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EU LAB

White Paper: Recommendations for integration of EULab as a Erasmus+ Exchange Programme, HEI Structural Adjustments Required

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IO6 White Paper

EULAB RECOMMENDATIONS: HEI STRUCTURAL ADJUSTMENTS

The purpose of this white paper is to inform policy about structural adjustments necessary to make EULab programmes available across Erasmus+ programme countries.

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Executive summary

The purpose of this white paper is to inform policy about necessary structural adjustments required to make EULab programmes available across Erasmus+ programme countries. Therefore, the white paper 1) outlines the Erasmus+ funded program *EULab*, an education programme developing and testing innovative pedagogy to address the challenges of sustainability and digitalization transitions, and 2) its potential contributions to EU policy areas on digitalization in HE and sustainability, as well as the development of competences in respective areas.

EULab is an Erasmus+ funded Strategic Partnership in the realm of blended mobility and virtual exchange solutions. EULab aims at empowering Higher Education (HE) students and faculty to tackle complex SDG related challenges through creating mission-led, place-based 'pop up' studio learning environments and fostering interdisciplinary collaboration and intercultural interaction.

EULab's pedagogical approach is based on challenge-based learning with heutagogy, a fundamentally learner-centric approach to teaching, as its underlying logic in a design-led studio learning environment. Thus, students' learning journey is scaffolded through prompts and toolkits to 1) understand current systems, 2) Imagine future systems and, 3) identify leverage points and design interventions to shape and therefore realise future economic and market systems. Within the EULab Strategic Partnership project this was tested in two different modalities: virtual exchange and blended mobility. The white paper outlines the structure, contents and methods of both modalities as carried out in respective pilots.

Within the existing EU policy landscape and related competence development priorities, EULab is strongly linked to blended mobility as a strategic educational development area (Blended mobility implementation guide for Erasmus+ higher education mobility KA131). Additionally, EULab builds on and contributes to priorities on sustainability (e.g., GreenComp) and digitalization in HE (e.g., DigCompEdu). As a cross-cutting priority, EULab supports life-long and innovative learning (as described in LifeComp). The competencies advocated in these policies are described and EULab's designed contributions explained. By means of quotes from participants (learners and educators alike), we show how their expectation, experiences and reflections met the intended development of sustainability and digitalization competencies. Results show that the heutagogy-driven challenge-based approach to learning can be initially difficult for learners to grasp, as their mode of learning (traditionally teacher-guided) requires large amounts of pro-activity and self-efficacy. Post-program reflections, however, show a high degree of satisfaction with the programme as it equips participants with necessary competences to identify, analyze and solve challenges in a self-directed manner.

The dissemination of the EULab model in HEIs across Europe is evaluated by means of a survey (to be found on the EULab webpage (www.eulab.org) and corresponding Erasmus+ Project ResultsPlatform) among HEI education and study specialists in European HEIs. An initial analysis of the results shows that there are rather stark geographic and education system-related differences in HEIs' readiness for the implementation of blended mobility and virtual exchange offerings. A high degree of modularity in terms of ECTS, timing, content planning, of an offering such as EULab can help overcome some bureaucratic burdens. Educators' generally positive attitude toward an EULab-like offering will be conducive to this development. HEIs' top management resistance, as is

the case in certain HEIs, however, can only be overcome through lobbying from the side of different stakeholders, including educators and policy makers.

As part of the results we present the 1) EULab toolkit as a set of tools for facilitating EULab modules at European HEIs and 2) A speculative platform design concept, as a part of a consecutive development step of the EULab, which will help participating HEIs in achieving the necessary structural readiness and the implementation of blended modality or virtual exchange modalities of EULab. These results can be found on the EULab webpage (www.eulab.org) and corresponding Erasmus+ Project ResultsPlatform)

This white paper proposes a roadmap with central milestones for the development of a pan-European EULab network - potentially using the EULab platform as an organizing hub. Central potentials and challenges of the integration of EULab in the European HEI landscape are described and its core value propositions summarized.

1. Overview of EULab

1.1 Background to the EULab Erasmus+ Strategic Partnership (KA)

We live in unprecedented times; the climate emergency and digital transformation are testing our assumptions on how markets and society should work. EULab is an Erasmus+ funded, interdisciplinary, immersive programme developed to enable students to work on place based wicked problems. Established as a pilot concept, its aim is to transform the role of the University's ability to make impact on real challenges. We want to enable meaningful change to happen in the University for future generations to feel empowered to tackle complex challenges.

EULab is an Erasmus+ funded project, led by the University of Limerick (IRE), in partnership with Audencia Business School (FRA), Oulu Business School, University of Oulu (FIN) and Universidad de Leon (SPA). Its aim is to transform the role of the University's ability to make impact on real challenges. EULab has enabled the partner universities to experiment and grow a novel education modality developed in University of Limerick, the Digital Futures Lab, toward the realisation of a European programme where student and faculty co-create Mission Led, Place Based, studio learning environments to imagine and model sustainable futures. The education and exchange programme developed equips active citizenship toward regenerative futures using a heutagogical blended exchange model.

Over the 30 months of the project (April 2021 – October 2023; inclusive of a COVID19-related extension), the project partners have collectively piloted two modalities of the EU Futures Lab. One, a virtual programme directly building on the 12 ECTS credit Digital Futures Lab module run at the University of Limerick. Two, a hybrid programme as a form of Blended Mobility (BM), designed and tested in EULab, involving 2 days online preparation, 1-week immersive place based lab and 4 week online interaction. The hybrid lab was led by Audencia Business School. Alongside the design-led studio-based learning environment the project developed an intercultural interaction module, led by Universidad de Leon during the first online 2 days, to support virtual and hybrid teams working across institution and cultural lines to collaborate more effectively.

EULab Objectives:

- Enable meaningful change and empower Higher Education (HE) students and faculty to tackle complex SDG related challenges.
- Create mission-led, place-based 'pop up' studio learning environments.
- Foster interdisciplinary collaboration and intercultural interaction.

EULab Project Highlights

1. Piloted two modalities of the EU Futures Lab:
2. Virtual Program: Based on the 12 ECTS credit Digital Futures Lab module at the University of Limerick.
3. Hybrid Program: Designed and tested in EULab, featuring a 1-week immersive place-based lab and 4-week online interaction. Led by Audencia Business School.
4. Developed an intercultural interaction module led by Universidad de Leon to enhance virtual and hybrid teams' collaboration across institutions and cultures.

A key objective of EULab KA project is to inform policy to create the structural adjustments required to make EULab programmes available across Erasmus programme countries. This will contribute to the achievement of existing EU policy areas such as digitalisation in HE, including Digital Education Action Plan (2021-2027). The Bologna Digital white paper on Digitalisation in the European Higher Education Area suggests that digitalisation is not only an additional challenge, but also an effective means to address key challenges for higher education in the 21st century. EULab also contributes to the EU policy area of sustainable development, namely GreenComp, through empowering citizens to become innovators for sustainable futures. Finally, EULab supports life-long, critical learning, as called for in EU's LifeComp strategy.

This white paper reviews many existing initiatives in setting out the areas in which digitalisation can contribute to these challenges, including in virtual and Blended Mobility (BM). Existing Virtual Exchange (VE) is built on the premise of digitalisation of existing physical mobility to enable students to enhance their access to comparable module content to their home university through online interaction and collaboration. EULab goes beyond existing initiatives which focus on either digital technologies as a support to the visiting students (use of video conferencing as additionality), or a method to encourage the development of cross-cultural collaboration and interaction (Erasmus+ Virtual Exchange).

The aim of this white paper is to offer **recommendations for integration of the EULab programme into the current ECTS system for virtual and blended exchange.** This white paper includes:

- overview of the EULab model as a means of equipping learners to become active citizens in deploying a heutagogical blended exchange model to address the Sustainable Development Goals (SDGs) and work to realise regenerative futures for Europe;
- contextualisation of EULab within the HE digitalisation and sustainability policy landscape (twin transition) and sets out its core areas for contribution;
- presentation of results from the EULab strategic partnership project to establish the process, curriculum (including assessment) and impacts of an EULab studio-based module/course;
- presentation of a pathway for the integration of EULab as part of HE digitalisation priorities, but in particular within VE/BM, but also more broadly as a setting for HE institutions to meaningfully contribute to the UN SDGs.

1.2 The EULab Education Programme

EULab is an innovative example of challenge-based learning (CBL), drawing on heutagogy as an underlying pedagogical approach (Blaschke, 2012), that scaffolds students' learning journey with prompts and toolkits to support a methodological approach to 1. Understand current systems, 2. Imagine future systems, 3. Identify leverage points and design interventions to shape and therefore realise future systems. As part of a virtual exchange or blended mobility, learners undertaking the EULab education programme start with a future-focused challenge aimed at addressing a complex or wicked problem that prompts the learner to imagine and then design for a sustainable future in a specific place. For example:

"Limerick: Circular Food City 2035"

"Nantes: *Feeding our cities: developing sustainable, resilient and inclusive food systems*"

Alongside digital competences, the EULab programme's focus is the development of **sustainability competences,** which, according to Bianchi et al. (2022) involves the empowerment of learners to embody sustainability values and embrace complex systems in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures. This is achieved using a challenge-based approach, informed by a heutagogical approach in a design led studio learning environment. We will now outline these as applied to the EULab Programme.

1.2.1 Challenge-Based Learning

Challenge-Based Learning (CBL) is an innovative teaching methodology that engages students to resolve real-world challenges while applying the knowledge they acquired during their professional training (Portuguez Castro & Gomez Zermeno, 2020). EULab programmes go further to enable new learning beyond existing capabilities as learners are prompted and supported in deep, immersive and accelerated place-based learning. For example, both pilots undertaken as part of the EULab Erasmus+ funded strategic partnership were founded on notions of circular economy (CE) and food systems. The students undertaking the labs came from either business analytics or more general business/marketing or responsible business disciplinary backgrounds. Learners therefore can learn about sustainability challenges and solution models (e.g Circular Economy), but at the same time, learn to localise or translate these ideas and models in a specific local context or situation. To support this EULab employs heutagogy as an underpinning pedagogical approach. **Heutagogy** is a student-centered instructional strategy that emphasises the development of autonomy, capacity, and capability to self-determine learning, where learners are regarded as problem finders; they know how to find and set their destination and become increasingly independent (Hase & Kenyon, 2013). This approach affords a level of freedom and flexibility where learners do not rely on the instructor as the only or primary source of knowledge on the challenge at hand. Instead, learners engage in deep dive research alongside and supported by stakeholder engagement. Stakeholders in EULab programmes are categorised as either 'problem owners' or experts or both.

1.2.2 Systems and Futures Perspective

Systems thinking is essential for grasping complex sustainability challenges and helps learners understand reality in various contexts and fields, fostering better decision-making for sustainability (Bianchi et al., 2022). In EULab, the focus on systems thinking is to develop the learner's capacity to apprehend interdependencies but also the distributed nature of agency and action in contemporary economic and market systems. The emphasis is to 'go upstream' of the problems as experienced, which are often symptomatic of deeper, systemic or structural dimensions. While systems thinking is a vital aspect of the EULab education programme, we view this as only a starting point. To this we add specific futures or strategic foresight perspectives and equip learners to methodically imagine and map multiple possible futures. This opens up the learners' imagination and supports in the development of their sense of agency to create change. According to Bianchi et al., (2022) creativity, imagination and being aware of our emotions and intuitions can inform our ability to envision alternative futures.

At EULab we have explored a range of visual tools and frameworks to support and guide learner imagination. For example, we have turned an exercise taught by futurist Jane McGonigle "100

facts" into a visual canvas, whereby learners (or EULab participants with stakeholders), firstly brainstorm current reality (in relation to a specific issue, e.g. current facts on food production), secondly, they flip these facts, and finally, reflect on a future where those flipped facts might be a reality. The canvas approach enables a group of participants to work "together but alone" each armed with post-it notes, everyone's ideas literally have a place on the canvas. Following this individual work the team is better placed to discuss the emerging common themes. Examples of systems and futures canvases developed or adapted as part of EULab are offered below. In the next section we will further advance this notion of visual sense making using tools/frameworks and 'thinking canvases' used as part of the design-led EULab learning experience.

