 34-year-old business analyst in renewable energy. Holds a BBA and an MBA in Strategic Management. Over 10 years of experience in sustainability projects. Based in London, balancing career and family.

Who is it? Young person that is motivated to learn new things about AI and sustainability

Goals and Aspirations

Main Goals and Drivers in completing MC

Wants to understand how to use AI to improve businesses and make them more sustainable

- Learn AI applications in sustainable business.
- Gain a competitive edge and advance to leadership.
- Build a network in AI and sustainability.

Barriers to Learning

- Does not understand business economics
- No deep knowledge of programming
- Limited time due to work and family.
- Lacks technical background in AI.

Learning Preferences

- Flexible, self-paced modules.
- Visual aids, real-world examples.
- Hands-on projects and simulations.
- Collaborative group discussions.
- Short, focused lessons.

Technology

Technology Proficiency

- Has some fundaments in programming and math, but, not that much experience
- Have domain knowledge in sustainability topics
- Lacks technical background in AI.

Industry Trends & SmUCS Challenges?

AI is a Hype
Green Washing

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The ABC-LD Model

Rapid and Creative Course Design (Young and Perović, 2016)

EU-CONEXUS Micro-credential Development

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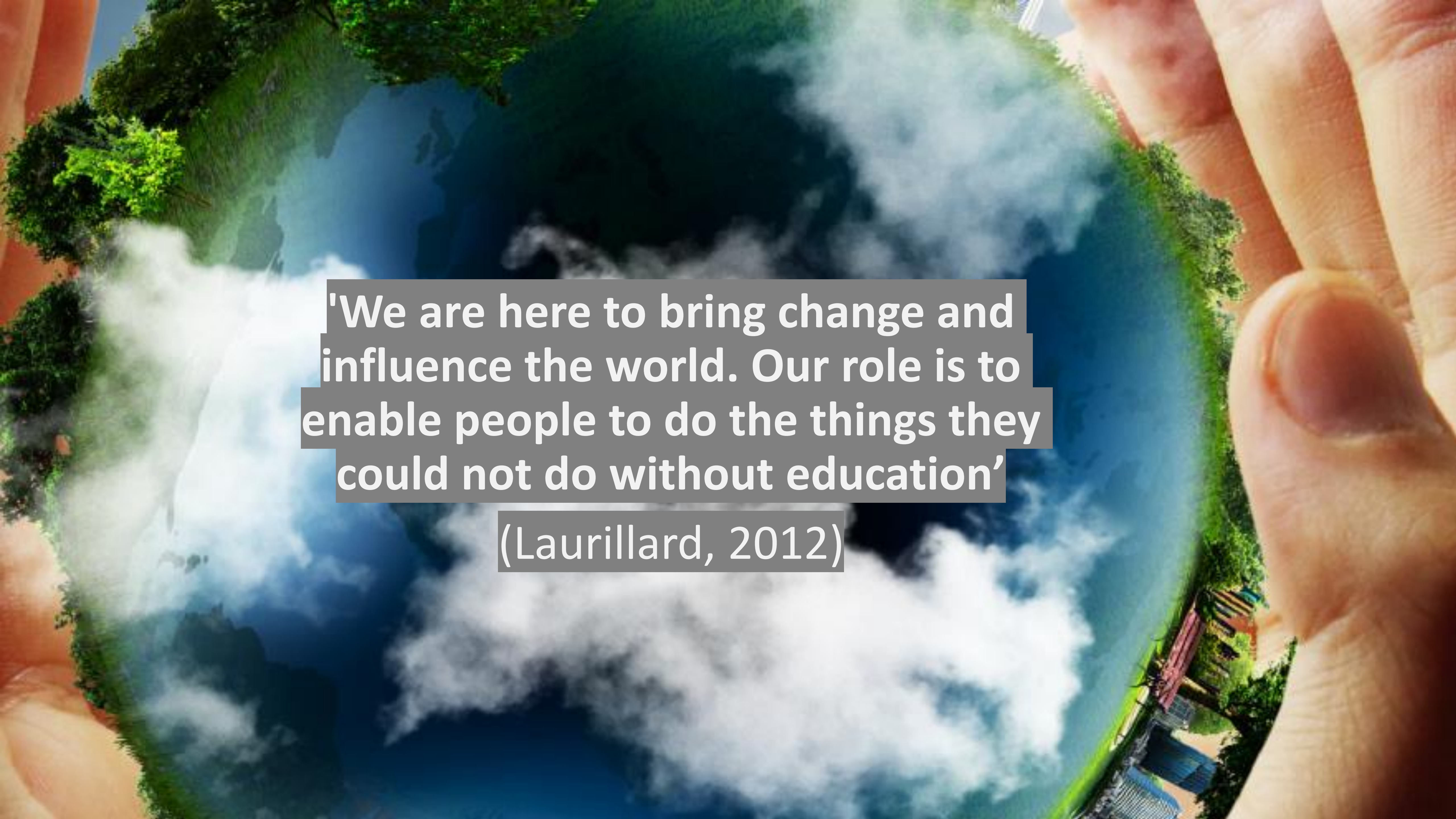
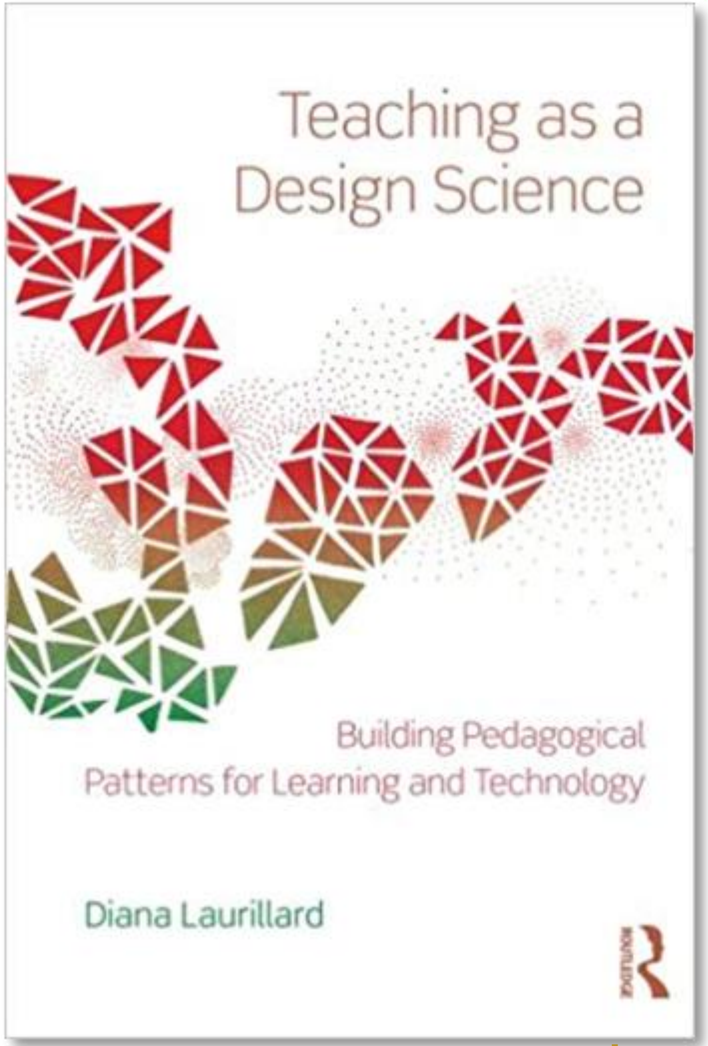

