D2.2.1 Preliminary report on existing overarching learning outcomes for the CBL Minor components

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Introduction

This preliminary report explores how Overarching Learning Objectives (OLOs) can be effectively structured to support the design of minor programs based on CBL modules. We draw on insights from existing learning objectives within the JUMP partners and the ECIU University alliance. By analyzing the mapped inventory of learning objectives, we identify key aspects to build upon when designing the JUMP OLOs, while also highlighting shortcomings and areas with potential for improvement. Given that skill development is a crucial dimension of CBL-related OLOs, we further examine how these learning objectives are linked to skill acquisition and assessment.

We acknowledge that this preliminary report is based on the work carried out by the project team during the first six months of the JUMP project. As such, it has certain limitations and requires further development to ensure a comprehensive analysis. Our work on CBL-related OLOs will continue, focusing on their design for the JUMP minor program and their assessment. The final report is scheduled for completion by February 28, 2026.

List of OLOs from the JUMP partners & the ECIU course portfolio

To establish an inventory of CBL-related OLOs for analysis, we first compiled and discussed the pilot minor designed at Linköping University. Next, we identified examples of CBL modules that could either be included in the JUMP program or adapted for integration. While these initial steps ensure that the OLOs selected for analysis are highly relevant to the JUMP program, we further expanded our mapping to include selected ECIU courses. This broader base provides a solid foundation for analyzing OLOs and discussing key pedagogical considerations in designing CBL-related learning objectives.

Pilot at Linköping University: Innovative Solutions for a Sustainable Economy

The pilot minor designed at Linköping University consists of three courses that offer flexibility in how they are selected and combined. Students have the option to take these modules individually or integrate them into a cohesive 10 ECTS minor program. This flexible structure allows students to tailor their learning experience based on their interests and academic goals while engaging with CBL principles.

The design of the package are two theoretical online modules and one, more practically and skills oriented challenge, where the mode is hybrid by means of that the challenge starts online, then students meet during one week (Erasmus blended intensive program) and then the course is finished online. The modules included in the pilot minor are:

MODULE 1: InGenious – Responsible Innovation for a Sustainable World (3 ECTS)

- Learn to design innovations within ethical and sustainable frameworks.
- Apply the principles of responsible innovation through real-life case studies

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MODULE 2: Business Modelling in the Circular Economy (2 ECTS)

- Understand how to create circular business models
- Gain practical experience by developing circular business ideas in collaboration with peers.

CHALLENGE:
The sustainable forest challenge: How to make the forest viable
InGenious – Sustainable Cities and Communities:An Interdisciplinary Future Project (5 ECTS)

- Collaborate with external partners on sustainable forests that promote ecological balance and social well-being.
- Includes a mobility week from March 3 – 7, 2025 at Linköping University, Sweden.

The modules can be taken individually or together for a comprehensive experience.

Module	Learning objective 1	Learning objective 2	Learning objective 3	Learning objective 4	Learning objective 5
InGenious - Sustainable Cities and Communities – cross disciplinary project, 5 credits	identify current challenges related to sustainable cities and communities, and propose sustainable solutions by applying degrowth economic principles	develop and present sustainable and value-creating concepts for sustainable cities and communities	communicate sustainable concepts, both in writing and orally, to stakeholders from diverse backgrounds	discuss and reflect on group processes and group dynamics in open innovation processes where individuals from different professions collaborate interdisciplinarily	reflect on their own learning process

InGenious - Responsible Innovation for a Sustainable World, 3 credits	understand and apply the concept of responsible innovation from different perspectives and contexts	explain and apply various perspectives to address ethical issues in the innovation process	explain and apply sustainability principles in an innovation context	motivate and reflect on the organization of responsible innovation	
Business modelling in the circular economy, 2 ects	Ability to describe theories in circular economy, sustainability, and innovation	Ability to explain central parts and theoretical models in business modelling	Ability to apply a selection of theoretical models and frameworks for business modelling in circular economy		

The three modules provide complementary perspectives on sustainability and innovation, collectively equipping students with a well-rounded understanding of how to address complex societal challenges. They cover a broad palette related to sustainability - from classical growt-oriented paradigm, but although sustainability oriented, to critical theory in case of degrowth. By refining synergies and ensuring alignment in skill development and assessment, these courses can further enhance their impact within the JUMP minor program.

Examples of OLOs of relevant modules from the JUMP partners

The analyzed CBL modules share several overarching themes, including problem-solving, interdisciplinary collaboration, application of knowledge to real-world challenges, and sustainability considerations. However, they differ in focus, spanning technical, entrepreneurial, and urban sustainability domains.

Key Themes Across Modules

1. Problem-Solving and Innovation
    - All modules emphasize problem-solving, with some integrating design thinking (*Green Innovators and Industry Project Management Masterclass)* and technological applications (*Shared Access for Family Electrically-Assisted Tricycle*).
    - Several modules focus on creative approaches and out-of-the-box thinking to tackle complex sustainability challenges.

2. Collaboration and Teamwork
    - A strong emphasis is placed on teamwork (*Future-ready Young Citizens in the Smart City Era, Industry Project Management Masterclass*), often interdisciplinary and in international or cross-sector contexts.
    - Modules such as *Shared Access* and *Green Innovators* explicitly highlight collaboration across sectors or disciplines, while *Developing a Network of Climate Shelters* focuses on spatial and environmental expertise.