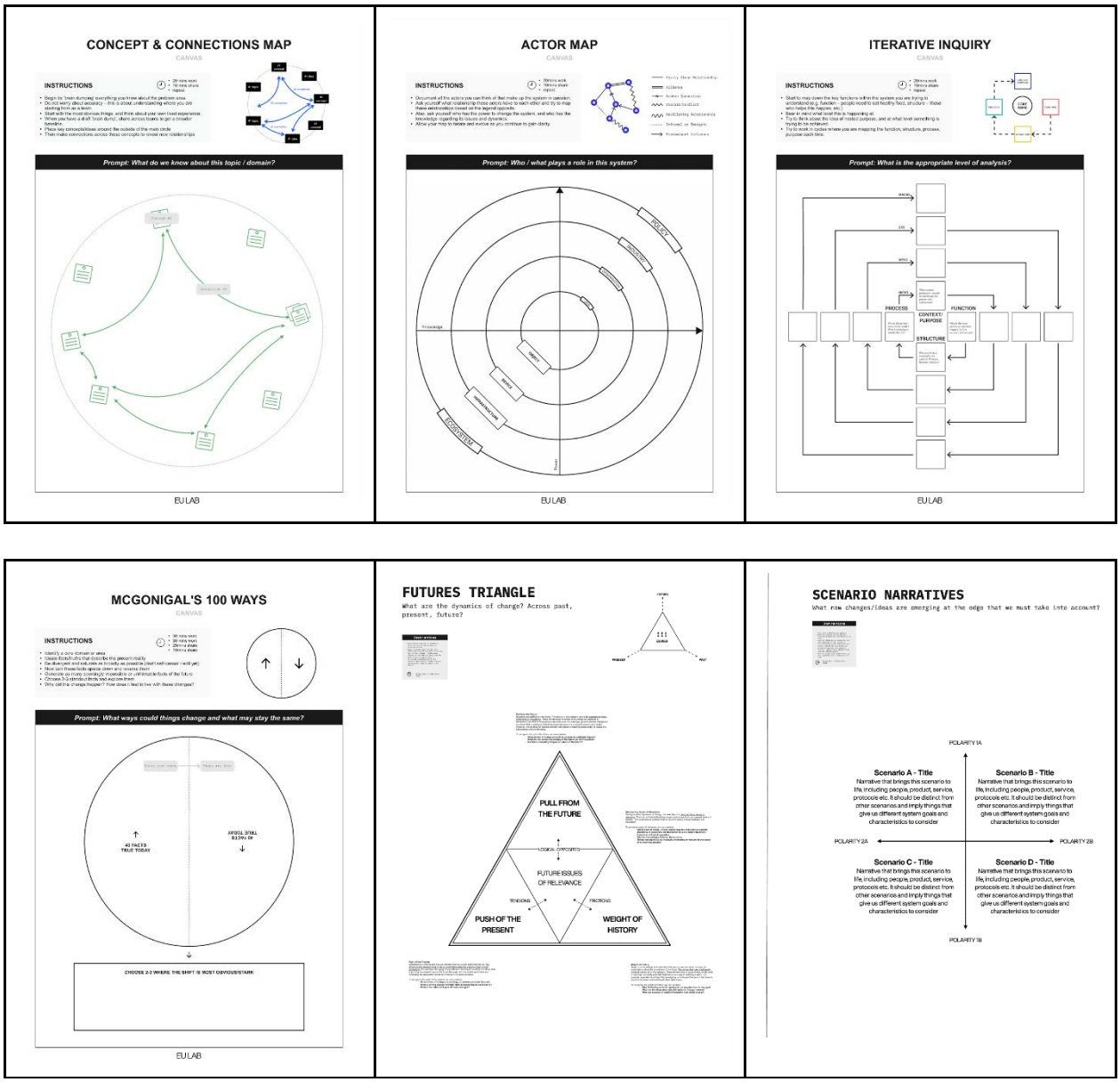

Figure 1. Sample of visual tools used by EULab learners to understand and map current systems imagine future systems

1.2.3 Market System Shaping

The systems and futures thinking perspectives underpinning EULab programmes, were originally (and continue to be) developed in the University of Limerick module, The Digital Futures Lab. Central to the development of the module has been an appreciation of the constructed nature of (market) systems, considered mutable and therefore subject to shaping and reshaping by actors/stakeholders. Theoretically, the module draws on Market Studies, an interdisciplinary theoretical approach that views market systems as collectives of distributed, heterogeneous sets of expertise made and shaped by market actors of all kinds: entrepreneurs, business managers, policymakers, community, and activist groups, and public and third sector workers. Drawing on Actor Network Theory (e.g., Latour, 2007), this approach recognises that technologies, devices, and inscriptions are also important actors in the making and maintaining of markets.

As a programme hosted in the Business School environment, we believe that future sustainable markets and (not only) business models need to be designed and developed in order to realise truly regenerative futures. The market system shaping canvases developed and tested in the EULab partnership are an important feature to the learner experience, aimed at developing their design skills and agentic capacity to realise not only change in systems, but system change. Samples of these tools or canvases are offered below:

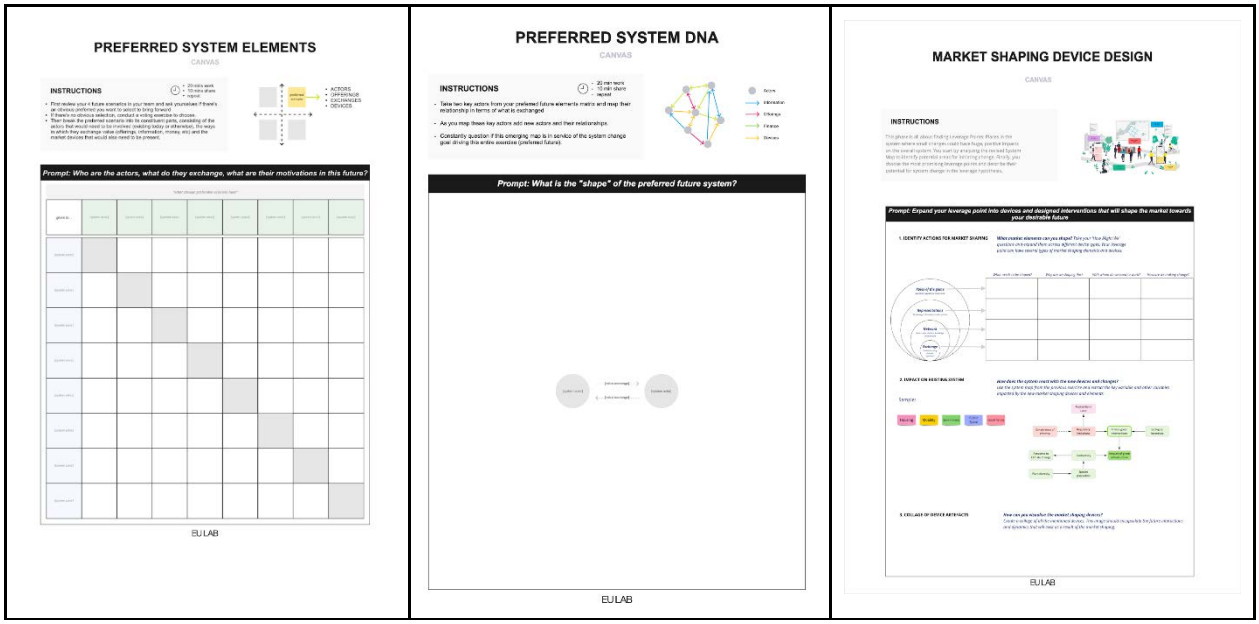

Figure 2: sample of visual tools used by EULab learners to design systems inventions

With this focus on imagining and designing future sustainable (market) systems we suggest that a new term, Mission Led Learning, might better describe the specific nature of the EULab challenge-based learning model. "Missions'' are 'north star' projects that drive collective action responses to foundational issues of our time. Mariana Mazzucato (2018) has developed the notion of mission led innovation which points to using missions to drive national industrial strategy or innovation policy by focusing less on sectors - from automotives to telecommunications - and more on problems that matter to all. Mission-oriented innovation is a framework that lays out common grand challenges in a way that allows multiple actors to shape the conditions that give rise to the infrastructure that might solve those challenges. Mission Led Education focuses on capacitating graduates as 'change makers', with ability to work collaboratively across disciplinary boundaries, towards addressing complex challenges, with emphasis on imagining future possible systems and

realising system innovation, and not just innovation in systems, by emphasising leveraging change in systems and designing detailed interventions.

1.2.4 Design led studio learning environment

The EULab education programme adopts a studio-based learning environment. A studio is a context for collective learning and offers a highly dynamic learning environment. Barry and Meisiek (2015) note that numerous business schools around the world have started experimenting with studio-based inquiry drawing inspiration from design but also visual or performing art schools. According to the authors, what sets studio work apart from other problem-based or experiential practices in management is 'the strong emphasis on participant-led inquiry through hands-on, creative engagement (…)' (2015:156). To them, the studio is a place of creative enquiry that differs from the more dominant scientific posture adopted by business schools in many notable ways: students engage in 'problem finding' and don't start working on a problem that needs solving; studios keep bringing the context in the room and attach importance to the local dimension of an issue; creative and inspiring accidents are welcome; learning comes through making. They highlight the need for a more 'holistic' perspective to address the dilemma of today's organisations and see studio-based teaching as a well-suited method for developing the relevant skills needed by future business graduates.
The EULab education programme adopts 4 key stages of studio-based teaching and learning as described by Hetland et al. (2022):

1. The teaching team in collaboration with stakeholders or 'problem owners' set the brief for a future focused real life challenge area. Students work in teams to 1. Understand the current problem area using systems thinking, 2. Methodically imagine future possible system elements and 3. Design system level interventions for change, involving stakeholders/ users/system actors in the process. The process also involves meetings with other stakeholders and clients along with pitches and co-creation sessions.
2. Students under the supervision of the teaching team work collectively answering the question/challenge set in an iterative way using bespoke visual canvases or creative tools (e.g. Lego Serious Play).
3. Students in the process are supported by regular reflection sessions which take place at regular intervals during the challenge/lab and during which they display and explain their work in progress. They receive feedback from their peers and the teaching team in critiques or 'crits' sessions.
4. On reaching the deadline, students are required to display and explain their final work to the audience. They will take the audience through their process and explain the final output.

The studio based learning environment is an example of heutagogical approach in practice, where for example, the *role of the teacher* in studio-based learning is moving from a pedagogy based on a 'master figure' (where the studio teacher is transmitting their knowledge through a constant dialogue with the student) to that of a teacher seen as a 'facilitator', 'critical friend,' or 'liminal servant' (McLaren, 1988). The teacher as facilitator supports learners to construct their own knowledge through addressing both the cognitive (scaffolding) and social (the underlying belief systems - values, norms, behaviours - implicit in the disciplinary area) dimensions of learning. The 'liminal servant' adopts a student-centered approach by supporting students in managing and constructing their own learning through an ongoing critically reflective dialogue.

Traditionally, as found in architecture, arts, and design schools, the studio has been conceived as a physical instructional space, where each student will have access around the clock to their own dedicated desk space and this, for the whole of the academic year. In EULab, we adapt this model to build a temporary immersive studio experience that is *digitally enabled*, and can be experienced in both a virtual and hybrid/blended environment. In both cases the physical set-up such as furniture, tools, light, and sounds will play a major part in developing the right learning environment in which the student will make their place (Barry and Meisiek, 2015)

Borrowing from Schön (1985), we conceive of the studio as a project or challenge specific 'laboratory', where students work in teams of approx 5 and in pods of up to 15 (with the lab involving multiple pods depending on the overall size of cohort). This ensures a more intimate learning experience for learners, no matter the scale of the challenge (e.g., the DFL module at the University of Limerick has up to 100 students taking part). This is important because the studio also promotes learning as a *social and collective activity*. Lave and Wenger (1991) talk of a community of practice. With this model of learning students can develop individual identities whilst contributing to the development of their own discipline. Both formal and informal encounters inside and outside the studio contribute to the 'hidden curriculum'. For EULab participants, developing sustainability competences in a live immersive learning environment involves more than just delivering knowledge, skills and abilities (or learning outcomes) reified in course documents, but actively learning through doing.

Research has suggested that studio-based learning can help students in fostering a wide range of skills and dispositions- also referred to as '*habits of mind*' (Hetland et al., 2022). The most notable are: observing, envisioning (or imagining), reflecting (becoming aware of one's decisions and style of working and being able to assess one's work and that of others), expressing (developing narratives), exploring (experimenting and taking risks), engaging and persisting (working deeply with issues on a sustained period of time), developing, and understanding professional domains (links between practice and the professional world). These habits of mind which result from orchestration of the studio pedagogy, the social environment, and the physical and digital set-up are important not only for visual art students but also for students from other disciplines.

Finally, an important modality of work of designers is to work with v*isual tools, frameworks or canvases* which prompt imagination while also framing tasks to enable shared understanding in a group setting. Designers use visual templates or canvases as tools to structure and facilitate the creative and problem-solving process in various ways. Designers choose templates based on the specific needs of their project and adapt them accordingly. Some common design templates include Business Model Canvas, User Persona Canvas, Empathy Map, and Customer Journey Map. Each template serves a different purpose and helps designers address various aspects of the design process systematically. In EULab we offer a 'starter kit' of visual canvases across the 3 part scaffold: understand, imagine, and design future systems, (see examples above).

1. **Problem Framing:** Canvases help designers define and understand the problem they are trying to solve. They provide a clear structure to analyse and break down complex issues into manageable components.
2. **Ideation**: Canvases stimulate idea generation by providing a visual framework to brainstorm and explore different concepts and solutions. Designers can sketch, write, or map out ideas within the canvas.

3. **Collaboration**: Templates encourage collaboration among team members or stakeholders. They offer a shared language and format, making it easier for different people to contribute their perspectives and ideas cohesively. Importantly, and using online tools such as miro.com, canvases enable learners to work 'together but alone', to zoom in, where each offers their perspective in intensive individual work time, but then to zoom out, to get a better whole group understanding.
4. **Visualisation**: Visual templates make abstract concepts or strategies more tangible. Designers can use them to create visual representations of ideas, helping to communicate and share concepts effectively.
5. **Iteration**: Canvases support an iterative design process. Designers can revise and refine their ideas by making adjustments within the canvas, helping to evolve and improve their solutions over time.
6. **User-Centered Design**: Templates often include sections dedicated to understanding user needs and experiences. This user-centric approach ensures that designs are grounded in empathy and user research.
7. **Efficiency**: Canvases save time and resources by providing a structured starting point. They prevent designers from starting from scratch each time they approach a new project, making the design process more efficient.
8. **Clarity**: Visual templates help designers maintain focus and clarity throughout the design process. They ensure that key elements, such as goals, user personas, and value propositions, are always considered.