'We are here to bring change and influence the world. Our role is to enable people to do the things they could not do without education’
(Laurillard, 2012)

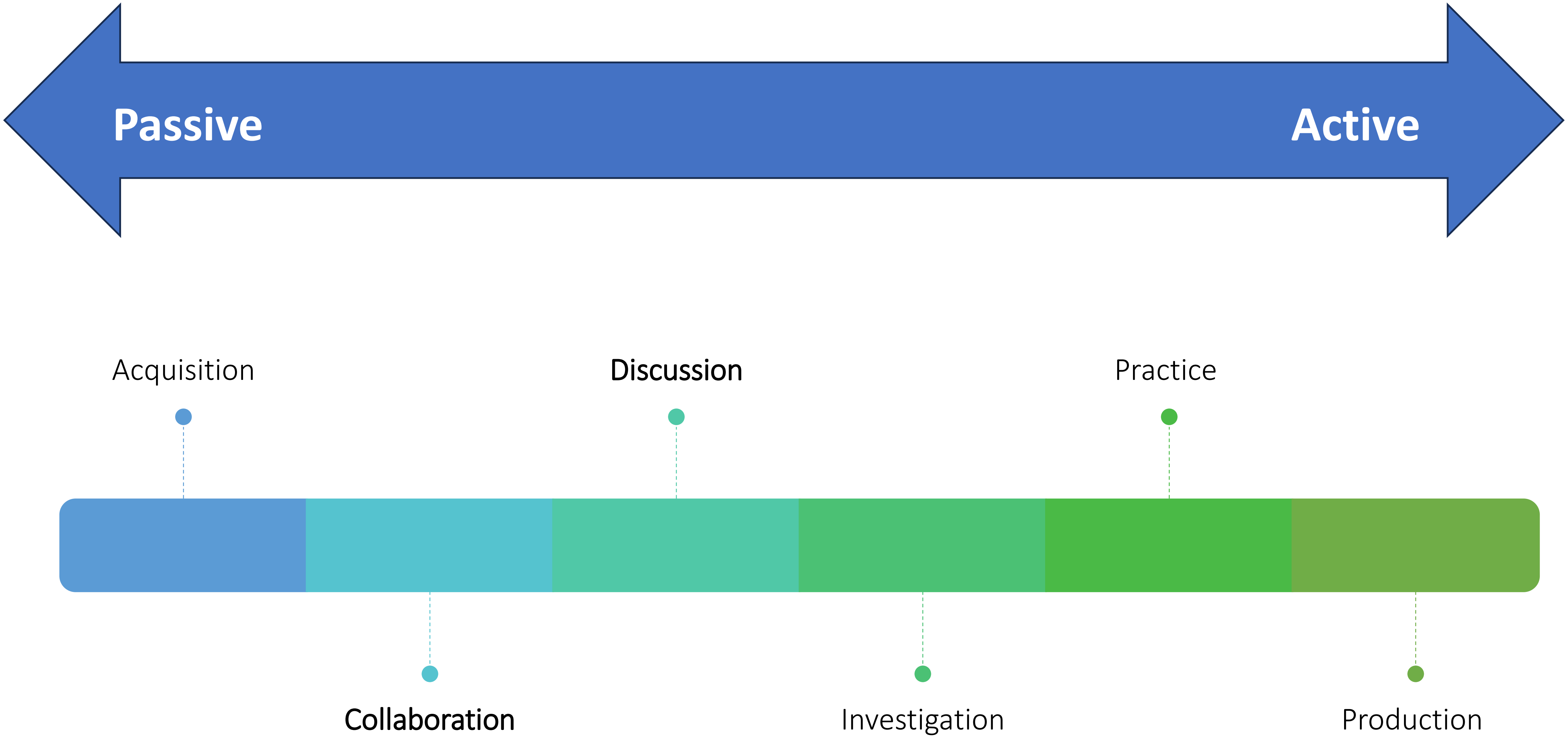
The ABC-LD Model

engaging hands-on, card-based approach to curriculum design – **curriculum design is where change**	Fast – requires minimal preparation	Student centred approach	Stimulates informed dialogue among teams	Aligns to strategic aims
Encourages blended approaches	Based on established theory 'Conversational Framework' (Laurillard 2012)	Discipline-neutral	Works for HE, FE, CPD, Moocs, with students etc.	Widely used - growing international community