3. Application of Knowledge to Real-World Challenges
    - Modules emphasize practical application, whether in technical domains (e.g., mobility technologies, urban climate analysis) or in business contexts (*Sustainable Wine Race, Circular Economy in Food and Feed*).
    - Several modules require students to engage with stakeholders or experts, particularly in sustainability-driven innovation projects.

4. Sustainability and Societal Impact
    - Many modules focus on sustainable urban development, circular economy, and environmental challenges, reinforcing their alignment with broader sustainability transitions (*Future-ready Young Citizens in the Smart City Era*).
    - Some modules, such as *Developing a Network of Climate Shelters*, incorporate technical evaluations (thermal performance, mapping, climate analysis), while others emphasize business-oriented sustainability (*Back to the Future*).

Potential Gaps and Opportunities

A key area for enhancement is the assessment and tracking of skill development over time. While the modules emphasize problem-solving, teamwork, and applied knowledge, the mechanisms for evaluating these competencies—especially in dynamic and interdisciplinary settings—could be made more explicit. Developing a structured framework that links specific learning objectives to measurable skill acquisition would provide clearer insights into student progress. Methods such as self-assessment, peer feedback, or portfolio-based evaluation could help track competency growth while offering students a way to reflect on and articulate their learning outcomes. Strengthening this aspect would not only enhance the educational impact of the modules but also support students in recognizing and leveraging their skills in future academic or professional contexts.

Beyond assessment, ensuring progression in skills development is crucial when CBL modules are combined within a broader program, such as the JUMP program. Currently, while individual modules foster key competencies, there is an opportunity to design a more intentional learning pathway

where students build on their skills progressively. This could involve structuring modules to move from foundational knowledge and basic problem-solving toward more complex, integrative challenges that require advanced collaboration, strategic thinking, and leadership. A well-mapped competency framework across the program would ensure that students not only gain experience in isolated projects but also develop a coherent and evolving skillset that prepares them for real-world sustainability transitions.

Additionally, explicit ethical and sustainability-related reflections on technological and business decisions could be further integrated into the learning objectives. As students engage with real-world challenges, they inevitably face dilemmas related to sustainability, societal impact, and responsible innovation. Embedding structured ethical reasoning exercises, stakeholder impact assessments, or value-based decision-making frameworks would help students critically navigate these complexities. By making ethical considerations an integral part of the learning process, students can develop a more holistic understanding of the consequences of their innovations, ensuring they contribute to sustainable and responsible solutions.

Selection of ECIU modules related to entrepreneurship and innovation

To expand our mapping of CBL modules, we explored Challenge-Based learning opportunities offered by the ECIU University alliance in 2024 and 2025 (see Appendix 2). ECIU provides an extensive portfolio of CBL and minor modules, encompassing over 200 learning opportunities. Given the emphasis on entrepreneurship and innovation in the design of the JUMP minor program, we focused on ECIU modules that self-identified within the entrepreneurship, technology, and innovation category—one of eleven key thematic areas offered by ECIU. Within this category, a total of 30 challenges are listed, with 5 currently open for application as of March 31, 2025.

ECIU CBL module related to entrepreneurship and innovation	Learning objectives
Unlocking B2B Opportunities in the Energy Transition	Participants will learn to develop and assess sustainable business models that support the energy transition in the mobility sector, balancing environmental impact with profitability and efficiency. Students will analyze market trends, regulatory frameworks, and policy incentives that shape the adoption of sustainable energy solutions in the transportation and logistics industries. Participants will apply creative thinking and problem-solving techniques to develop scalable, technological, or service-based innovations that facilitate the mobility sector's shift to cleaner energy. Design and evaluate Business-to-Business (B2B) models to boost the energy transition sector

From lab to market Overcoming early-stage challenges in green energy innovation	Apply entrepreneurial tools to identify and analyse challenges in the commercialisation of research-based innovations. Discuss sustainable entrepreneurial solutions through interdisciplinary collaboration and interaction with various stakeholders. Reflect on value creation through innovation and entrepreneurship in a market context
Back to the Future Circular Economy of Functional Ingredients: Technological and Market Perspectives in Novel Food and Feed Sectors.	An integrated approach that takes into consideration environmental concerns along with economic development. Applying basics of futures studies (such as scenarios and back-casting) to the challenge
Empathy, Compassion and Meaning Theory and participatory approaches	Upon course completion, the candidate has advanced theoretical knowledge about the contributions from different traditions in the study of empathy, compassion and meaning; contributes significant to the development and documentation of new research-based knowledge and practices in empathy, compassion, and meaning. Upon course completion, the candidate can challenge established knowledge and practices in the fields of empathy, compassion and meaning; plan and conduct research that addresses issues of empathy, compassion and meaning in their projects in a reflective way; handle complex issues about the impact that our own emotions and values, as well as those of others, have in mental health and well-being. After completing the course, the candidate should be able to identify and critically evaluate relevant ethical dilemmas around empathy, compassion and meaning in research, as well as respond to these with scholarly integrity; assess the need for, as well as initiate and practice transdisciplinary and innovative collaborations in research based on the principles of empathy, compassion and meaning; critically reflect about the epistemological and ontological implications of different understandings of empathy, compassion and meaning.
Track birds, empower informed biodiversity decisions How can we empower communities to make better choices that protect wildlife?	Self-sufficiently pinpoint a unique and impactful research direction, utilizing existing knowledge and acquired competencies. Innovatively tackle complex real-world issues using the core tenets of challenge-based learning methodology. Utilise effective teamwork and leadership principles while collaborating within diverse, interdisciplinary teams. Create and effectively present innovative ideas and developed prototypes tailored to the requirements of unique audience.