As learners become more practised in use of visual canvases as tools (and not simply as forms to be filled), we encourage them to adapt the tools, or identify others from a range of tools repositories available from, for example, Service Design Network, Accelerating Systemic Change Network ASCN or European Network of Living Labs.

In the next section we will explain the two exchange modalities of the EULab education programme that were piloted as part of the EULab Strategic Partnership project: Virtual Exchange and Blended Mobility.

1.3 The EULab as Exchange Programme

As part of the Erasmus+ funded Strategic Partnership, two distinct modalities of EULab as exchange programme were piloted; virtual exchange and blended mobility. We will now give an overview of both modalities as designed and tested, including an overview of the learner and teacher experience. Firstly we provide the definitions of both modalities.

1.3.1 Virtual exchange (VE)

We define here virtual exchange (VE) as an umbrella term which refers to the numerous online learning initiatives and methodologies which engage learners in sustained online collaborative learning and interaction with partners from different countries and cultural backgrounds as part of their study programmes at their home institutions and under the guidance of teachers or trained facilitators (O'Dowd, 2023).

Apart from the two basic characteristics of using technology and engaging in intercultural collaboration and exchange, this definition also highlights two further characteristics which are likely to be inherent in all types of VE: first, that the online collaboration forms part of students' study programmes and, second, that it involves the guidance of teachers or trained facilitators.

The first of these is an important part of any definition of VE as it allows us to differentiate between projects which are integrated into education programmes and more informal intercultural interactions and collaborations which might take place online.

For example, students often interact in online social networks with colleagues and friends from other countries. This may be beneficial for, for example, their foreign language skills and their cultural knowledge, but this should not be seen as VE. VEs differ from informal online interactions in that VE initiatives are generally integrated in some way into students' formal learning and students' participation in the project is provided with some form of academic recognition, whether it be in the form of grades, credit or badges.

The second point means that VEs recognise that to maximise the learning potential of the online interaction, educators need to actively structure the activity, designing tasks and providing support and assistance in the online intercultural collaborations. As Helm and van der Velden (2020, p. 3) explain "[i]n contrast to more social online activity such as participation in social networks, VE initiatives are structured and intentionally designed to produce learning outcomes".

In EULab, the first of the two pilots was planned and implemented as a VE and built on the 12 ECTS credit Digital Futures Lab module run at the University of Limerick. It took place in Spring 2022 and lasted 3 weeks.

1.3.2 Blended mobility (BM)

Blended Mobility (BM) refers to the strategic combination of phases of online learning with periods of short physical mobility (Helm and O'Dowd, 2020). This approach to international learning has gained considerable interest in European university education in recent years due to the introduction of Blended Intensive Programmes (BIPs) in the new Erasmus+ programme. Blended Mobility is seen as offering a more accessible and inclusive form of international learning for students who may not be able to engage in long-term student mobility programmes for diverse reasons. It also offers the opportunity of integrating periods of international collaboration more effectively into the curriculum and into classroom practices. BM involves physical mobility supported by different forms of online interaction. Thereby, as suggested by the European Commission, physical mobility shall be organized as short (typically between 5 and 30 days) intensive periods. The online, or virtual, interaction can take place before or after the physical mobility and can be understood as virtual exchange (Helm and O'Dowd, 2020), as described above.

The following table maps the structural features of EULab as VE and BM modules as they were implemented as pilots in the project. A more detailed account of the pilot modules follows after the table.

EULab features	Pilot 1, Virtual Exchange	Pilot 2, Blended Mobility
Home programme or module	Exchange students joined existing 12 credit DFL module at University of Limerick (IRE)	New winter school temporary module created at Audencia Business School (FR)
Number of exchange students	4	13
ECTS Credits or equivalent	Equivalent to 12 credits	Equivalent to 6 credits
Time commitment	Full time over 3 weeks	1 week full time (onsite), 3.5 weeks part time (online)
Instruction method	Studio-based, online	Studio-based, online and onsite
Assessment	Formative	Formative
Stakeholder engagement	Various governmental, non-governmental and business actors	Various governmental, non-governmental and business actors

Table 1: EULab Pilot 1 and Pilot 2 overview

1.3.1 Pilot 1, Virtual Exchange modality: Digital Futures Lab module at University of Limerick (2022)

The EULab pilot 1, a VE module, took place as Digital Futures Lab 22 in May/June of 2022 and was hosted by the University of Limerick. The host programme is the Digital Futures Lab (hereafter DFL), a studio-based programme developed at the Kemmy Business School at University of Limerick, which has been running since 2020 and is the core platform for the EULab curriculum. The DFL22 programme included a 3-week main lab, and a prelab comprising a 2-day intercultural training workshop.

1.3.1.1 Prelab cross cultural and cross disciplinary collaboration module (2022, 2023)

The intercultural collaborative training (see Figure 3 for an excerpt of contents) was specifically designed by the University de Leon team in collaboration with the EULab team to support both the virtual exchange students and home students. The pre-lab training module focuses on developing the cross-disciplinary, cross-cultural competences to support learners in their engagement in the lab-based modules and forms a prerequisite module for EULab programmes. The module builds upon existing virtual exchange (VE) curriculum, broadening this to focus on both a) inter and transdisciplinary working and b) self-determined learning.

timeslot (CET-1 or Irish Summer Time)	Tuesday Session 1: Digital Tools and Team formation 1	Wednesday Session 2	Wednesday Session 3
9-9.10	Welcome and setting up the session	Welcome and setting up the session	----------
9.10-9.30	Overview of MSTeams site, channels and their use	Collaboration concerns brainstorm	----------
9.30-10.45	Introduction and engagement on miro board	Critical incidents and strategies to address them	----------
10.45-11	Using task planner (Kanban) on your miro board	Communication strategies and Netiquete	----------
11-11.45	----------	----------	How you will work in DFL: overview of Agile, self determined work practices

Send feedback

Figure 3: Structure and content of the pre-lab intercultural training

The training was delivered via an interactive whiteboard tool, miro.com, where each team had their own working space (see Figure 4 below). Teams were formed from within the DFL module and spreading out visiting exchange students across 4 teams.

Figure 4. Screenshot of miro board, showing how each team had their own work space to engage in intercultural learning.

The following screenshot evidences the exercises students engaged in, with bespoke canvases designed by the University of Limerick team. The content of the programme is evidenced based and focused on: netiquette, common concerns and communicative strategies and dealing with critical incidents. The workshop offered an important space for learners to openly express what might otherwise go unsaid with regard to cultural differences in organising group work. Teams were facilitated in setting their own ground rules, which formed an important form of social contract or resource that the team could refer to during the immersive 3-week programme.

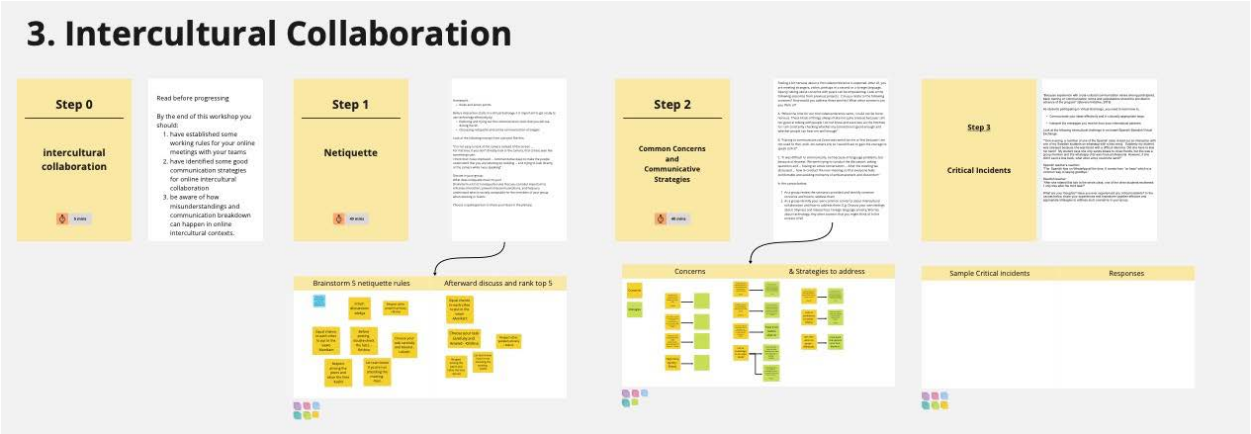

Figure 5. Main features of the intercultural training as set out in the bespoke miro based canvas

1.3.1.2 Main DFL Lab

The lab is orientated on action and developing capacities for systems thinking, designing and action. Learners collaborate virtually in mixed teams using a digital working environment, enabled by existing digital collaborative tools (MSTeams/Slack and Miro). The lab is transdisciplinary, focusing on addressing socially relevant challenges that are solution-oriented and situated in the context of the home city. The main lab took place over three weekly sprints, including a kick-off session on Monday, weekly midweek mentor check-in, and end of week crit/review session. The focus of the lab was the **designing a circular economy for Limerick by 2030**. Key stakeholders, including industry and community groups were enrolled into the lab process, to direct the work and ensure relevance and impact.

Figure 6. the DFL 22 Challenge or Mission broken down into 3 thematic areas or pods

The lab was organised into a series of pods and teams within pods in order to span different scales of the challenge. Each team had one visiting virtual exchange student. For the purposes of the pilot, the exchange students participated on a voluntary basis. Recruitment took place via email and announcements at each other partner institutions. A recruitment pack, via PowerPoint was developed to explain the workload and benefits of the program. 4 visiting students (1 from Oulu Business School and 3 from Audencia Business School) participated in the virtual programme.

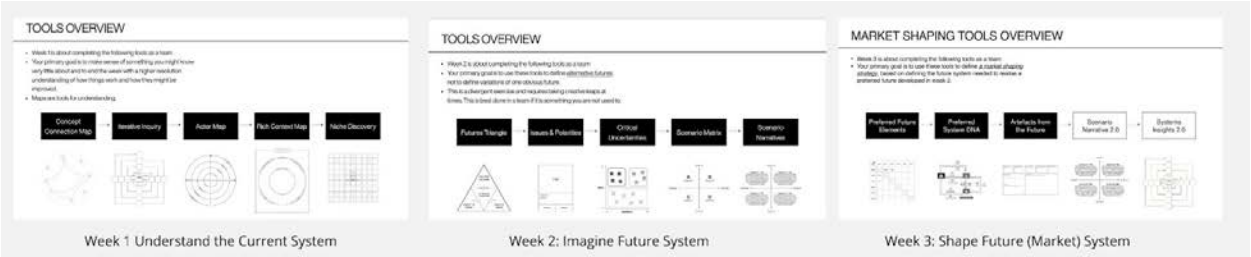

Figure 7. 3-week structure of DFL with snap shot of tools/canvases provided to participants

A series of both adapted and bespoke tools were developed for the programme (see above) to support the 3 weekly sprints that scaffold the learning journey. Each tool was shared with teams on their miro boards, offering them examples, as well as suggestions for work spaces they could create. Each week teams were given a key milestone or deliverable to focus their work and ensure they had something concrete to speak to at the weekly crit.

Figure 8. Weekly deliverables for DFL 22

1.3.1.3 Assessment

The module assessment design is an important aspect of the studio learning experience where grades were used to incentivise the kinds of behaviours we wish the students to develop, for example, we emphasised process over outputs, and gave grades for intergroup support. The MSTeams channels were important to be able to track progress and teams were encouraged to share minutes of meetings, as well as evidence their work in progress via their miro boards. For example, where teams offered feedback to each other, or share research on the MSTeams general channel they were instructed to use #teamxsupport. Using this hashtag allowed the teaching team to easily track the team's engagement with their pod, or whole cohort.

Level of Assessment	Percentage of Grade	Medium	Submission by	Weeks
Group Level				
Process Assessment	40%	Sharing WIP on Miro and MS Teams	End of each week	Ongoing
Output Grade	20%	See deliverables next page	Friday 26th May Friday 2nd June Friday 9th June	Weeks 1,2 & 3
Intergroup Support	10%	Teams Engagement	Friday 9th June	Ongoing
Individual Level				
Personal learning journal	30%	video	Friday 26th May Friday 2nd June Sunday 11th June	Weeks 1,2 & 3

Table 2. Example of the Assessment strategy of DFL/EULab education programme

The DFL's grading rubric goes beyond the traditional grading which focuses on subject competence. The DFL rubric encompasses other competencies which are fundamental attributes of change architects, instigators, innovators and future-makers. This has been informed by the Nesta competency framework: https://www.nesta.org.uk/toolkit/skills-attitudes-and-behaviours-fuel-public-innovation/)

1. **Subject Competence:** Quality of engagement with core disciplinary materials, models, theories, synthesised and applied meaningfully.
2. **Action Competence**: Ability to materialise ideas, share, take corrective action and iterate work within the team.
3. **Relationship Competence**: Identification and usage of both mentor and stakeholder network, engagement with mentors, skill mentors and stakeholder. Quality of intra team interaction and learning is vital here.
4. **Change Competence:** The ability to learn independently. The ability to make a sense of, and act within ambiguous situations and uncertainty.

1.3.1.4 Digital Tools

As a virtual lab, with only one hybrid event (closing presentations and exhibit of work), the digital tools deployed not only enabled learning, but collectively acted as a virtual studio learning environment. DFL 22 employed MSTeams, where each team had their own channel, to organise their research, partake and record team meetings, share minutes etc. Added to this, the miro.com team boards were a vital "24 hour collaborative space" as one student defined it.