The ABC-LD model masks learning theories that are complex	The cards link theory and practice	The student-centred design is naturally embedded through the card activities.	Can localise or adapt it to our needs	MCs are framed through activity rather than content

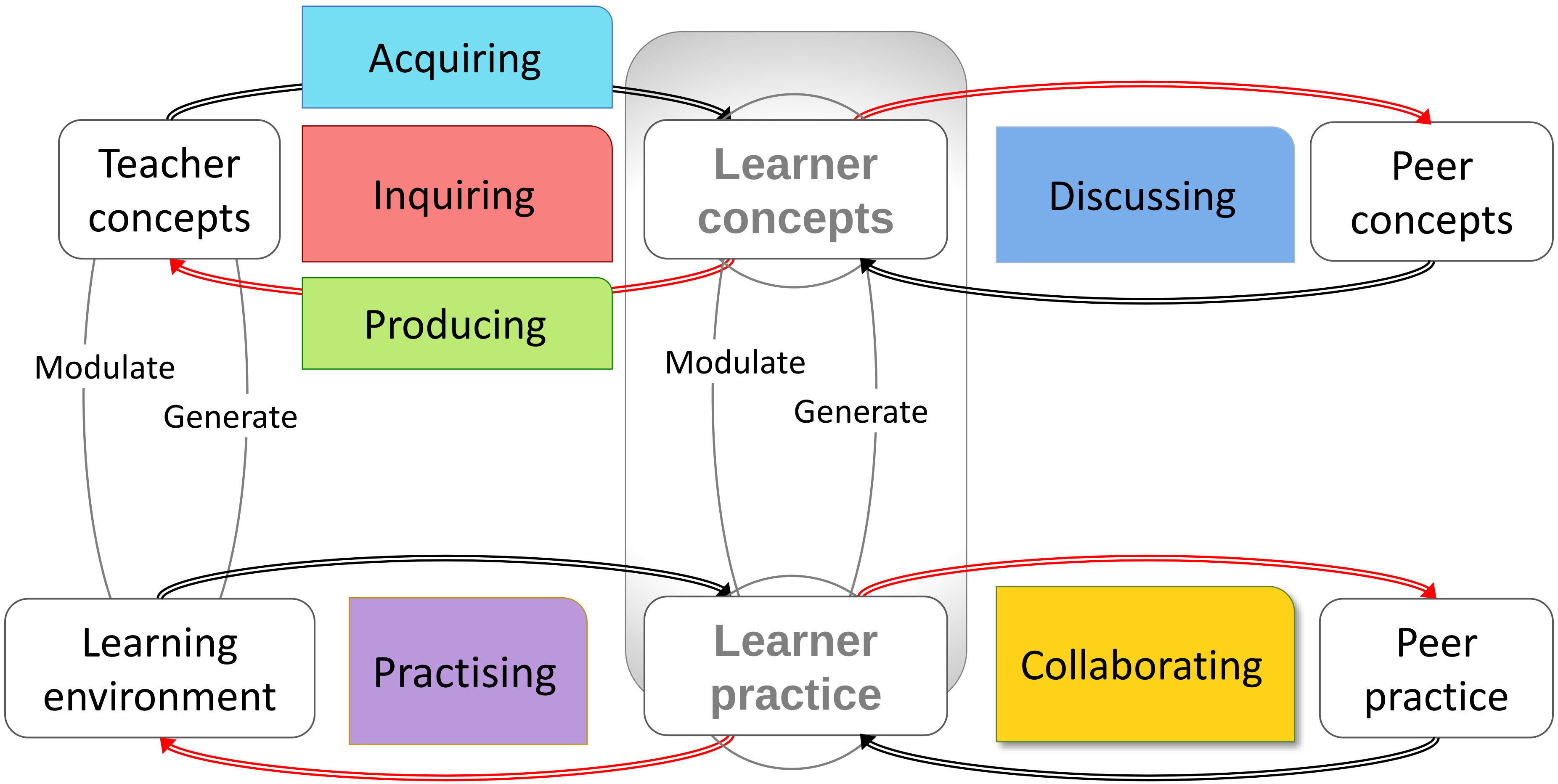


A Natural Integration of UDL

Multiple Means of Engagement	Multiple Means of Representation	Multiple Means of Action/Expression
Stimulate motivation and sustained enthusiasm for learning by promoting various ways of engaging with material.	Present information and content in a variety of ways to support understanding by students with different learning styles/abilities.	Offer options for students to demonstrate their learning in various ways (e.g. allow choice of assessment type).
		