The analyzed ECIU CBL modules related to entrepreneurship and innovation emphasize interdisciplinary problem-solving, sustainability, and business model development. Several modules focus on commercializing research-based innovations, applying entrepreneurial tools, and addressing early-stage challenges in green energy and circular economy sectors. Other modules

integrate futures thinking, stakeholder collaboration, and ethical considerations, particularly in areas such as empathy, compassion, and biodiversity decision-making. A recurring theme across these modules is the application of innovation-driven methodologies, including scenario planning, backcasting, and participatory approaches, to real-world challenges. Overall, these modules provide a diverse yet complementary foundation for fostering entrepreneurial mindsets, bridging research and practice, and preparing students to tackle sustainability transitions with a systemic and forward-looking perspective.

Analysis

Our mapping of CBL modules and micro-modules across European higher education institutions highlights a wide availability of learning opportunities. A positive trend is the general recognition of the importance of clearly defined learning objectives—every module we analyzed included a set of learning objectives that were publicly accessible. This transparency benefits students, educators, and university administrators alike, providing a clear overview of the expected outcomes of challenge-based and micro-modules offered across Europe.

However, despite this positive development, our analysis reveals some key challenges in structuring CBL modules within a coherent educational program. The learning objectives are typically written with a module-specific focus, without reference to broader programmatic requirements, such as within the framework of a study program. This means that while the learning outcomes are well-articulated, the learning inputs and instructional methods—such as required prior knowledge, pedagogical approaches, or progression between modules—are rarely specified. This lack of integration poses difficulties when designing a program like JUMP, where individual modules must not only stand alone but also contribute to a structured learning journey.

Furthermore, because the modules are generally designed as standalone learning experiences rather than as components of a broader educational pathway, we observe significant redundancies in learning objectives across similar courses, particularly regarding the skills to be developed. While micro-modules exhibit slightly greater variation in learning outcomes due to focus on developing domain knowledge and the greater differences thereof, the core skills targeted through CBL remain largely uniform across modules. This highlights the need for a more deliberate approach to skill differentiation and progression when structuring a minor program.

Another key finding from our analysis is the lack of a consistent or strategic approach to skills classification in CBL modules, particularly in the ECIU courses (see Appendix 1 for an overview). For example, the most frequently referenced skill is “transversal skills”, yet how this term is defined and applied varies significantly across modules. If we compare this to structured frameworks such as

ESCO (European Skills, Competences, Qualifications and Occupations), we find gaps in how skills are articulated and categorized. The so-called transversal skills can be taken as an example of this problem. Transversal skills are by ESCO defined as one of the four main group of skills, including both interpersonal and intra personal skills. Hence it becomes problematic if a module claims to cover transversal skills, teamwork and communication, as the latter two by definition are transversal. This inconsistency and lack of understanding makes it difficult to ensure a coherent and progressive skill development pathway for students moving through different challenge-based modules. This problem could also be due to the fact that the ESCO skill framework is rather unclear and therefore complicated to handle, as basically the same skills show up under different headlines. The CDIO (Conceive, Design, Implement, Operate) list of skills for example is more stringent and hence easier to use.

Given these findings, careful evaluation of both domain knowledge and skills progression is necessary when designing a program based on challenge-based and micro-modules. Since the JUMP minor program focuses on entrepreneurship and innovation, it is particularly important to clearly define the expected learning outcomes, educational methods, and skill development processes within these domains. We recommend that the JUMP team consider where it is sufficient to focus solely on learning outcomes and where it is also necessary to specify learning inputs, such as prerequisite knowledge, foundational understanding, and key skill levels required at different stages of the program.

Furthermore, to address the broad and often vague definitions of skills in existing CBL modules, we suggest adopting a more tailored skills framework specifically aligned with entrepreneurship and innovation. A key step would be to develop a matrix outlining the essential skills at the program level, which can then be operationalized at the module level. This would ensure that skill development is structured and progressive, enabling students to build competencies in a systematic way rather than encountering them repeatedly at the same level across different modules. A well-structured approach would also facilitate a coherent and measurable learning pathway, ensuring that students move through increasingly complex challenges and responsibilities.

Finally, we observe that many modules use buzzwords without clearly contextualizing them within the learning experience. Terms such as “innovation,” “collaboration,” and “problem-solving” appear frequently, but their specific meaning in relation to each module’s content, methodology, and expected learning outcomes is often unclear. To ensure consistency and a shared understanding within the JUMP program, we recommend developing a dedicated JUMP terminology guide that defines key concepts. This would help create a common language across modules, reducing ambiguity and strengthening alignment between course content and intended outcomes.