The Miro home board, illustrated below, allowed the teams to navigate their own boards, as well as pursue the boards of other team members. This level of transparency is an important aspect of studio based learning, as learners learn from each other in the process.

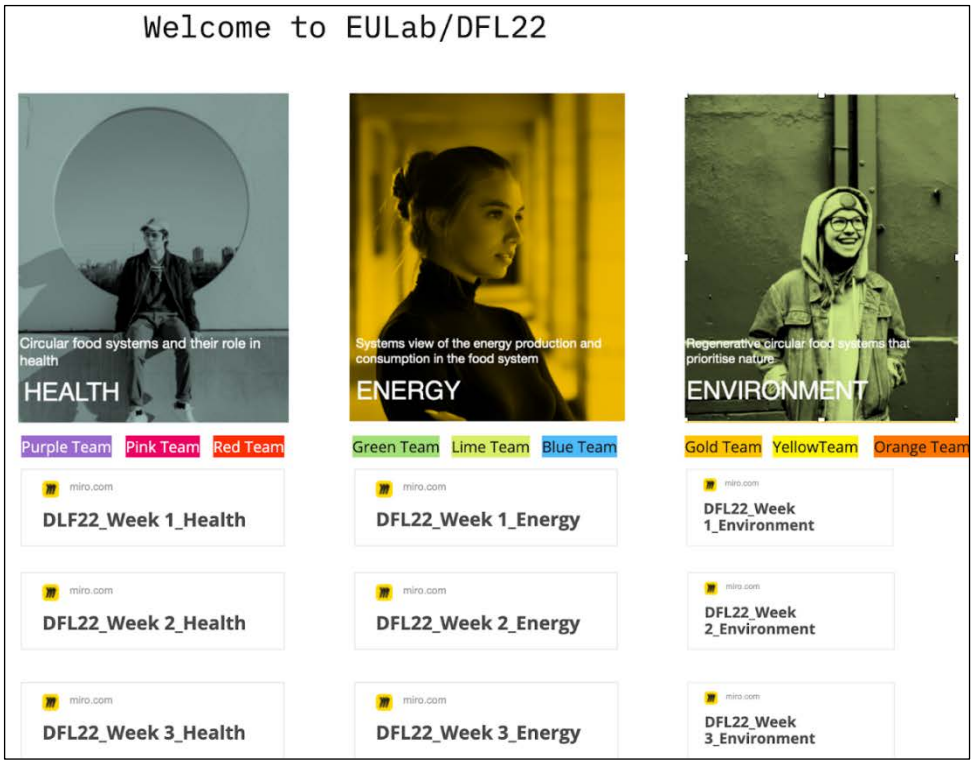

Figure 9. Screenshot of DFL 22 miro Home Board, an index to all teams, all boards for the 3-week lab. https://miro.com/app/board/uXjVO2YE6T0=/?share_link_id=109183853550

1.3.1.5 Team formation

Teams were requested to identify and volunteer for key roles to be played in the group. Each member of the team played a role, giving an accountability structure as well as a sense of agency for each team member. This role structure also enables a large amount of work to be undertaken and shared amongst the team members, including recording of minutes of meetings and other process related tasks.

Team Leader	Overall responsibility for the team's success, deliverables and engagement
Project Lead	Responsible for setting up the Kanban and managing the workflow
Product Lead	Responsible for the development of the visualisations or other technical elements to the deliverables.
Process Lead	Responsible for setting up and managing the check-in & check- outs, and Wednesday Team Mentor check-point, and the Miro Board.
Team Liaison Officer	Responsible for building bridges to other teams, external stakeholders and managing Teams and Video Conferencing
Communications lead	Responsible for external communications, engaging with stakeholders and sharing the team journey via social media

Table 3. Team roles and responsibilities as practised in the DFL/EULab virtual pilot.

A further role played is one of *Futures Mentor.* This role has been played by alumni of the DFL programme ensuring that mentors have a deep understanding of the nature of the programme. The mentor guides teams and individuals as they progress on their learning journey, lead a weekly check in and keep teams on track. For DFL 22 there were 3 mentors, each with responsibility for one pod. Duties include: weekly check ins with teams, review of individual reflections, engaging in weekly crit sessions and participating in the assessment process. A further mentor channel and spreadsheets to track progress across teams enables transparency across the mentor team.

1.3.1.5 Student Experience

Research was undertaken to a) understand student experiences with the DFL module and b) to compare student experiences at pre and post stages of the DFL module. Two separate surveys were created at two different stages to capture (holistic) student experiences. The following figure(s) demonstrate an important result of this research, in depicting the increase in levels of students' sense of autonomy, empowerment and sense of agency in bringing about change in systems.

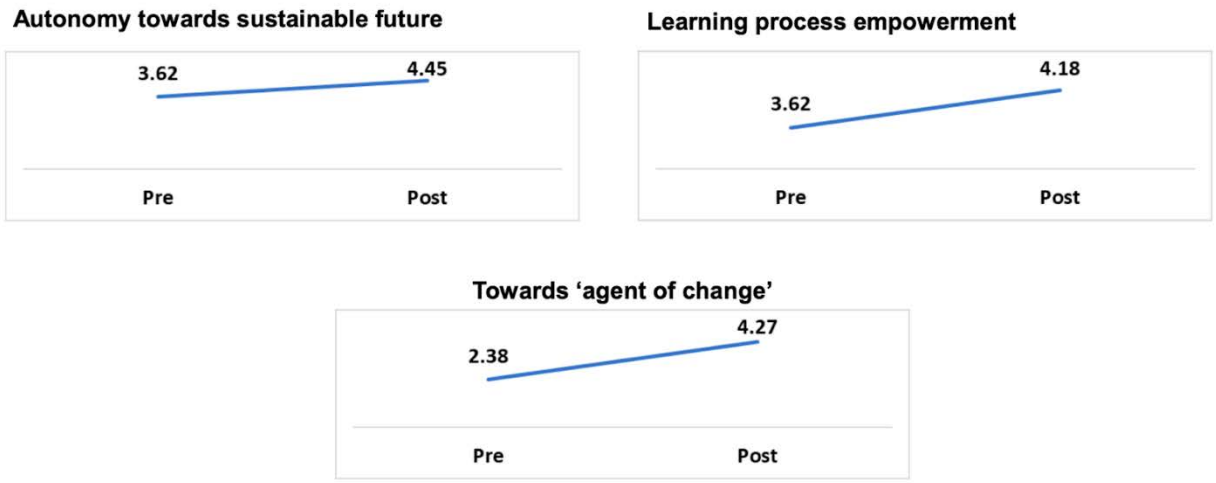

Figure 10. Key results from research undertaken with DFL 22 VE students.

1.3.2 Pilot 2, Blended Mobility modality: Nantes Winter School (2022)

The second pilot of the EULab was led by the French project partner Audencia Business School and took place from 11th January to 13th February 2023. The main aim of this second prototype lab was to further test and refine 'Futures Lab' methodology. It followed the delivery of pilot 1 (Digital Futures Lab, hosted in UL in Spring 2022). The Nantes lab addressed similar educational needs to pilot 1, in terms of developing learner and faculty competences in heutagogy and providing a setting for the institution to positively impact on the local community setting while addressing key challenges as framed in the UN SDGs. It was oriented on action and developing systems thinking, designing and action based competences (central to GreenComp). It further offered the Futures Lab subgroup an opportunity to examine how the learning environment shapes the competency development and how the digital learning environment can support a face-to-face studio setting.

1.3.2.1 Nantes Lab structure

The Nantes lab as a BM programme was organised as a five-week module consisting of interchanging online and onsite interventions.

1) WEEK 1 - PRE-LAB PREPARATION: **virtual** delivery. As learners were expected to collaborate virtually in mixed teams using a digital working environment enabled by existing digital collaborative tools (Slack, Miro), a specific two half-day online module was offered as a preamble to the on-site week. Its aims were manyfold: designed to prepare students in cross-cultural, cross-disciplinary and studio learning competences, it was also used to introduce some of the design tools that learners might be using during the rest of the module. It was led by University of Leon for the cross-cultural training and Limerick for the demonstration of the use of Miro and Slack and the introduction to design mapping tools. It took place on 11 and 12th January 2023.

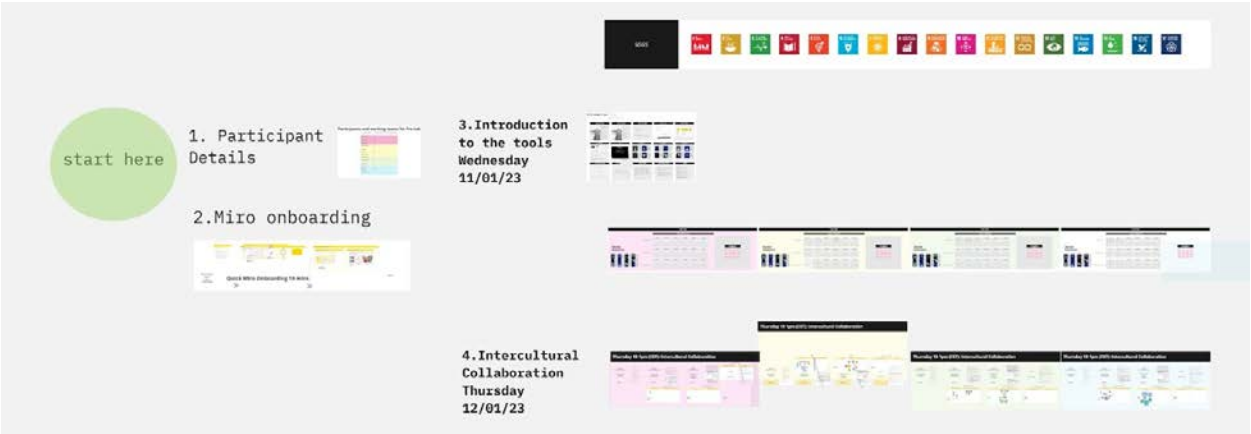

Figure 11: Screenshot of Miro board, showing the various steps in the pre-lab online training

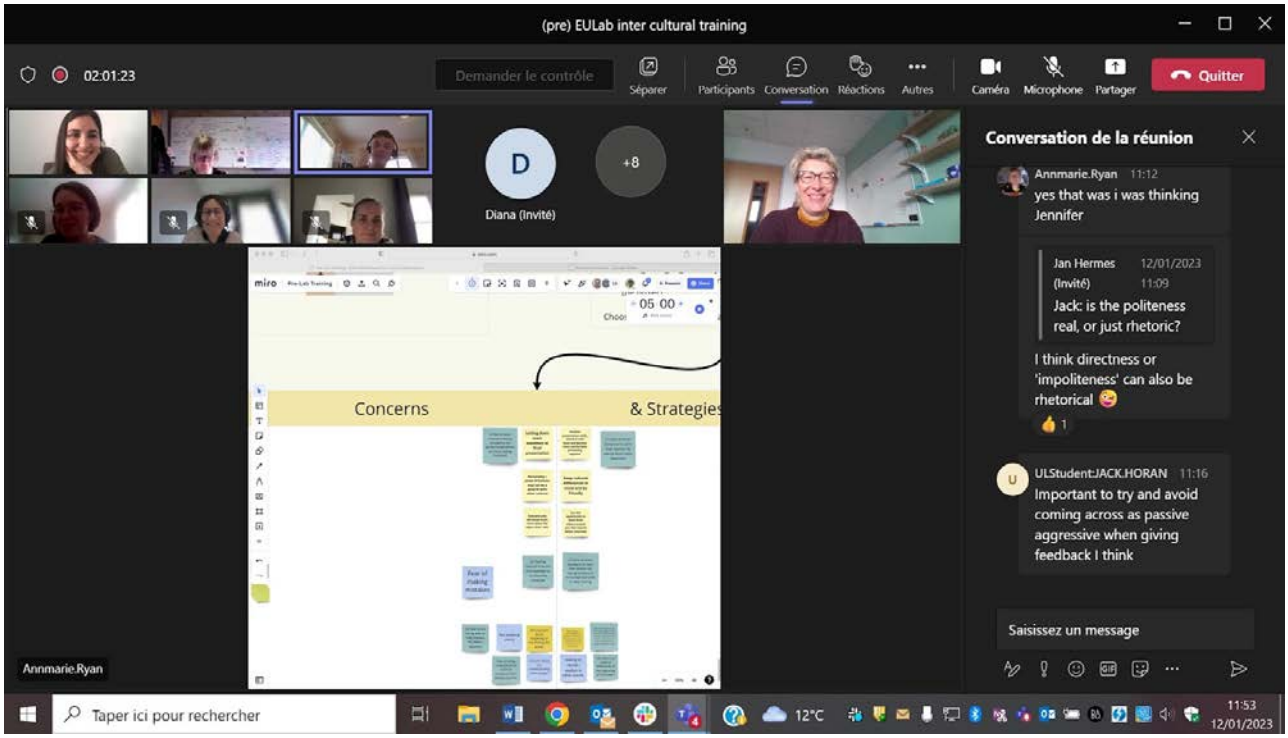

Figure 12. Screenshot from the prelab session: introducing digital communication and content creation and sharing tools.

2) WEEK 2 - NANTES FUTURES CHALLENGE: **on-site face to face** delivery. The **"*Feeding our cities: developing sustainable, resilient and inclusive food systems*"** themed lab was hosted by Audencia Business School on their Mediacampus in Nantes (FR). This was a one week long winter school immersive challenge where students, in their teams, initiated their research on the current state of the food system in Nantes, including engagement with local stakeholders to better understand and describe the problem to be identified and addressed. It took place from 16th to 23rd January 2023.