Passive
Active
Acquisition
Discussion
Practice
Collaboration
Investigation
Production

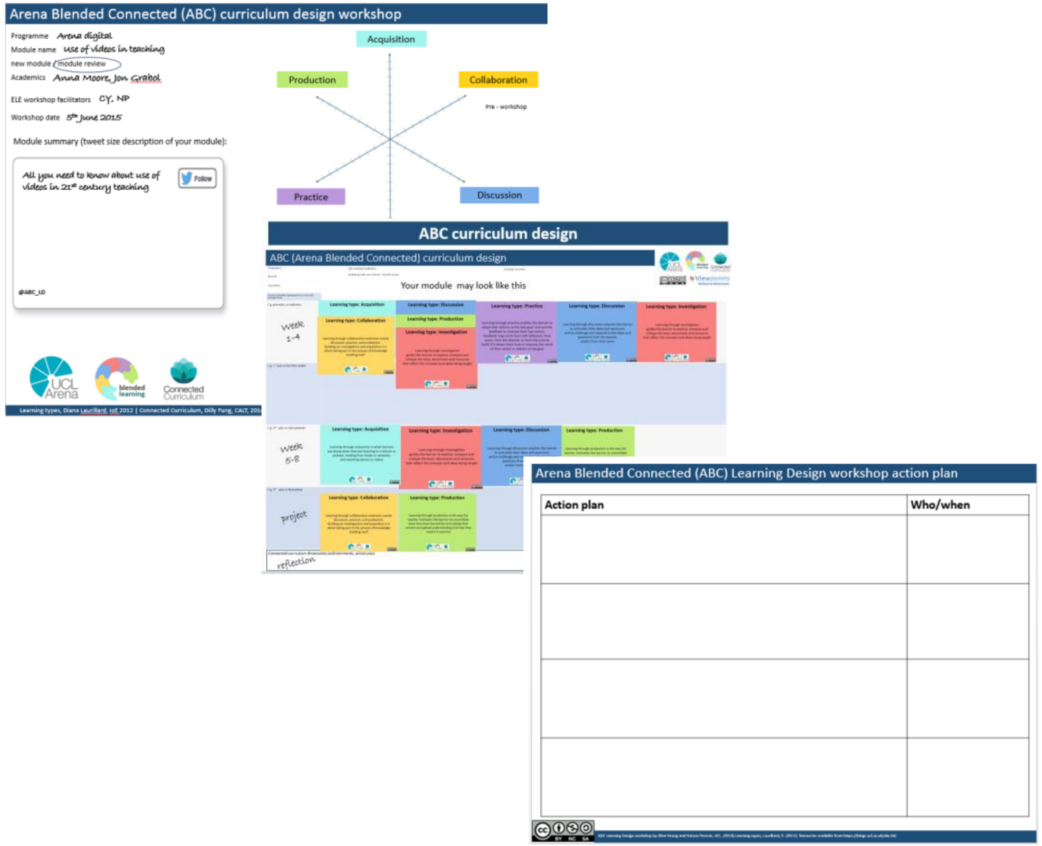
Learning in the context of adult education: The Conversational Framework



A sequence of learning activities for a specific outcome uses the appropriate balance between all these types of learning, conventional and digital

Source: Teaching as a Design Science (Laurillard, 2012)

ABC Learning Design



Workshop schedule (2.5 hours):

Phase 1 - Module info, tweet and shape

- **Tweet your module** – tweet size description of your module
- **Module shape** (**Learning types activities graph**) distribution of learning types
- **Blend** – (blended graph)
- **Storyboard of student journey**
- **Storyboard** – learning types sequences and activities
- **Assessment** – align activities and assessment

Phase 2: Module info, tweet and shape

- **Review the graphs** – what has changed? Why?

Phase 3: Actions – what next for team?

Learning types cards

Acquisition

Learning through acquisition is what learners are doing when they are listening to a lecture or podcast, reading from books or websites, and watching demos or videos

Collaboration

Learning through collaboration embraces mainly discussion, practice, and production. Building on investigations and acquisition it is about taking part in the process of knowledge building itself

Discussion

Learning through discussion requires the learner to articulate their ideas and questions, and to challenge and respond to the ideas and questions from the teacher, and/or from their peers

Investigation

Learning through investigation guides the learner to explore, compare and critique the texts, documents and resources that reflect the concepts and ideas being taught

Practice

Learning through practice enables the learner to adapt their actions to the task goal, and use the feedback to improve their next action. Feedback may come from self-reflection, from peers, from the teacher, or from the activity itself, if it shows them how to improve the result of their action in relation to the goal

Production

Learning through production is the way the teacher motivates the learner to consolidate what they have learned by articulating their current conceptual understanding and how they used it in practice

learning types: definitions on one side and examples of activities on the other

Learning types cards (front and back)

Learning type: Acquisition

Conventional method	Digital technology
reading books, papers	reading multimedia, websites, digital documents and resources
listening to teacher presentations face-to-face, lectures	listening to podcasts, webcasts
watching demonstrations, master classes	watching animations, videos

Learning type: Collaboration

Conventional method	Digital technology
small group project	small group projects using online forums, wikis, chat rooms, etc. for discussing others' outputs
discussing others' outputs	building a joint digital output
building joint output	

Learning type: Discussion

Conventional method	Digital technology
tutorials	online tutorials
seminars	seminars
discussion groups	email discussions
class discussions	discussion groups
	discussion forums
	web-conferencing tools
	synchronous and asynchronous