While the availability and accessibility of CBL modules in European higher education are promising, integrating them into a structured minor program requires additional considerations. The JUMP program must ensure skill progression, minimize redundancy in learning objectives, and adopt a more deliberate approach to defining competencies in entrepreneurship and innovation. By introducing a structured skills matrix, clarifying prerequisite knowledge, and developing a common terminology guide, JUMP can create a coherent and impactful learning experience that builds on the strengths of existing CBL initiatives while addressing their limitations.

Preliminary guidelines for assessment of OLOs & skills

To guide Teamchers in how to assess and grade OLOs and the knowledge and skills they are associated with, we have started the work to develop guidelines. Below, a preliminary version is developed. As example we use the Challenge "InGenious - Sustainable Cities and Communities – cross disciplinary project, 5 credits" 799g60 https://studieinfo.liu.se/en/kurs/799G60/vt-2026#syllabus. This challenge is within the ECIU named "The sustainable forest challenge".

Short description of the challenge

How can we innovate for the better? This course explores the concept of responsible innovation—innovations that aim to ethically and sustainably leverage technological progress to address societal needs while remaining within planetary boundaries. Through case-based learning, students will apply this concept in various situations and contexts while reflecting on the potential impacts of innovation, considering ethical and sustainable perspectives. Additionally, we will discuss how to organize the innovation process to implement responsible innovations.

STEP 1: Identify ESCO skills related to course goals – List skills

In the below table, the OLOs are listed and we have started to craft suitable skills for each OLO.

Course goals	ESCO Skills that could be relevant
OLO1: identify current challenges related to sustainable cities and communities, and propose sustainable solutions by applying degrowth economic principles	**Analytical & research skills, Critical thinking**, Communication skills, Teamwork

OLO 2: develop and present sustainable and value-creating concepts for sustainable cities and communities	**Develop Sustainable Solutions, Design Concepts**, Communication skills, Teamwork
OLO 3: communicate sustainable concepts, both in writing and orally, to stakeholders from diverse backgrounds	
OLO 4: discuss and reflect on group processes and group dynamics in open innovation processes where individuals from different professions collaborate interdisciplinarily	

STEP 2: Order skills due to how they will be addressed

When working with OLOs and related knowledge-based concepts and skills its important to be aware of how these will be handled in the challenge or module. I.e. if they will just be (1) introduced at basic levels, (2) if they are supposed to be applied by the students, e.g. as tools or frameworks for analysis, or if they are (3) examined and hence need to be measured and graded.

In the below table the examples of skills identified in Step 1 have been sorted.

Skill	Introduce – basic understanding	Apply – ability to apply in practice	Examine – measure level and grade
S1A: Analytical & research skills			x
S1B: Critical thinking			x
S1C: Communication skills		x	
S1D: Teamwork		x	

STEP 3: Creation of an assessment matrix

In the table below, OLOs and skills are given formative requirements for pass-level and higher grade. Through such a matrix the students can see what is required and hence adjust their efforts. For

teamchers the grading matrix becomes a tool for transparent and secure assessment and grading. The levels are built upon the SOLO taxonomy, see Figure 1 below.

As an example, we have continued with our challenge module and the skills identified and related to examination level have been added under each OLO.

Learning goals (LG) and associated skills (S)	Requirements for "pass"	Requirements for "pass with distinction"	Course activity in which the goal/skill appear
OLO 1: identify current challenges related to sustainable cities and communities, and propose sustainable solutions by applying degrowth economic principles	Show ability to break down the "big idea" into a graspable problem Show basic understanding of the context (SDG11) and the degrowth economic principles Showe some ability to apply this on the challenge defined	Show strong ability to creatively break down the "big idea" into a relevant and graspable problem Show understanding of the context (SDG11) and the degrowth economic principles Showe some ability to apply this on the challenge defined	Engage phase, ideation activities (group work)
S1A: Analytical & research skills	The student can collect and summarize relevant information about sustainability challenges. Identify problems related to the context of challenge	Conducts independent, systematic research using a range of reliable sources (academic, policy, data). Identify problems related to degrowth economic principles the context of the challenge	
S1B: Critical thinking	The student can identify and describe key challenges facing sustainable cities and summarise the principles of degrowth	The student demonstrates a deep and integrated understanding of sustainable urban challenges and degrowth theory. The student can critically evaluate assumptions behind both conventional and degrowth models	

OLO 2: develop and present sustainable and value-creating concepts for sustainable cities and communities	Solved the task by means of leveraging some kind of sustainable solution that can be said to have a value for an external part or for the society.	Solved the task by means of leveraging a well-funded, solution that has a clear sustainability and degrowth focus. The solution also shows an inventive step and that creates value for an external part or for the society.	Act phase, final presentation seminar and written report (group work)
OLO A: Develop Sustainable Solutions	Identifies a specific sustainability-related problem relevant to cities or communities.	Proposes a well-integrated, innovative solution that balances all three sustainability pillars (environmental, social, and economic)..	
S2B: Design Concepts	Presents a clearly defined concept relevant to sustainable urban or community development.	Develops a detailed, original, and context-sensitive concept that reflects a deep understanding of sustainable design principles.	
OLO 3: communicate sustainable concepts, both in writing and orally, to stakeholders from diverse backgrounds	The students have made several presentations of their challenges, and their project plan is logically structured and written in a way that is understandable and able to follow. The students have shown ability to visualize their solution so that it could be understood by their audience. The students have shown ability to give feedback on other students.	The students have made several presentations of their challenges, and they have learned and improved from the feedback they have got. The students have shown ability to visualize their solution in a creative and interesting way that appeals to their audience. The students have leveraged substantial feedback to other students with robust advice on how they can improve.	All phases, group assignments (group work)
S3A:			
S3B:			