Figure 13. EULab winter school participants and educators in Nantes, France.

The face-to-face environment was used to build interpersonal relationships between team members, engage with local stakeholders, and engage in deep research on the current state of the challenge that the lab addressed. The lab was transdisciplinary, focusing on food systems situated in the context of the host city, Nantes. Key stakeholders, including industry and community groups joined the lab process to support in directing the work and ensuring relevance and impact.

Figure 14. Participants using different design tools.

During this stage, participants were also introduced to design tools and techniques that they would carry on using in the following virtual phase of the lab.

3) WEEKS 3 and 4 - BUILD THE FUTURE: **virtual** delivery. During a two week virtual phase of the lab participants in their teams continued to work on the self-set challenge, to ideate and prototype their solutions as well as the future system in which their solution would best thrive. Regular online meetings with coaches were organised each week and so were end of the week presentations. Learners and faculty continued to work virtually on a part-time basis (10-15 hours

per week). The teams further explored the role of the digital working environment and the digital collaborative tools (Slack, Miro) supported this work.

4) WEEK 5 SHARE: **virtual** delivery. The lab concluded with a virtual conference, where each team shared a series of outputs generated during the lab and presented a proposed solution and a roadmap for its realisation. This event was open to all Nantes-based stakeholders as well as faculty and staff from the partner institutions.

The Audencia team dealt with the recruitment of participants in liaison with the other EULab project members and made all the necessary logistic arrangements to host the lab and liaising with local key stakeholders to finalise a rich immersive week. The Limerick team brought their expertise in design tools and the Leon team in virtual exchanges.

Participants to the Nantes Lab were recruited through open competition. In total, 19 students applied, of which 13 participated and completed the programme (5 Audencia students, 4 Oulu students, 4 Limerick students). Participants included recent Master's level graduates from Audencia Business School, final year Bachelor students from the Kemmy Business School, and Oulu Business School Master's students in International Marketing and International Business Management.

1.3.2.2 Nantes Lab content (place-based week)

The Nantes team put a lot of effort in designing an intensive place-based week programme to offer a mix of site visits, meetings, talks which would help immerse all learners in the City of Nantes and help them understand the multi-faceted problem of feeding such a big city (6th largest city in France). As it happens Nantes has been experimenting different ways of feeding its citizens and finding innovative, sustainable and inclusive schemes to present to learners was not an issue. The week was rich in opportunities for learners to meet and discuss with various stakeholders, see their working environment and get to understand their issues.

For example, learners had presentations by two speakers from Nantes Metropolis Council. The first one explained the local food system, its actors and the Council's strategy (PAT) whilst the second offered insights into the issues around cattle breeding in Nantes and its districts. The issue of inclusivity and social justice came through the presentation on site or off-site of various not for profit organisations (Les jardins de Cocagne , La Sauge both producing and selling fresh farmed products as a way to give work to unemployed people, Le goût des autres is a caterer offering work to migrants). The opportunities of developing new ways of eating were also presented by two small entrepreneurs based in Nantes that fed the learners during their lunch breaks whilst explaining their motivations and business models (La Maison Arlot Cheng, Le vélo à gaufres). The circularity of the food system was explored during a visit to les Alchimistes, a non-for profit organisation recycling food waste to transform it into fertilizers.

Back in the studio created by the team, learners were offered time to work in their respective team. Activities to develop their creativity and imagination were offered and so were opportunities to explore the various design tools that would help them in their mission.

There was a lot of discussion amongst the teaching team before the Audencia intensive week as to the selection and the ways in which the design tools used during Pilot 1 would be introduced to learners in Pilot 2. It was decided that all the 9 tools selected would be explained but that teams would have the possibility to choose the ones they felt more familiar with after 'toying' with all of

them during the Nantes week. Three tools were offered at each stage (system mapping, imagining future systems, detailing the future systems), as shown in figure 15 below.

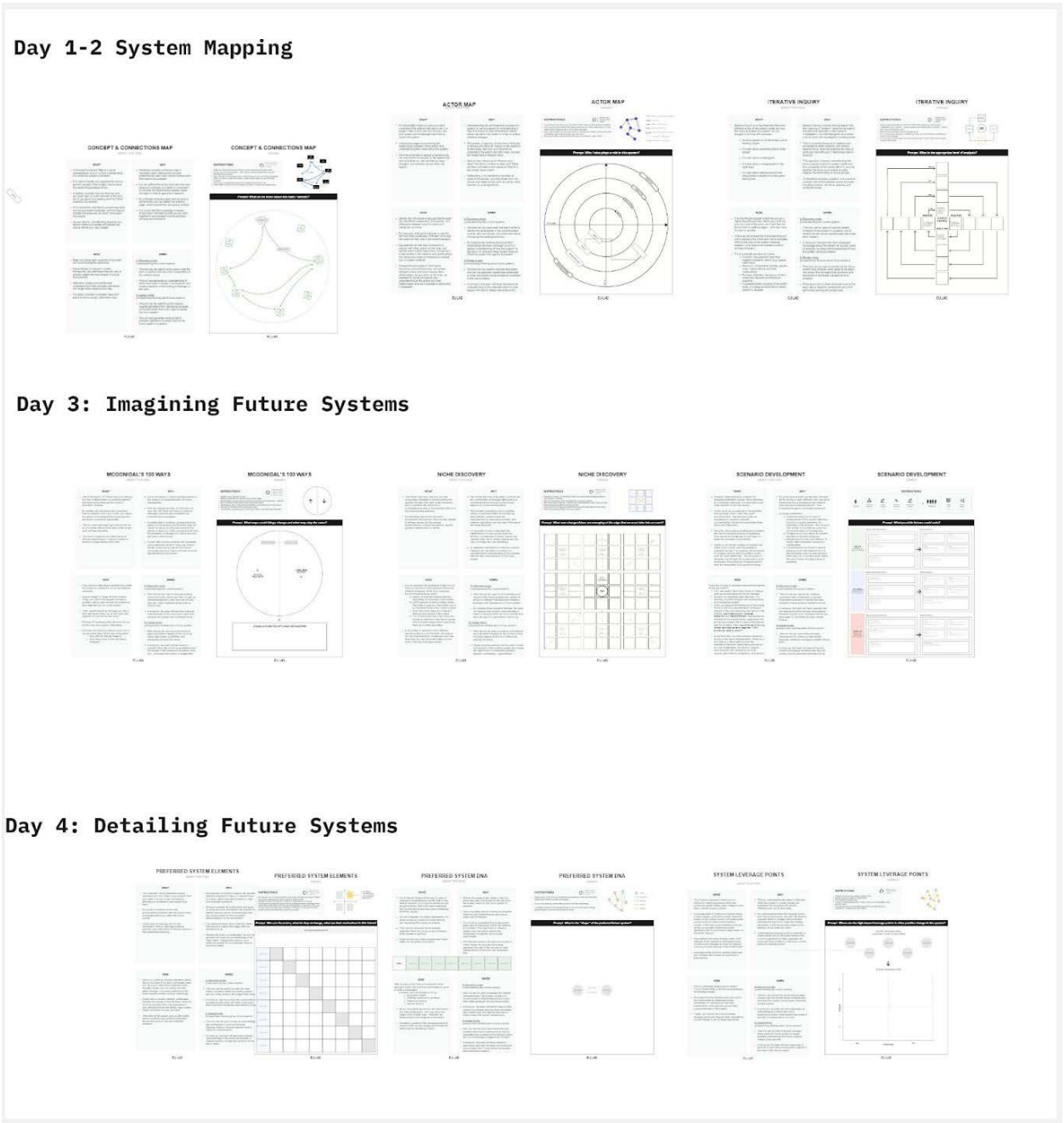

Figure 15. Screenshot of participants' design tools.

2. Contextualization of EULab within the HEI policy landscape

2.1 Mapping of relevant EU policy areas and policies

EULab as an educational development project contributes to the advancement of competences mainly in the areas of sustainability (GreenComp) and digitalization (DigCompEdu). More peripherally, EULab also supports the development of lifelong and innovative learning competences (LifeComp). Through its focus on the development of new forms of virtual and blended exchange with novel pedagogical approaches and methods, EULab adds to the request for new forms of learner mobility, as called for in the "Blended mobility implementation guide for Erasmus+ higher education mobility" (KA131).

2.1.1 Digitalization in HE

Digitalization, and its successful implementation, is a key priority area of the EU. Several EU policies published in recent years have focused on the assessment, implementation and monitoring of digitalization processes across society. In this white paper, a selection of digitalization policy papers that relate to EULab are referred to.

In September 2020, the EU adopted a renewed roadmap for the entry of its member states into the digital era. The "Digital Education Action Plan (2021-2027)" puts forth a vision of high-quality, inclusive and accessible digital education in Europe with priority on, first, the creation of an effective digital education environment and, second, the development of digital skills and competences. Notably, action 5 ("Digital transformation plans for education and training institutions") of the policy is much in line with EULab. The policy calls for supporting enhanced digital capacities for education and training institutions and provision of professional development opportunities for teachers and trainers.

Likewise, the European Framework for the Digital Competence of Educators "DigCompEdu", published in 2017, elaborates on the evaluation and nurturing of digital competences for educators: "[...] digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills and attitudes." (DigComp 2.2 framework). In order to facilitate learners' digital competences, educators, too, need to possess (and constantly update) digital competences. These competences relate primarily to teachers' pedagogical repertoire of sourcing, teaching, assessing and empowering learners by means of digital tools.

With a specific focus on the development of digitalization in higher education (HE), the white paper "Bologna Digital 2020" outlines necessary conditions, skills and implementation practices for successful teaching and learning in a digital era. One of the key enablers of a digital transition in HE, as mentioned in the white paper, is Virtual Exchange and Blended Mobility as novel patterns of mobility (see 4.a.iii). The following table provides a selection of key digital competences and EULab's contributions to them.

Digital competence of educators and learners	Competence details	EULab contribution to competence development
Information and data literacy	- articulate information needs - locate and retrieve digital data, information, content - judge relevance of source and content - store, manage and organize digital data, information, content	- self-determined learning goal and methods setting
Communication and collaboration	- interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity - participate in society through public and private digital services and participatory citizenship - manage one's digital presence, identity and reputation	- introduces and encourages use of a variety of latest digital communication tools - Miro (as example of interactive online whiteboard tool) enables collaboration, visual sense making, a research repository and communications tool. - MSTeams/Slack used as industry relevant tool, developing work place skills in remote team collaboration
Digital content creation	- create and edit digital content - improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied - know how to give understandable instructions for a computer system	- operates mainly using digital content creation tools - visuals generated in miro boards, used both in sensemaking, collaboration and communication - teams prompted to create video and graphic communication of concepts development

Table 4. Digital competences and EULab's contribution to their development.

2.1.2 Sustainability

Published by the European Commission in 2022, *GreenComp: The European Sustainability Competence Framework* (Bianchi et al 2022), provides a clear and comprehensive framework of sustainability competences for life-long education. The fruit of policy actions which were laid out in the *European Green Deal* and building on the EU's 2020 reports: *European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience* and the *European Education Area by 2025*, *GreenComp* was launched after over a year of consultation and discussions with experts and stakeholders of sustainability education. It is aligned with SDG4 target 4.7 "ensure that all learners acquire the competences, such as knowledge and skills needed to promote sustainable development".

GreenComp provides a reference framework and common language with which to talk about specific sustainability competences. These competences have the aim of empowering learners "to

embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures." (Bianchi et al 2022, pp.12). The competences embrace knowledge, skills and attitudes and apply to all types of learning and all spheres of life.

The four competence areas: 1) Embodying sustainability values, 2) Embracing complexity in sustainability, 3) Envisioning sustainable futures and 4) Acting for sustainability, each include three competences with a description and associated examples of knowledge, skills and attitudes which would fall into each category. The further breakdown of each competence into multiple statements helps to further define and refine the competences making them easily accessible to educators.

The objectives of EULab are strongly aligned with all four of the sustainability competence areas identified in the *GreenComp* framework. Notably, the complex systems and problem framing focus of the EULab is strongly rooted in the second set of competencies encouraging participants to engage in self-determined learning and becoming problem finders. The place-based learning and intercultural aspects of EULab make a strong link with context: local, national and international. The EULab is future oriented emphasizing exploratory thinking and empowering students to make decisions and become change agents with a strong emphasis on political agency and collective action. EULab is fundamentally anchored in the *GreenComp* framework, as summarized in the following table:

Sustainability competence of educators and learners	**Competence details**	**EULab contribution to competence development**
Embodying sustainability values	- valuing sustainability - supporting fairness - promoting nature	- sustainability-related problem identification and solution is largely driven by learners' values and priorities for a sustainable future - place-based learning creates connection with local social and ecological environments
Embracing complexity in sustainability	- systems thinking - critical thinking - problem framing	- challenge-based learning is built on the premises of critical thinking, problem identification and presentation and requires a systems-analytical approach
Envisioning sustainable futures	- futures literacy - adaptability - exploratory thinking	- learners generate ideas for sustainable futures - learners become system innovators

Table 5. Sustainability competences and EULab's contribution to their development.

However, the framework is itself a living document and needs to be further refined as it is put into practice. Neither subfields nor educational levels are included in the existing framework. In the context of higher education there is potential to develop further the transdisciplinary aspect of sustainability which remains a challenge and will require overcoming disciplinary and field siloes.