Learning type: Investigation

Conventional method	Digital technology
using text-based study guides	using online advice and guidance
analysing the ideas and information in a range of materials and resources	analysing the ideas and information in a range of digital resources
using conventional methods to collect and analyse data	using digital tools to collect and analyse data
comparing texts	comparing digital texts
searching and evaluating information and ideas	using digital tools for searching and evaluating information and ideas

Learning type: Practice

Conventional method	Digital technology
practising exercises	using models
doing practice-based projects	simulations
labs	microworlds
field trips	virtual labs and field trips
face-to-face role-play activities	online role play activities

Learning type: Production

Conventional method	Digital technology
producing articulations using:	producing and storing digital documents
statements	representations of designs
essays	performances, artefacts
reports	animations
accounts	models
designs	resources
performances	slideshows
artefacts	photos
animations	videos
models	blogs
videos	e-portfolios.

learning types: definitions on one side and examples of activities on the other

Investigation

Web search (forum, wiki) V
OER resources (external)
Literature reviews and critiques (forum/blog/wiki/RSS) V
Field/lab observations (media/blog/wiki) V
Action research V
Authentic research / data analysis – write a paper V
Lead a group project V

Acquisition

Guided readings (library resources)
OER resources (external)
Podcast (media) V if students do it
Webinars (virtual classroom) V
Q&A forum (forum, where teachers answer student questions) V
Video lectures (webcast),
YouTube videos (external)
Field/lab observations (media/blog/wiki) V
MCQs - formative with automatic feedback V
Portfolios (MyPortfolio) V

Practice

MCQs - formative with automatic feedback V/A
Online role play (forum, virtual classroom)
Reflective tasks – group or individual (forum) V/A
Case studies (forum, lesson) V/A
Rapid-fire exam questions (forum) V/A
Advanced role play – you are the consultant etc. V

Collaboration

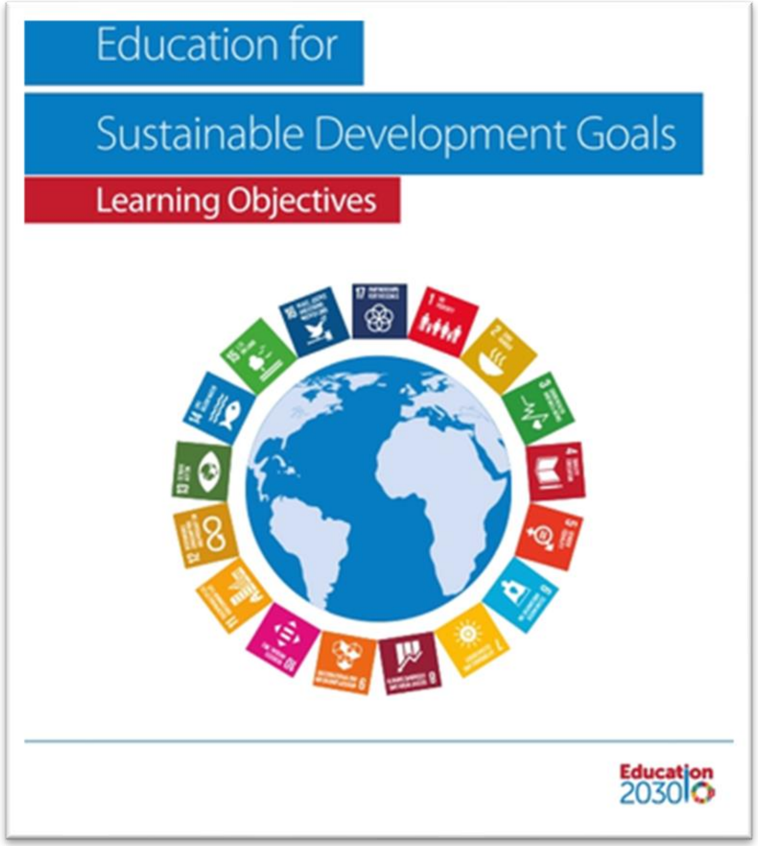
Collaborative wiki - what do we know about ...? V/A
Develop a shared resource library (database/glossary/wiki) V
Social networking – participate (external) V
Special interest groups - share on a topic (forum) V
Mentor other learners V

Discussion

Interview an expert (forum/chat) V
Webinars (virtual classroom) V
Model answers/examples of previous work (forum)
Analyse chat text (in course or uploaded) V
Job/professional reflections (blog) V/A
Group discussions on the topic, problem, reading (chat/blog/wiki) V/A
Social networking – participate (external) V
Reflective tasks – group or individual (forum) V/A
Special interest groups - share on a topic (forum) V
Lead a group project V/A

Production

Interview an expert (video/forum/chat) V
Literature reviews and critiques (forum/blog/wiki/RSS) V/A
MCQs - formative with automatic feedback V/A
Develop a shared resource library (database/glossary/wiki) V/A
Shows/demonstrates learning (displays, posters, presentations) V/A
Portfolios (MyPortfolio) V/A
Case studies (forum, lesson) V/A
Summarisation tasks (upload texts – individual or group) V/A
Rapid-fire exam questions (forum) V/A
Concept mapping (external) V
Create video of performance (media) V/A
Audio commentary of performance (media) V/A
Skype or virtual classroom 'viva' V/A
Make and give a presentation (external) V/A
Video blog (external) V/A
Write a report (external) V/A
Make an analysis (external) V/A
Case studies V/A
Advanced role play – you are the consultant etc. V
Action plan for workplace V/A
Action plan for further study V/A
Authentic research / data analysis – write a paper V/A
Prepare professional briefing V/A
Create, make a case (study) V/A
Create podcast (media) V/A
Work assignment (blog/report) V/A
Interview professional colleagues V/A
Lead a group project V/A