OLO 4: discuss and reflect on group processes and group dynamics in open innovation processes where individuals from different professions collaborate interdisciplinarily	The students have created a group contract, following the template and have also made a reflection upon the contract. In this work, risks have been identified and treated. The action plan has been discussed and if needed – redesigned. Each student have made an individual reflection that discuss and analyze the group process and the own development.	The students have created a well-funded and detailed group contract and they have made a serious and deep going reflection upon the same. Each student has made an individual reflection that, in depth discuss and analyze the group process from a critical point of view and also show upon own development and learnings that have been made.	Group report and individual reflection (group work & individual reflection)
S4A:			
S4B:			
OLO 5: reflect on their own learning process	The student show some ability to reflect over the own learning process and relate this to the group learning process. The reflection follows the template and some relevant aspects are identified and discussed. Answers are based on objective grounds and the reasoning is logical. The entrecomp framework is superficially taken into account when discussing the own competence development.	The student show ability to make in depth reflections over the learning process. The analysis is qualified by literature and learnings are synthesized. The reflection follows the template and several relevant aspects are identified and discussed. Answers are based on objective grounds and the reasoning is logical. The entrecomp framework is thorougly taken into account when discussing the own competence development.	Individual reflection (individual)
S5A:			
S5B:			

Tool for identification of requirements for each level.

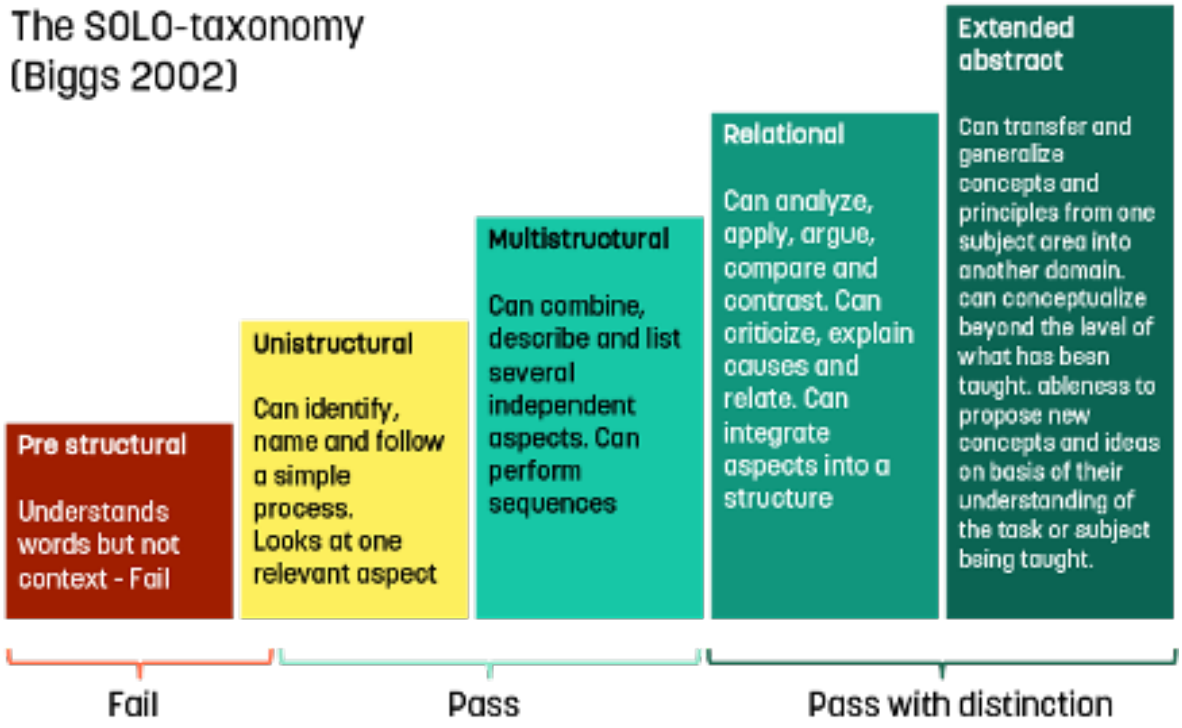

Figure 1

Conclusion and future direction

Our analysis of CBL modules and micro-modules highlights their widespread availability and accessibility across European higher education institutions. These modules provide valuable opportunities for students to engage with real-world challenges, develop entrepreneurial and innovation skills, and apply interdisciplinary problem-solving techniques. However, despite the richness of these offerings, integrating them into a structured study program like JUMP requires careful consideration of progression, coherence, and skill development.

One key challenge is that CBL modules are often designed as standalone experiences, with learning objectives that focus on immediate outcomes rather than long-term educational pathways. This modular design approach, while flexible, can lead to redundancies in skill development and a lack of clear progression between courses. Furthermore, while skills such as critical thinking, creativity, and collaboration are frequently emphasized, their assessment and tracking over time remain inconsistent. A more structured approach to skill categorization and competency progression is needed to ensure that students develop and refine their abilities systematically as they move through different modules.