2.1.3 Blended mobility / internationationalization of education

In the European Commissions' document "Blended mobility implementation guide for Erasmus+ higher education mobility KA131", published in 2022, blended mobility and virtual exchange are called for by HEIs as inclusive, flexible and innovative mobilities under Erasmus+. Thereby, blended mobility and virtual exchange serve as cross-cutting tools for "promoting and implementing quality mobility, while at the same time achieving all the horizontal priorities of Erasmus+ such as inclusion, digitalisation, sustainable development and active civic participation" (p. 9). In particular, the Bologna Digital 2020 agenda calls explicitly for the increase of blended mobilities to increase digital competences among educators and learners.

This, according to the blended mobility implementation guide, is supposed to happen through HEIs across Europe committing to "developing more varied courses to students and include blended courses in their international strategies". At the same time, "university administration, international offices and mobility coordinators have an important role to play in the preparatory phase of blended mobility, coordinating actions and organising workshops to train staff" (p. 22).

EULab is one such initiative which aims at creating a priority cross-cutting template for HEIs in Europe to adapt and flexibly offer blended mobility and virtual exchange modules to ingoing and outgoing learners.

2.1.4 Mission-led innovation

Through its LifeComp priority, the European Commission aims to equip citizens with competences that enable them to thrive personally and socially and to develop learning for a lifetime approach. This cross-cutting priority includes competences "applying to all spheres of life that can be acquired through formal informal and non-formal education" (p. 8).

EULab and its heutagogical, i.e., fundamentally learner-centered, approach to teaching and learning, equips learners with the ability to grasp large-scale and complex challenges and to identify those parts of the challenge they wish to tackle. This capacity is essential for learning how to learn and innovate, especially in an increasingly interconnected, yet socially stratified global society.

2.2 Location of EULab in EU policy landscape

To summarize, EULab as an educational research program contributing to Erasmus+ mobility development is strongly rooted in and contributes to Erasmus+ HEI mobility and respective policies (e.g., blended mobility implementation guide). At its core, EULab supports the creation of 1) sustainability competences (e.g., GreenComp) and 2) digitalization competences (e.g., DigCompEdu). More generally, EULab relates to the cross-cutting priority of life-long learning and innovating (e.g., LifeComp). The figure below visualizes the location of EULab in the EU's policy landscape. Importantly, EULab is both inspired by the EU's strategic priorities and suggests contributing to them in a novel combination.

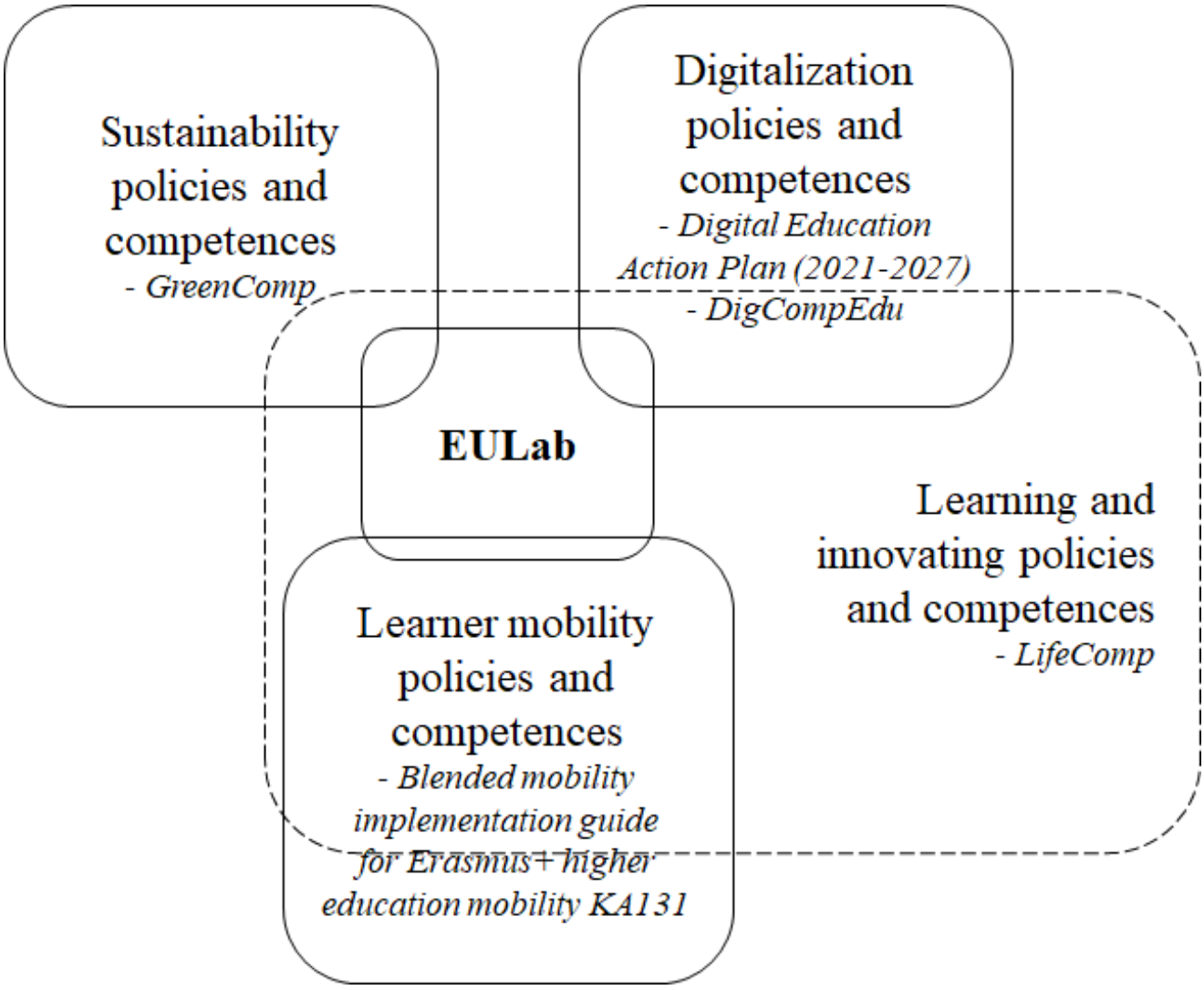

Figure 16. EULab's location in the EU policy landscape.

3. EULab as a competence developing mechanism

EULab is designed as a mechanism to develop competences mainly around sustainability and digitalization, as presented in chapter 2. In this section, we first show how EULab participants, i.e., learners and educators perceive the EULab experience in a temporal manner; we present individual development trajectories through comparing participants' pre-lab expectations, their experiences during a lab and post-lab reflections. Second, we focus particularly on the development of aforementioned competences, as seen by individual lab participants.

3.1 Lab participants' expectations, experience and reflections

EULab participants (both learners and educators) of the blended mobility module (see 1.3.2 for details) were interviewed before, during and after their exchange programme to better understand their expectations, experience and reflections, respectively. The following table provides excerpts from those interviews and indicates learning and engagement journeys.

Stages	**Learners**	**Educators**
Pre-lab	"First of all the topic, 'food sustainability' getting more knowledge about this area, new culture and individuals (meeting different people) and new method of learning which I can learn" (IntPreS4, F) "I am always interested in new challenges, sustainability aspect really interests me, collaborating internationally, and seeing other cultures, really interesting for me at (EULab)" (IntPreS12, M)	"Specially here I think, it is more about 'how you think'' like stretching the thinking process in different ways and that you do not know what is is like until you do it" (IntPreT1, F) "As an educator, EULab is a mechanism of creating a real change and having an impact that education need not be in isolation, it can be more integrated into our places" (IntPreT4, F)
During-lab	"I liked brainstorming sessions we had, where in our group we were trying to figure out what to do, how to do it, and how to use tools (introduced at EULab)." (IntDurS3, M) "We had a great week in Nantes, one of the richest parts for me was the social part, the food system in Nantes…. It (EULab) was about trying different things to get some new results" (IntDurS7, F)	"I think future thinking is very important, it makes us realise that we are able to imagine something different through the tools at (EULab)…..it is very special to consider when talking about sustainability" (IntDurT2, F) "It is just nice, there is a mixture in this program…..the place is very important, the food sustainability (as a topic), diversified and collaborative efforts, students from different countries made it great" (IntDurT5, M)

Post-lab	"I enjoyed it (EULab), the whole concept of the Lab, it was a cool idea, something different to (explore).... Got more knowledgeable about sustainability practices" (IntPostS6, M) "Being able to see, individual and collective learning, the sense of community of place-based learning" (IntPostS10, F)	"To me, it (EULab) is about fellowship, learning, and co-learning with colleagues, students, and the place" (IntPostT5, M) "You can teach a better understanding of SDGs (sustainable development goals), if you teach them in a specific place, where participants can see the initiatives, and you can inspire by the place and by the people" (IntPostT6, F)

Table 6. Interview quotes about lab participants' expectations, experience and reflections.

Learners started off with interest in and curiosity about both the sustainability topic and the lab modality which also dominated their in situ experience and post-lab reflection. After the lab, learners also pointed at the benefits of immersion in a specific location.

Educators contemplated the learning and teaching methods before and during the lab. In retrospect, they commended the lab's different characteristics, and particularly its place-basedness.

3.2 Competence development

Taking a closer look at participants' development of sustainability and digitalization-related competences, interviews carried out during the different stages of the blended mobility lab were analyzed against the competence criteria presented in section 2.

3.2.1 Sustainability competences

The following table provides excerpts of participants' reflections on the competence development guided by the four competence areas in the *GreenComp* framework: 1) Embodying sustainability values, 2) Embracing complexity in sustainability, 3) Envisioning sustainable futures and 4) Acting for sustainability. We summarize and discuss the competence development of learners and educators after the table.

Sustainability competence development	**Learner reflections**	**Educator reflections**
Embodying sustainability values - *valuing sustainability* - *supporting fairness* - *promoting nature*	"The most important takeaways from the EU lab was being able to see how all of these small independently run organizations in and around Nantes were all kind of following a similar premise, all having a very similar goal, even though they all had different missions in the end and and everyone was individually working on all of their projects to try to bring both sustainability [and] employing some people that may be underprivileged, you know, utilizing some area that	"Obviously the environment is in crisis and large parts of our humanity and our societies are in crisis, and the feeling of justice, it's very prominent. And justice, fairness and and, you know, just a general well-being community feeling that is very important to me personally. So that comes through in all my teaching. I've research on sustainability. I teach in sustainability. So gets kind of

	may have been forgotten. So I think what was great was all of these organizations kind of all picked some of the same values that they were working towards to try to bring nods and you know their their own groups to accomplish something that you know they just felt was good and that they should be doing, you know, intrinsic motivation. But what I also like too is that some of them were using one another right, so some of it this community involvement, there were some of these light networks and connections talking from the lady who was the waffle lady. And, you know, using some of the local farms local produce and knowing other people that we had talked to within the whole EU. So I guess even one of those community farms, they knew other people within the community. So even though they were individual and coming up from these individual organizations, there was this loose network of connection throughout. So that was one thing that I thought was very cool to see. After going on the field trips." (Student 10, Nantes Lab, post) "Visiting concretely the places versus just reading them on article was a game changer. Rarely do we get attached to do such things when we are learning. So yeah, it made it different impact on your memory and you sort of feel tasty touch here, and you are there in the moment with those stakeholders for instance when we were discussing about how the urban farming is happening. That was really insightful and I think a long lasting memory. Doing these sort	everywhere." (Staff member 1, Nantes Lab, post) "I think that the strongest moment was when we were here and I think that working in the city for the city with the city is an experience that is very difficult to match. I think so whatever happens, you know, to the EU lab, I'm pretty sure -- this is a moment which is going to stick in their mind. I'm pretty sure for good and bad reasons, mostly for good ones, I think. But because it was so intense and -- I think we managed to create a a good atmosphere and ambiance. And I think that the student -- were in safe hands. -- And I think it also came from with the guests and the guests were very open, very sharing and so it was a moment of sharing it was a moment of reflection. It was a moment of discovery. I think it would be very difficult to match if we hadn't had this time in the city. So for me it's one of the key point and obviously the EU lab is all about thinking about how we can extract, we can ask people to travel around Europe or maybe not to travel around Europe. This is really an argument for traveling to the place and for doing work on the in the place and meeting people in the place. So I don't think you can do that. It's not going to stick in your memory and in in your in your body as much as if it were all online, I think. (Staff member 6, Nantes Lab, post)

	of excursions are important aspect in learning, but maybe it could have been improved by first, getting some theoretical knowledge and then going to see it implemented, because now we sort of like jumped into the pool without having that theoretical knowledge. So there could have been a lot of nuances that we couldn't just, you know, see, because we weren't informed enough about about certain aspects. Then going to a different place than your hometown, for instance to learn sort of accelerates the learning because you're constantly picking up different cues from the different culture, different places. So you're sort of like your eyes are more open and wait to see differences. Whereas if you would just go to place here in [the student's home city], I think I would have missed a lot of things because they were sort of already there." (Student 12, Nantes Lab, post)	
Embracing complexity in sustainability - *systems thinking* - *critical thinking* - *problem framing*	"I feel like the EULab is a good idea to implement in order to imagine new ways of learning, especially in the European context, and try to innovate in the learning processes, in schools, in universities, [and] like, for any age. So for that, I think it's very relevant. On another point, I guess, our experience was good. However I think to be efficient while searching on those specific topic, it can be nice as well to increase like the amount. I mean the time, the duration of the project like not over one month but maybe one month and 1/2 or two months so that you will have more time to dig into the topic. And also I guess the participants would have more time to get used to the tools if they have	"Through sort of the the headlines of the project and thinking this sounds really interesting, complex but interesting and and I think it was, it was primarily the topic that connected the most to me. So this idea of thinking about sustainability, thinking about grand challenges, thinking about it from, you know,this kind of more systems perspective." (Staff member, pre-stage)