ABC- LD LOCALISED TO EU-CONEXUS FOR EDUCATION FOR SUSTAINABLE DEVELOPMENT

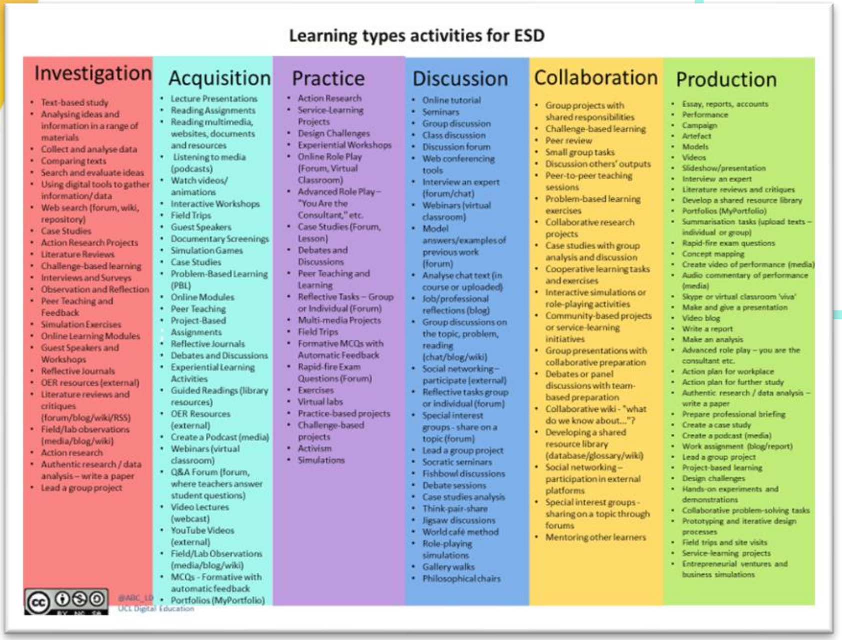
Acquisition

Activity	Sync	A-Sync
☐ Reading books, Papers	☐	☐
☐ Listening to Teacher-Led Presentations Face-to-Face, Lectures	☐	☐
☐ Watching demonstrations, Master classes	☐	☐
☐ Problem-Based Learning	☐	☐
	☐	☐
	☐	☐
	☐	☐

Online Tools	Sync	A-Sync
☐ Reading Multimedia, Websites, Digital docs and Resources	☐	☐
☐ Listening to Podcasts, Webcasts	☐	☐
☐ Watching Animations, Videos	☐	☐
☐ OER's, Games & Simulations	☐	☐
☐	☐	☐
☐	☐	☐
☐	☐	☐

Green Competency
☐ Valuing Sustainability
☐ Promoting Nature
☐ Systems Thinking
☐ Critical Thinking
☐ Problem Framing
☐ Futures Literacy
☐ Adaptability
☐ Exploratory Thinking
☐ Collective Action
☐
☐
☐

HOW:



Learning types activities for ESD

Investigation
- Text-based study
- Analysing ideas and information in a range of materials
- Collect and analyse data
- Comparing texts
- Search and evaluate ideas
- Using digital tools to gather information/ data
- Web search (forum, wiki, repository)
- Case Studies
- Action Research Projects
- Literature Reviews
- Challenge-based learning
- Interviews and Surveys
- Observation and Reflection
- Peer Teaching and Feedback
- Simulation Exercises
- Online Learning Modules
- Guest Speakers and Workshops
- Reflective Journals
- Literature reviews and critiques (forum/blog/wiki/RSS)
- OER resources (external)
- Field/lab observations (media/blog/wiki)
- Action research
- Authentic research / data analysis – write a paper
- Lead a group project

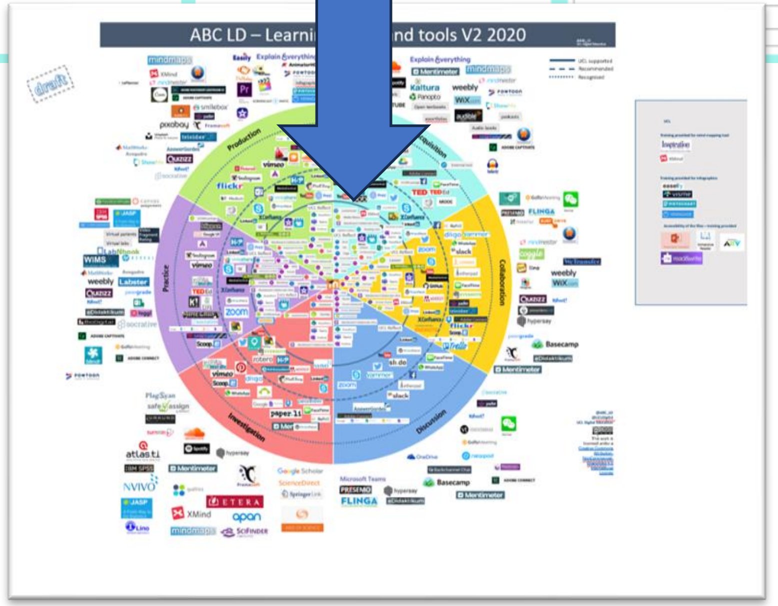
Acquisition
- Lecture Presentations
- Reading Assignments
- Reading multimedia, websites, documents and resources
- Listening to media (podcasts)
- Watch videos/ animations
- Interactive Workshops
- Field Trips
- Guest Speakers
- Documentary Screenings
- Simulation Games
- Case Studies
- Problem-Based Learning (PBL)
- Online Modules
- Peer Teaching
- Project-Based Assignments
- Reflective Journals
- Debates and Discussions
- Experiential Learning Activities
- Guided Readings (library resources)
- OER Resources (external)
- Create a Podcast (media)
- Webinars (virtual classroom)
- Q&A Forum (forum, where teachers answer student questions)
- Video Lectures (webcast)
- YouTube Videos (external)
- Field/Lab Observations (media/blog/wiki)
- MCQs - Formative with automatic feedback
- Portfolios (MyPortfolio)