To address these challenges, we propose that JUMP adopts a program-level framework that outlines key competencies in entrepreneurship and innovation, mapping how they are developed across modules. This could be supported by a skills matrix that helps align learning objectives with expected progression, assessment methods, and prerequisite knowledge. Additionally, establishing a common terminology guide for JUMP would ensure clarity in defining key concepts, reducing ambiguity, and strengthening coherence across modules.

By embedding a structured approach to learning progression, skills assessment, and competency development, the JUMP program can move beyond simply assembling challenge-based modules and instead create a well-integrated, high-impact educational experience. This approach will enable students to engage deeply with entrepreneurial and innovation challenges, ensuring that they build on their skills progressively and are well-prepared to navigate complex sustainability transitions in their future careers through entrepreneurship and innovation.

Appendix 1

Competences used in ECIU courses

Competence names	Occurrences
Transversal	**130**
Challenge	28
Micro-Module	102
Critical and innovative thinking	**93**
Challenge	24
Micro-Module	69
Inter-personal skills	**67**
Challenge	23
Micro-Module	44
Entrepreneurship, technology and innovation	**62**
Challenge	18
Micro-Module	44
Preparatory	**62**
Challenge	18
Micro-Module	44
Media and information literacy	**52**
Challenge	6
Micro-Module	46
SDG/Domain	**48**
Challenge	14
Micro-Module	34
Creative thinking	**44**
Challenge	12
Micro-Module	32
Innovative thinking	**44**
Challenge	13
Micro-Module	31

Problem solving	**42**
Challenge	12
Micro-Module	30
Teamwork	**40**
Challenge	22
Micro-Module	18
Working with technology	**40**
Challenge	9
Micro-Module	31
Intra-personal skills	**37**
Challenge	9
Micro-Module	28
Digital competence	**33**
Challenge	3
Micro-Module	30
Generate ideas	**30**
Challenge	16
Micro-Module	14
Resilient communities	**30**
Challenge	9
Micro-Module	21
Verbal Communication skills	**29**
Challenge	9
Micro-Module	20
Global citizenship	**25**
Challenge	7
Micro-Module	18
Analysing and evaluating media content	**25**
Challenge	5
Micro-Module	20
Ability to learn	**25**
Challenge	2

Micro-Module	23
Exercise self-reflection	**21**
Challenge	6
Micro-Module	15
Energy and sustainability	**20**
Challenge	7
Micro-Module	13
Conscientiousness	**20**
Challenge	7
Micro-Module	13
Empathy	**20**
Challenge	3
Micro-Module	17
Intercultural understanding	**17**
Challenge	5
Micro-Module	12
Social innovation	**16**
Challenge	9
Micro-Module	7
Respect for Diversity	**15**
Challenge	4
Micro-Module	11
Environmental impact	**15**
Challenge	5
Micro-Module	10
Project management	**15**
Challenge	6
Micro-Module	9
Quality of life in cities and communities	**15**
Challenge	6
Micro-Module	9
Circular economy	**12**

Challenge	2
Micro-Module	10
Universal access to services	**12**
Challenge	2
Micro-Module	10
Self management	**12**
Challenge	5
Micro-Module	7
Planning	**11**
Challenge	1
Micro-Module	10
Entrepreneurial skills	**9**
Challenge	2
Micro-Module	7
Non-verbal communication skills	**9**
Challenge	3
Micro-Module	6
Understanding and analysing numerical and statistical information	**9**
Micro-Module	9
Responsible consumption and production	**9**
Challenge	2
Micro-Module	7
Locating and accessing information	**8**
Challenge	1
Micro-Module	7
Resource-efficient systems	**8**
Challenge	3
Micro-Module	5
Transport and Mobility	**7**
Challenge	2
Micro-Module	5
Sharing and reusing	**7**

Challenge	1
Micro-Module	6
Language learning	**7**
Challenge	1
Micro-Module	6
Openness	**6**
Challenge	1
Micro-Module	5
Inclusive policies	**5**
Challenge	1
Micro-Module	4
Perseverence	**4**
Challenge	1
Micro-Module	3
Inclusive public spaces	**4**
Micro-Module	4
Low carbon transport	**4**
Challenge	2
Micro-Module	2
Tolerance	**3**
Challenge	1
Micro-Module	2
Demonstrate enthusiasm	**3**
Micro-Module	3
Resilience	**3**
Micro-Module	3
Finnish	**3**
Micro-Module	3
Optimising movement	**3**
Challenge	1
Micro-Module	2
Sustainable urbanization	**3**

Challenge	1
Micro-Module	2
Sustainable transport policies	**2**
Challenge	1
Micro-Module	1
English	**2**
Challenge	1
Micro-Module	1
Conflict resolution	**2**
Micro-Module	2
Waste management	**2**
Micro-Module	2
Air pollution	**2**
Micro-Module	2
Financing circular economy	**2**
Micro-Module	2
Assertiveness	**1**
Micro-Module	1
Portuguese	**1**
Micro-Module	1
Disaster risk reduction	**1**
Micro-Module	1
Swedish	**1**
Micro-Module	1
French	**1**
Micro-Module	1
Grand Total	**1310**