	never used the tools before. But overall, I think it can be nice to repeat the experience, maybe like in another context." (Student 8, Nantes Lab, post) "But that's also like a wake up call to like, OK, so there's a lot of food, but it isn't present when you're going to restaurants, when you go into local markets. So it's obviously an issue that has to be corrected. – I don't think you would have really had that sort of a focus on those things because you're sort of like living there every day. You're breathing the same air every day. So. So going to a different place really help to accelerate that process. That thought process of seeing things critically and being open to learn." (Student 12, Nantes Lab, post). "The kind of practical steps that you can take on a pretty small scale is a part of sustainability. Sustainability isn't just this massive broad concept that governments and big corporations are in charge of. Responsible for real, like you can take [and] make pretty incremental changes in like small from anything like small villages up to cities like now it's the greater knowledge area." (Student 6, Nantes Lab, post)	
Envisioning sustainable futures - *futures literacy* - *adaptability* - *exploratory thinking*	"You know, we can focus on, OK, we want to produce food in a better way than we do. We do today because we are well aware of all the issues et cetera. But we also want to offer new types of jobs to people, new ways of working or living and do it collectively and with people from different backgrounds." (Student 7, Nantes Lab, post)	"Even yesterday we were talking about something in Paris, and I find myself referring back to the week about something that we learned. And a type of activity that we did, or a visit or the topic or or something that makes me think of that week. We also had a meeting last week where we were about 6 or 7 sustainability interested in sustainability teachers and we got together and we spent about 3 hours

		today brainstorming different aspects of sustainability, teaching and what that means. And and you know, it's a topic that's quite relevant. And I think what we did really helps feed into that from a teaching point of view." (Staff member 1, Nantes Lab, post) "It (EULab) doesn't have a solid goal like even the words written about it, which are very beautiful, the very open to interpretation. Even like, if you look at the EULab website, the ways that we talk about are still super open and if you ask each individual faculty, they would probably describe it very different. Now we would say some of the same words, but we don't mean the same thing by the same words. And I think what's funny is also during it the students also picked up on that. So we called it a feature cause I don't think -- you can say honestly this is what a creative environment looks like and this is all about like creating what is our goal here is to create a common language as well as understand the diversity of thought and process people have for creativity and for problem solving. So with that there will be different interpretations. When I say systems mapping I mean something different than my colleagues. And then the students also do, and then their interpretation with the tools. And our approach towards tools and results are different. And so I think that it's hard to say what the take away is. I'm not sure what it was other than I think we could all agree it was to explore and to see how they reacted to the different components and to us. -- It's it's fascinating. I think

		it's an interesting problem. I don't know if it's an interesting problem if you're thinking if you want it to have one cohesive thing. That being said, it could have some structuring principles and not have, like a cohesive rule book and more of just guiding principles that can be flexible." (Staff member 5, Nantes Lab, post)
Acting for sustainability - *political agency* - *collective action* - *individual initiative*	"I am really more conscious now about food system. I also think that it's very important to have mini views to try to change or to improve things. It's important to gather the main actors to discuss together about the same issues and try to find solutions." (Student 7, Nantes Lab, post) "[I'm] more knowledgeable on sustainability and how the whole idea of this works and how it can be implemented. I'll be a bit more confident talking about that. -- I feel like I'm not just making it up as I go along now. I have some good experience to put behind it." (Student 6, Nantes Lab, post)	"The rhythm of those two parts [online and offline] were quite a different experience. I think the week is also much more memorable and than the online work. So I mean personally I remember lots and lots and lots of things that went on in the week and I don't remember very much about our feedback sessions during the last three weeks or even the final presentations too much and which is interesting from a maybe from a learning point of view as well that when it's very intense like that you do have. I don't know what the students said, but when when it's intense like that, it kind of stays with you for longer perhaps, which is interesting." (Staff member 1, Nantes Lab, post) "I think that the strongest moment was when we were here and I think that working in the city for the city with the city is an experience that is very difficult to match. I think so whatever happens, you know, to the EU lab, I'm pretty sure -- this is a moment which is going to stick in their mind. I'm pretty sure for good and bad reasons, mostly for good ones, I think. But because it was so intense and -- I think we managed to create a good atmosphere and ambiance. And I think that the student -- were in safe hands. -- And I think it also

		came from with the guests and the guests were very open, very sharing and so it was a moment of sharing it was a moment of reflection. It was a moment of discovery. I think it would be very difficult to match if we hadn't had this time in the city. So for me it's one of the key point and obviously the EU lab is all about thinking about how we can extract, we can ask people to travel around Europe or maybe not to travel around Europe. This is really an argument for traveling to the place and for doing work on the in the place and meeting people in the place. So I don't think you can do that. It's not going to stick in your memory and in in your in your body as much as if it were all online, I think. (Staff member 6, Nantes Lab, post) “It's interesting because when you ask me about the EU lab, I thought straight away of the week when they were here, I didn't think about the pre controlled training because I couldn't be there so I didn't attend it. And I didn't think which is a little bit surprising. I didn't really think about the three weeks spent online that so to me I think the highlight of the EU lab was when we were all together in the city and discovering the city, discovering it's actors, stakeholders and to tell you the truth, I believe and I have mentioned that before, I believe properly we could have stayed two weeks in the city and maybe reduce, you know the time online because I think that you know, when we started online, students were very curious and they were happy to be online to do this preparation course.”

		(Staff member 6, Nantes Lab, post)

Table 7. Participant reflection on sustainability competence development.

Embodying sustainability values
The EULab blended exchange programme promotes embodying sustainability values by enhancing competencies that relate to the identification of sustainability-related problems for which solutions are largely driven by sustainability-related values that are important for learners and their priorities for a sustainable future. Learners reflected that they started to notice during the Nantes winter school the interconnectedness of values between different companies even though those companies were operating in different fields. Learners also said that they could notice that based on the shared values base the companies started to create a value network, meaning connecting with each other more tightly, rather than standing in competition to each other.

Educators reflected their concerns about the environment and their own personal commitment to sustainability and will to make a change through their teaching. They also shared the key sustainability values. Even though traveling to and from the onsite module was considered problematic by educators, they still said that place-based learning creates a real connection with local social and ecological environments. Thereby offering an intensive, memorable experience for learners that cannot be created using only online techniques was reflected as truly valuable.

Embracing complexity in sustainability
The EULab embraces complexity in sustainability by showing that challenge-based learning is built on the premises of critical thinking, problem identification and presentation and requires a systems-analytical approach that recognizes the role of governments, corporations, and individuals in creating the sustainable future. Learners stated that traveling to another place in another cultural context offered a chance to accelerate learning and to see the connections between different sustainability aspects. As already previously mentioned, learners also reflected how they started to see the connections (systems level) while they were working with companies and other stakeholders. Educators also found it important how the EULab made it possible to see sustainability more on a system level connecting different stakeholders. Learners thought that collaborating with local stakeholders helped them to frame the problem and see how they could affect sustainability in practice starting from small changes.

Envisioning sustainable futures
The EULab shows that envisioning sustainable futures enables learners to generate ideas for sustainable futures collectively and become confident system innovators for a sustainable future. For learners the EULab offered a place to think about the future and possibilities for new kinds of working and new professions. Educators point of view the process of EULab was open enough to encourage both students and teachers in exploring innovatively the meaning of different aspects, phases and tools. There were no strict rules on how to go forward but more space for self-guided reflection and discussion for meaning making and understanding the diversity of people's thoughts and processes for creative problem solving.

Acting for sustainability
The EULab acts for sustainability by connecting learners with local stakeholders to create the possibility for collaboration with them and by encouraging learners to become active citizens in

their home countries and globally. Learners reflected that the EULab experience gave them confidence, knowledge and competences for taking agency over sustainability. They felt that after the experience they were more equipped as individuals to act as change makers and they also knew the importance of bringing different stakeholders together. From the educators perspective the connection with the local stakeholders was a transformative experience constructing a really memorable process of learning and acting for sustainability jointly.

3.2.2 Digitalization competences

In addition to sustainability, the development of digitalization related competences (see 2.1.1) was key in EULab. The following table provides excerpts of EULab participants' reflections on their digital competences. The table is followed by summaries and discussion of the different digitalization sub-competences.

Digital competence development	**Learner reflections**	**Educator reflections**
Information and data literacy *- articulate information needs* *- locate and retrieve digital data, information, content* *- judge relevance of source and content* *- store, manage and organize digital data, information, content*	"I actually really like the platform [Miro]. – I like the way it is visually represented, and I like that you can essentially have unlimited space and you can organize your thoughts however you want. So I actually like Miro. I also like slack. I use it for work, so it's pretty easy for me to understand and to use. When it comes down to the slack, I think there's almost too much going on in the slack that you know, I can't say that I've looked at all the references that were posted again and it just kind of comes into the if this was the only thing I was doing, it'd be great. But because it's like, I also have my work slack going off and all these other things, it kind of just gets lost and you're like, alright, like, I'll get to it later and then, you know, you don't really. So, tools as far as the technical." (Student 10, Nantes Lab, during)	"It hasn't changed any structures, but I think it might just have created awareness that there are interesting things we could do. But we are working in a very structured environment and that might mean that it's difficult to do things that we'd really like to do. So maybe just that realization is also the first step to thinking about how it might be done differently. I don't think we're there yet, but certainly it's raised a few, you know it's started, it's raised some conversations that we wouldn't have had. And -- we had a lot -- external stakeholders who came and join." (Staff member 1, Nantes Lab, post)
Communication and collaboration *- interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity*	"So we were struggling to find common time because the time slots were different than we were messing them up the first week we were all on at the wrong time there and Diana, as she's in Colombia, the time	"It's been learning a lot about how to set up a week like this. I mean, we've done these kind of intensive weeks before, so in that sense it wasn't anything different, but trying to think about how to use the tools and

- participate in society through public and private digital services and participatory citizenship *- manage one's digital presence, identity and reputation*	difference was big, but we used Slack. And then we like discussed with each other while like text messages in like WhatsApp or Instagram direct messages and discuss the concepts. So even though we weren't able to meet and do work together that much at the same time, we were still able to discuss things which we wanted to do and then, when we were doing or working together, when we were all or most of us in Slack at the same time. -- That was the best part to make progress when we were all together, even though like text messaging is efficient in a way. But we didn't make as much progress there because it's not. So you can praise on so much when you do it." (Student 3, Nantes Lab, post)	trying to do it in a different way and use our positions in a different way. So I think one of the outcomes for me, just the experience of doing it, being more questioning about teaching methods, having more confidence in terms of trying new things and going in this direction, even when students seem to question it a little bit. And outcomes, II think it's different to read and write about something and then having actually done it. Now that we've got a concrete sort of package that we've done, we can then work on different bits of it. We can share that with others. We can go into discussions with sort of concrete experience of it, and I think that's really valuable for sort of fought on forward going discussions. (Staff member 1, Nantes Lab, post)
Digital content creation *- create and edit digital content* *- improve and integrate information and content into an existing body of knowledge while understanding how copyright and licences are to be applied* *- know how to give understandable instructions for a computer system*	"Well, the technical side. When we were face to face, it was so much easier to like, try and focus on the tools. But now that we are online it it's sort of like it's it's a bit vague on like how to organize everything. So it's like it's an OK, cool then me and my team for example, we established our own little slack channel so that we were not monitored by professors and and others. So we can, like, really talk how we wanted to talk with each other. And how to organize stuff after we leave that I think it's sort of like opened up or or dialogue and we could like really collaborate. But before, before we did that, it was sort of like we we I think we were regulating how we were speaking because we obviously understood that everybody could see what we are writing and that that is not always the best solution when	"One example [is that some learners] were rerunning the tool, they were gonna do it again for different situations and it was like she's got this tool and now she's using it for what she wants for, what she wants to do." (Staff member 1, Nantes Lab, post)

	you are supposed to, you know collaborate and and have an open discussion about things. So yeah, slack was an OK platform, I think it's very similar to Discord, sort of like helping helping on collaboration part. I think any any of these other would have sufficed as well like Teams or other that we are using like Google Hangouts and stuff. -- So yeah Miro then. As a tool, it's really heavy. I think even though I have a pretty new computer, less than 1 1/2 years old it's so heavy that it runs slowly. And then for some reason like I told told you before that I had this issues with my username not being authorized." (Student 12, Nantes Lab, during)	
Problem solving *- identify needs and problems* *- resolve conceptual problems and problem situations in digital environments* *- use digital tools to innovate processes and products* *- keep up-to-date with the digital evolution*	"On the learning side, you realize that there is not only one way of learning. You can use very different tools and you can switch from a more conventional tool to another more innovative tool, and it doesn't mean that you lose time. Or that you feel like there is no progress. Sometimes you can feel this way and you should feel confident that at one point you will connect everything together and you will feel the progress and the understanding. I was really positive on this experience of exploring different tools." (Student 8, Nantes Lab, post)	"So in terms of the order of things. I think the sequence works. I think what we wanted to include, what we knew was important to know pre course was important, right? So I think the cultural training is important and I think the tools training is definitely important to get all of these in sort you know. Download installation, access things or so it's that that takes ages and we could maybe have done a bit more of the intercultural and aspect beforehand. So you know whether we needed to have anything more for the students beforehand to get them more prepared, understanding a bit better how it was gonna work. I mean, we did have we had an introduction. And maybe it's easiest just to do it when we're all together during the week and the sort of immerse everyone in. So maybe there anything, maybe just a bit more intercultural. And then -- the transition from the intensive week to the online

		week, I think it needs to be smoothed a bit and then linked to that, it's finding the balance." (Staff member 1, Nantes Lab, post)

Table 8. Participant reflection on digital competence development.