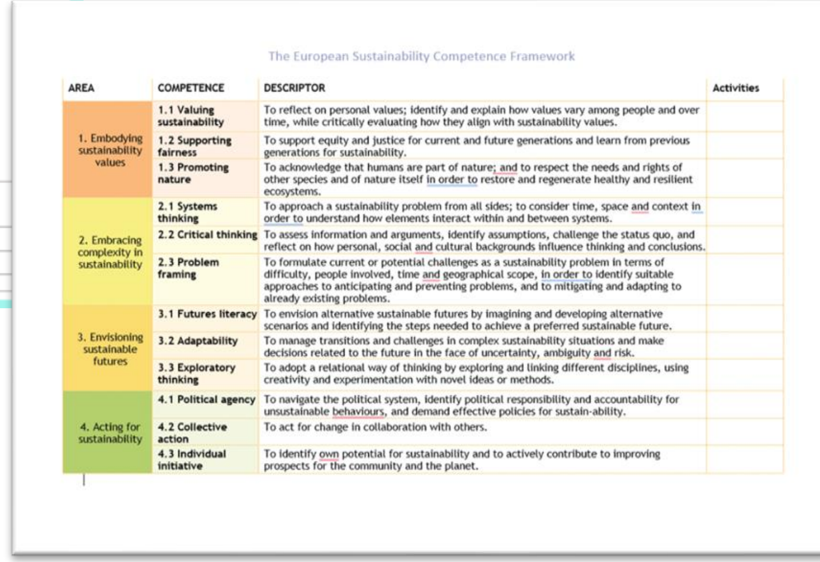
Practice
- Action Research
- Service-Learning Projects
- Design Challenges
- Experiential Workshops
- Online Role Play (Forum, Virtual Classroom)
- Advanced Role Play – "You Are the Consultant," etc.
- Case Studies (Forum, Lesson)
- Debates and Discussions
- Peer Teaching and Learning
- Reflective Tasks – Group or Individual (Forum)
- Multi-media Projects
- Field Trips
- Formative MCQs with Automatic Feedback
- Rapid-fire Exam Questions (Forum)
- Exercises
- Virtual labs
- Practice-based projects
- Challenge-based projects
- Activism
- Simulations

Discussion
- Online tutorial
- Seminars
- Group discussion
- Class discussion
- Discussion forum
- Web conferencing tools
- Interview an expert (forum/chat)
- Webinars (virtual classroom)
- Model answers/examples of previous work (forum)
- Analyse chat text (in course or uploaded)
- Job/professional reflections (blog)
- Group discussions on the topic, problem, reading (chat/blog/wiki)
- Social networking – participate (external)
- Reflective tasks group or individual (forum)
- Special interest groups - share on a topic (forum)
- Lead a group project
- Socratic seminars
- Fishbowl discussions
- Debate sessions
- Case studies analysis
- Think-pair-share
- Jigsaw discussions
- World café method
- Role-playing simulations
- Gallery walks
- Philosophical chairs

Collaboration
- Group projects with shared responsibilities
- Challenge-based learning
- Peer review
- Small group tasks
- Discussion others' outputs
- Peer-to-peer teaching sessions
- Problem-based learning exercises
- Collaborative research projects
- Case studies with group analysis and discussion
- Cooperative learning tasks and exercises
- Interactive simulations or role-playing activities
- Community-based projects or service-learning initiatives
- Group presentations with collaborative preparation
- Debates or panel discussions with team-based preparation
- Collaborative wiki - "what do we know about…"?
- Developing a shared resource library (database/glossary/wiki)
- Social networking – participation in external platforms
- Special interest groups - sharing on a topic through forums
- Mentoring other learners

Production
- Essay, reports, accounts
- Performance
- Campaign
- Artefact
- Models
- Videos
- Slideshow/presentation
- Interview an expert
- Literature reviews and critiques
- Develop a shared resource library
- Portfolios (MyPortfolio)
- Summarisation tasks (upload texts – individual or group)
- Rapid-fire exam questions
- Concept mapping
- Create video of performance (media)
- Audio commentary of performance (media)
- Skype or virtual classroom 'viva'
- Make and give a presentation
- Video blog
- Write a report
- Make an analysis
- Advanced role play – you are the consultant etc.
- Action plan for workplace
- Action plan for further study
- Authentic research / data analysis – write a paper
- Prepare professional briefing
- Create a case study
- Create a podcast (media)
- Work assignment (blog/report)
- Lead a group project
- Project-based learning
- Design challenges
- Hands-on experiments and demonstrations
- Collaborative problem-solving tasks
- Prototyping and iterative design processes
- Field trips and site visits
- Service-learning projects
- Entrepreneurial ventures and business simulations