Appendix 2

Challenge-Based learning opportunities offered by the ECIU University alliance (2024-2025)

Name	SubTitle	Start	End	ECTS	Responsible HEI
Sustainable development	UN Global Goals and sustainability challenges	2024-09-02	2024-12-01	3.0	Linkoping University
Sustainable development	UN Global Goals and sustainability challenges	2024-09-02	2024-12-01	3.0	Linkoping University
Autonomous Delivery Robots: the future of delivery services in urban environments	How can robotic delivery systems overcome technical, ethical and legal challenges and contribute to sustainable cities?	2024-09-05	2024-12-13	8.0	Linkoping University
Adultcentrism in Educational Relationships	Creating Awareness of Adultcentrism in Educational Relationships through Game-based Learning	2024-09-05	2024-11-25	3.0	University of Stavanger
EcoTech Challenge – Pioneering Innovative Technologies for a Sustainable Future	Leveraging cutting edge technologies to support a greener future	2024-09-09	2024-12-13	5.0	Dublin City University
Advancing Sustainable Futures: Integrating Biogas Production into Society for a Greener Transition	Turn organic waste from a problem to a solution	2024-09-09	2024-12-13	5.0	Linkoping University
Bioprocessing for the Circular Economy	Learn how bioprocessing can be a key enabler of circularity across different industrial sectors.	2024-09-09	2024-11-30	7.5	Dublin City University
Solutions to global sustainability challenges	understand solutions to complex sustainability challenges through an interdisciplinary perspective	2024-09-30	2024-11-08	5.0	Linkoping University
Beyond Boring Green Narratives	How can we make sustainability education interesting?	2024-10-03	2024-12-19	6.0	Kaunas University of Technology
Telecommunications Services With Net-Zero Emissions	How can we transform the ICT business and services to achieve net-zero emissions?	2024-10-03	2024-12-19	6.0	Kaunas University of Technology
Digital Transformation of Energy Sector Greenhouse Gas Management	Co-creating data-driven sustainable solutions sought by energy sector leaders	2024-10-03	2024-12-19	6.0	Kaunas University of Technology
Ride, game, thrive: indoor cycling revolution	How can you turn a bicycle into a year-round, interactive fitness adventure?	2024-10-03	2024-12-19	6.0	Kaunas University of Technology
Urban Digital Twins for Sustainability	How can innovative technologies be applied for improvement of sustainability indicators within the built environment?	2024-10-03	2024-12-19	6.0	Kaunas University of Technology
Climate change and migratory movements.	How could we identify to what extent the effects of climate change are causing new migratory processes at an international level?	2024-10-03	2024-12-19	3.0	Universitat Autònoma de Barcelona

Challenge Basics		2024-10-07	2024-12-20	1.0	University of Trento
New ideas to revolutionize the Future of Plant-Based food	Be a trailblazer in the world of plant-based foods!	2024-10-07	2024-12-20	3.0	University of Trento
Accelerating Innovation Adoption	Accelerating Innovation Adoption: Strategies for Rapid Implementation and Success	2024-10-15	2024-11-19	2.0	Kaunas University of Technology
Intercultural Teamwork	MASTERING INTERCULTURAL TEAMWORK: A PRACTICAL VIRTUAL COURSE	2024-10-15	2024-11-25	2.0	Kaunas University of Technology
Laser Principles and Applications	Ignite the laser emission and light up the pathways for its emerging applications	2024-10-15	2024-11-26	2.0	Kaunas University of Technology
Load-Bearing Efficiency: A 3D Printing Challenge		2024-10-29	2025-01-28	6.0	Hamburg University of Technology
Challenge Based Learning enhanced by Virtual Reality		2024-11-06	2024-11-08	0.0	Universitat Autònoma de Barcelona
Challenge-based Learning enhanced by Virtual reality		2024-11-06	2024-11-08	1.0	Universitat Autònoma de Barcelona
Adapting to Climate Change with Spatial Engineering	Help the city of Valencia (Spain) to adjust sustainably to climate change with Spatial Engineering	2024-11-11	2025-01-31	15.0	University of Twente
ECIU Staff Days at UT	Inspire, connect, innovate	2024-11-20	2024-11-22		University of Twente
Mentoring in Challenge Based Learning: tools to face the challenge	Discover new activities to guide your students in solving their challenges.	2025-02-01	2026-03-31	0.0	Universitat Autònoma de Barcelona
Quantum Communication and Computing	A Short Introduction	2025-02-03	2025-05-31	2.0	INSA Group
TRIZ and AI-Driven Innovation	Unlock Advanced Problem-Solving at the Intersection of TRIZ, AI, and Industrial Revolution	2025-02-03	2025-07-11	6.0	INSA Group
Inventing in a Digital World Using TRIZ and AI	Understand Structured Creativity and Transform it into an Actionable Process	2025-02-03	2025-04-30	2.0	INSA Group
Responsible Futuring	Proactively take up societal challenges and design interventions that co-shape societies for pluriversal futures.	2025-02-05	2025-04-17	10.0	University of Twente
Responsible Innovation for a Sustainable World	How we can innovate for the better	2025-02-06	2025-04-17	3.0	Linkoping University
Sustainable Nanotechnology	Help co-create sustainable solutions using nanotechnology tools.	2025-02-12	2025-06-25	5.0	University of Twente
Back to the Future	Circular Economy of Functional Ingredients: Technological and Market Perspectives in Novel Food and Feed Sectors.	2025-02-17	2025-05-29	3.0	University of Trento
ECIU AI assistant hackathon	Creating learner guidance AI tools for the digital and virtual environments	2025-02-26	2025-03-28	2.0	Tampere University
Green Innovators	Transform Your Campus	2025-03-03	2025-05-30	2.0	INSA Group