The European Sustainability Competence Framework

AREA	COMPETENCE	DESCRIPTOR	Activities
1. Embodying sustainability values	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
2. Embracing complexity in sustainability	2.1 Systems thinking	To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.	
	2.2 Critical thinking	To assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
3. Envisioning sustainable futures	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.	
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.	
	3.3 Exploratory thinking	To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.	
4. Acting for sustainability	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviours, and demand effective policies for sustain-ability.	
	4.2 Collective action	To act for change in collaboration with others.	
	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

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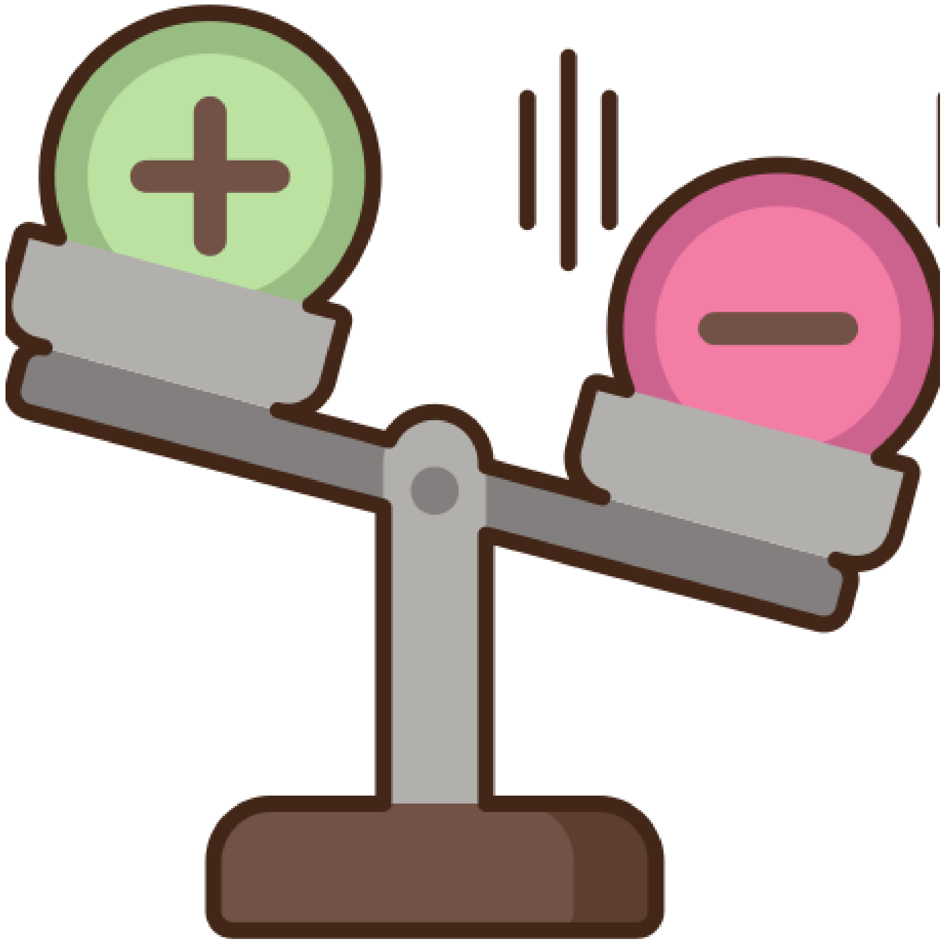
Please download and install the Slido app on all computers you use

What do you think was our biggest challenge in designing sustainability-focused micro-credentials?

ⓘ Start presenting to display the poll results on this slide.

Using ABC for Bottom-up MC Design CHALLENGES

- The LOs, curriculum topics, and sub-topics need to be in a robust position
- Blurred line between curriculum and pedagogical design
- ABC-LD facilitating is a learning curve – takes pre-planning and coordinating
- Planned VLE activities may not translate into reality when it comes to online learning design
- Continued SME engagement is important for consistency and fluidity in planning
- ABC-LD designers tout a 90-minute design process – it's more like 2 – 2.5 hours for higher amounts of ECTS
- Requires prior knowledge of what VLE and digital tools are available to your institution before design (Edit the APP wheel)
- Inviting Industry to participate in the design process is logistically challenging.



Using ABC for Bottom-up MC Design ADVANTAGES

- Fast, fun, collegial
- Promotes better pedagogical design and quality through its structure - methodological
- Effectively ensures constructive alignment
- Embeds skills and competencies into activities and assessments.
- Adaptable & customisable (i.e., embed competencies or strategies)
- Student-centered
- Thoughtful & visual curriculum design and assessment planning
- Inspires and motivates
- Super anchor for collaborative design
- Highly rewarding

Suggestions for use:

- Useful to pilot it first
- Make sure the curriculum is in a good place – perhaps use Generative AI to assist with a starting point
- Having a content wireframe developed in advance will reduce obstacles
- Take the opportunity to localise the cards to your programme needs – For example the Connecting for Impact, EntreComp, etc
- Don’t introduce too many tasks or concepts at once
- Ensure you have knowledge of digital resources and required support
- Having all relevant collaborators or SME’s present in the design is important
- Can be intense and cognitively demanding

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Thank you!

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