Track birds, empower informed biodiversity decisions	How can we empower communities to make better choices that protect wildlife?	2025-03-06	2025-05-29	6.0	Kaunas University of Technology
From Waste to Worth: Harnessing Excess Summer Heat	What is the best way to use cheap summer surplus heat of district heating?	2025-03-06	2025-05-29	6.0	Kaunas University of Technology
Shaping the Future of District Heating	How to manage short-term consumption peaks using available technological innovations?	2025-03-06	2025-05-29	6.0	Kaunas University of Technology
Designing Flexible and Stretchable Electronics for Real-World Applications	Exploring the Fundamentals of Soft Polymer Electronics and Their Practical Impact	2025-03-11	2025-04-14	1.0	Hamburg University of Technology
Data Visualisation and Presentation	Improve your data visualisations	2025-03-17	2025-05-04	2.0	Kaunas University of Technology
Socio-Economic Evaluation of Projects	It is essential for every company and various governing bodies that projects' choices would be evaluated to ensure an optimal outcome	2025-03-17	2025-05-05	2.0	Kaunas University of Technology
Pathway of Disruptive Innovation	Ignite your potential and transform tomorrow with the power of innovation	2025-03-17	2025-04-17	2.0	Kaunas University of Technology
Rethinking Manufacturing	It's time to rethink manufacturing	2025-03-17	2025-04-17	2.0	Kaunas University of Technology
Accelerating Innovation Adoption	Accelerating Innovation Adoption: Strategies for Rapid Implementation and Success	2025-03-17	2025-05-09	2.0	Kaunas University of Technology
Cognitive Neuroscience	Cognitive neuroscience provides a window on how the structure of the mind through behavioural experiments processes occur	2025-03-17	2025-05-19	3.0	Kaunas University of Technology
AI and Consumer Behaviour	AI's impact on consumer behaviour	2025-03-17	2025-05-02	2.0	Kaunas University of Technology
Laser Principles and Applications	Ignite the laser emission and light up the pathways for its emerging applications	2025-03-18	2025-05-13	2.0	Kaunas University of Technology
Ethics of Artificial Intelligence	Ethical questions about technology and AI	2025-03-24	2025-06-06	7.5	Linkoping University
Enabling Industry 4.0	Get in touch with Industry 4.0 challenges	2025-03-24	2025-04-28	3.0	Hamburg University of Technology
Introduction to Biomaterials	Unlocking the Potential of Inorganic Biomaterials for a Healthier Future	2025-04-01	2025-05-31	2.0	Kaunas University of Technology
Intercultural Teamwork	Mastering Intercultural Teamwork: a Practical Virtual Course	2025-04-08	2025-06-08	2.0	Kaunas University of Technology
Circular Business Model	Be a sustainability champion: dive into the exciting world of circular business models and learn how to transform businesses into forces for good!	2025-04-14	2025-05-18	2.0	Kaunas University of Technology
Hydrogen and Sustainable Aviation Fuels (SAF) – Key Factors for Carbon-Free Aviation?	Explore future scenarios for refueling infrastructure and supply networks, with Airbus, Hamburg Airport and the German aerospace centre (DLR)	2025-04-14	2025-07-18	6.0	Hamburg University of Technology

Leading Systemic Change	Learn how to manage the change-making process by designing, developing, and deploying holistic systems thinking	2025-04-22	2025-07-04	10.0	University of Twente
Adultcentrism in Educational Relationships	Creating Awareness of Adultcentrism in Educational Relationships through Game-based Learning	2025-04-24	2025-06-20	5.0	University of Stavanger
Art-based Research Methods in Intercultural Competence and Multilingualism	Exploring, analyzing, and using various research methods	2025-05-12	2025-06-02	5.0	University of Stavanger
Circular Value Chains	Is designed for everyone, who wants to take on the challenge of transforming the entire value or supply chain to become more circular and sustainable	2025-05-12	2025-06-08	2.0	Kaunas University of Technology
Children's Thinking in Kindergarten Daily Life	Supporting Children's Thinking Skills and Confidence Through Engaging, Practice-Based Learning	2025-06-16	2025-09-19	5.0	University of Stavanger
Technology Transfer and Entrepreneurship with a Focus on Technological Innovation	Empowering Startups to Solve Real-World Problems	2025-07-01	2025-07-31	1.0	Hamburg University of Technology
Industry Project Management Masterclass SS24_25	Practical Solutions for Managing Challenges in Industry through simulations	2025-05-06	2025-06-27	9.0	Łódź University of Technology
Future-ready Young Citizens in the Smart City Era	Empowering the Next Generation for Innovation, Sustainability, and Connectivity	2025-03-01	2025-05-31	4.0	Łódź University of Technology