Information and data literacy
The EULab develops digital competencies of the learners and the educators, as the quotes above show. The EULab emphasizes information and data literacy and develops competencies that relate to the setting of self-determined learning goals and methods by expanding the earlier technological knowledge of the learners with novel heutagogical learning methods and tools.

Learners reflected that digital tools facilitated the learning process and helped them to organize information in a creative way. They also talked about the challenge of critically evaluating the content and information to concentrate on key knowledge. From the educators side the new tools offered a chance to see more innovative ways of handling information compared to the systems they use daily in their work.

Communication and collaboration
The EULab develops communication and collaboration competencies of the learners and the educators to the new level by introducing and encouraging the use of a variety of latest industry-relevant digital communication tools such as Slack and Miro board that enable remote team collaboration, communication, and visual sense making.

For learners, engaging in communication was generally smooth through online methods even though there were practical challenges in maintaining unified schedules for the teams and navigating the time zone differences. For educators, on the other hand, it was a process of learning to use the tools in ways distinct from their previous methods. They learned how to reposition themselves as facilitators of learning, noticing the need for a shift in their role. learning. Additionally, educators observed the importance of pre- EULab training, emphasizing the importance of fostering mutual respect among students and addressing possible cultural differences.

Digital content creation
The EULab enhances digital content creation competencies for example, by operating a variety of digital content creation tools that are used in concept development, sensemaking, collaboration and communication. Learners found it important to have a trustful space for discussion to be able to express themselves fully. Sometimes they were having some practical challenges in using the onlinetools like running the programs. Otherwise they are used for different tools and online collaboration.

Problem Solving

The EULab highlights problem solving competencies and offers environments that empower learners to use online digital and data based tools in problem identification, solution development, and developing future narratives and interventions. By using the different tools during the EULab the learners noticed that they were capable of taking new tools in use and reflected about raising confidence to keep on taking in use new digital tools also in the future. Additionally, educators

observed that the training of the different tools before EuLab is essential. This proactive approach is vital for establishing a smooth and effective communication and use of different digital tools.

Overall, both participating learners and educators were well satisfied with their EULab experience. While the participants were satisfied with the online parts of the Lab (before and after the onsite part in Nantes), they considered the in-person week in Nantes the most memorable and beneficial part of the Lab. This was mainly due to the concrete connection with the locality, i.e. Nantes' sustainable food system and related onsite experiences. Additionally, the bonding among and between learners and educators created an motivational atmosphere of engagement which helped immerse into the learning experience.

4. Pathway for the integration of EULab as part of HE priorities

In this chapter, we draw on different understanding and tools developed during the EULab pilots to develop a pathway for its integration in the pan-European HEI landscape.

4.1 European HE readiness

In EULab, a study (to be accessed via the EULab webpage (www.eulab.org) and corresponding Erasmus+ Project ResultsPlatform) was carried out on the readiness of European HEIs for the implementation of EULab exchange programs. The study shows that HEI readiness for the implementation of a European-wide EULab model template that is universal enough to fit into HEIs' curricula is rather heterogeneous. Depending on a) the rigid (vs. loose) curriculum structure, b) organizational support and c) individual teachers' motivation and attitude towards new teaching and learning methods, the integration of an EULab model template is possible between HEIs that engage in such collaboration with a signed agreement.

4.2 Sharing the EULab model

EULab was launched to create a Europe-wide applicable educational exchange tool that allows through its two modalities (virtual exchange and blended mobility) to be shared across European HEIs. EULab's dissemination is planned to rely on the following three initiatives.

4.2.1 Train the trainer (TTT) Programme

The EUlab TTT programme was developed and piloted as part of the EUlab Erasmus+ funded strategic partnership. The design of the programme included lessons learnt across the partnership team and from partner participation in DFL 22 VE and BM pilots. For example, University of Limerick designed an interactive workshop with partner faculty introducing the tools and frameworks being used in the DFL and EULab pilots. Further, faculty were facilitated in a discussion on facilitating student autonomy, building on prior experiences and reflection on what was different in EULab programme.

The format included a half day online workshop, participation in the opening and closing conferences of DFL23 and engagement in DFL23 as a mission education observer (this latter aspect was subject to availability and the level of engagement varied amongst participants).

The half day workshop included an overview of Drivers of Change in HE including: Education for climate, green competences and heutagogy and a miro based workshop focusing on facilitating and enabling student autonomy in participant's education practice (miro board). A further panel discussion provided an overview of studio based education and included an Interview with Morgan Flynn, School of Architecture UL and Prof Catherine Morel, Audencia Business School, France on Mission Led Education and the role of a studio learning environment. The opening live in person conference allowed TTT participants to hear first person accounts of EULab alumni and gain an appreciation of the student experience. Further, the innovative hybrid teaching and learning methods could be observed as each element was live streamed and recorded for online TTT participants. Content of the programme is being made available via the EULab webpage (www.eulab.org) and EULab Linkedin group: https://www.linkedin.com/company/eulab/.

4.2.2 EULab Sustainability Challenge Toolkit

The aim of this toolkit is to support higher education faculty and staff looking to embrace a mission-led approach to Education for Sustainable Development and create an engaging and

student-centric learning environment. The toolkit offers a comprehensive guide, starting with an overview of the EUlab Strategic Partnership. It provides a detailed program overview, explores pedagogical foundations including EULab Verticals, System Thinking & Futures, and Market System Shaping. The toolkit delves into the Studio Learning Environment, discussing the Studio in the Business School and Visual Tools. It outlines essential steps in running an EULab, emphasizes assessment strategies, discusses roles and responsibilities within EULab, and concludes by offering further resources for continued exploration and implementation. The toolkit is being made available via the EULab webpage (www.eulab.org) and EULab Linkedin group: https://www.linkedin.com/company/eulab/ and also on the Erasmus+ results platform.

4.2.3 EULab Proposal for cosmo-local SDG impact platform

The journey of the EULab platform concept, evolving from conceptualisation to speculative wireframe visualisations, encompassed extensive research, collaborative workshops, and iterative design phases. The combination of the final white paper and speculative visuals sought to present a fully conceptualised cosmo-local SDG impact platform. This platform concept, deeply intertwined with the work of Futures Lab and Policy subgroups within EULab, holds the potential to amplify insights, facilitate collaborations, and foster knowledge exchange across geographical settings and HE institutional boundaries, and to enhance HEIs capability in addressing the SDGs through education. The platform concept paper is being made available via the EULab webpage (www.eulab.org) and EULab Linkedin group: https://www.linkedin.com/company/eulab/ and also on the Erasmus+ results platform.

4.3 Roadmap for Integrating Studio-Based and Mission-Based Learning for Sustainability

We combine insights from the EULab pilot modules, competence policy analysis and HEI structural readiness survey to sketch a roadmap for the integration of EULab as an innovative blended/virtual exchange template into the European HEI landscape.

The EULab pilot modules have pointed at both the potential for an EULab programme to empower learners to become active citizens and problem solvers, and the challenges in implementing such programmes. Aside from HEI management commitment, educators require a short-term, specialized introduction to heutagogical learning facilitation methods, as they significantly differ from more traditional pedagogies. The competence policy analysis produced insight into EU competence priorities. The GreenComp and DigiComp priorities, in particular, highlight areas of development that EULab needs to address. EULab's HEI structural readiness survey, in turn, produced understanding of the structural challenges to be overcome for implementing a low-threshold EULab offering across Europe.

The following table shows roadmap steps based on the current understanding and progress of EULab and related challenges. The step-by-step roadmap encompasses various necessary phases of EULab's integration in HE institutions divided by stakeholder groups (educators, university management, national or EU level policy makers). From the initial assessment of needs to continuous evaluation and adaptation, this framework provides guidance for a structured but flexible approach to implementing EULab.

Roadmap step	**Educator engagement activities** (teachers, tutors, etc.)	**University management engagement activities** (study executives, deans, etc.)	**National / EU level HEI policy making** (European Commission, Ministries for education, etc.)
1) Needs assessment	Knowledge sharing: - solution potential clarification: EULab's support in learning facilitation in blended/virtual mobility	Awareness creation: - problem identification: potential lack of flexible blended/virtual mobility - solution potential clarification: EULab's support in learning facilitation in blended/virtual mobility	Awareness creation: - problem identification: high degree of structural readiness diversity across HEIs - solution potential clarification: EULab's support in learning facilitation in blended/virtual mobility
2) Contractual frameworks		Signing bilateral and multilateral contracts with other EULab participating HEIs	Creating general multilateral contracts: - allowing HEIs to move away from bilateral and toward multilateral contracts
3) Pre-training (*Train the trainer*)	Participation: - getting acquainted with EULab's education programme and methods	Support: - motivating and providing resources for educators to receive necessary resources	Support: - financially and politically supporting pre-training activities
4) Expanding the EULab network	Growing participation: - regular involvement and spreading the word among colleagues	Growing participation: - regular involvement and spreading the word among partner HEIs	Continuous support: - financially and politically supporting the network growth
5) Continuous reflection and improvement	Regular review of learning facilitation methods	Continous review of resource and strategy adequacy	Continuous review of structural appropriateness

Table 9. 5-step roadmap for EULab integration in European HEI landscape.

1. Needs assessment

During the first phase, the three stakeholders groups across the European HEI landscape will need to engage needs assessment. This includes awareness creation and knowledge sharing activities.

Particularly university management and policy makers are required to identify the potential lack of flexible blended/virtual mobility opportunities in their HEI(s) and to understand the structural and resource-related challenges in implementing them. Additionally, policy makers will further enhance the dissemination of the benefits of EULab offerings or similar blended/virtual exchange offerings. University management, policy makers and educators, additionally, are advised to explore the opportunities an EULab can generate in terms of meeting learning requirements and structural implementability.

2. Contractual frameworks
While university management are initially encouraged to enter into necessary new bilateral agreements with other HEIs participating in EULab programmes, policy making institutions are requested to pave the path for more simplified, low-threshold, multilateral agreements that interested HEIs can sign to get involved in EULabs. This will require equalisation of e.g. minimum ECTS points for learning modules and more flexibility to changes in existing curricula.

3. Pre-training
To widen the number of EULab host HEIs across Europe, the number of facilitating educators needs to be increased. This requires continuous pre-training of educators across Europe, e.g. by means of EULab's train-the-trainer offering. Train-the-trainer events help educators familiarize themselves with heutagogical principles and the basic ideas of EULab blended/virtual exchange programmes. University managements support the process through incentivizing educators' participation in pre-trainings and policy makers leverage the process through allocating necessary resources.

4. Expanding the EULab network
To ensure that beyond first-mover HEIs also other HEIs in across Europe open up to EULab blended/virtual exchange offerings, both participating educators and university managements are required to spread the word about EULab among their partners and collaborators. In bottom-up initiatives they can push administrators, management and accreditation organizations to institutionalize EULab-like blended/virtual exchange offerings. Policy makers, in turn, will politically and financially incentivize universities' participation in these offerings through creating the necessary flexibility and space in curricula.

The EULab platform is an additional resource to help grow the normalization of blended/virtual exchange offerings across European HEIs. It serves as a pool of educational resources for educators (e.g. the EULab toolkit) and a hub for university management and policy makers to meet.

5. Continuous reflection and improvement
According to the spirit of the EULab heutagogy, including its empowering and critical approach to solving problems, EULab itself needs continuous reflections on its mission, structure and practices to stay relevant and serve the purpose of meeting the requirements for learning facilitation of the today and the future.

4.3.1 Potential of Integration

An integrated EULab blended/virtual exchange offering in the wider EU HEI landscape provides benefits for learners, educators and HEIs in general:

1. Enhanced Sustainability Education
By incorporating EULab, universities offer students an in-depth educational experience, equipping students with comprehensive competencies, practical skills, and a deep understanding of sustainability. This student-centered, heutagogical approach goes beyond subject-specific knowledge, cultivating attributes essential for the next generation of change makers. EULab empowers students through deep learning processes, enabling them to develop critical green competencies necessary to address complex future challenges. Through active engagement and guided utilization of related tools, students gain agency over problems and learn how to enact active citizenship for more sustainable business practices. EU Lab's studio-based modules provide a dynamic, immersive learning environment that fosters creativity, critical thinking, collaboration, and practical skills.

2. Learning from Unique Contexts
EULab offers a unique opportunity to learn from the distinct contexts of various higher education institutions. Collaborative efforts between students and businesses across different regions and institutions (universities and companies) foster multidisciplinary, holistic understanding of sustainability issues. This collaborative environment brings together students from diverse disciplines, encouraging innovative thinking and providing an invaluable opportunity to learn from diverse perspectives.

3. Empowering Students as Change Agents
Students benefit from a hands-on, collaborative learning environment that empowers them to play an active role in addressing sustainability challenges. EULab prepares them to act as change agents in their future careers. It enables students to explore cultural, social, and ethical considerations, prompting them to tackle meaningful real-world sustainability issues. Through EULab, students witness the global interconnections of sustainability issues when they collaborate with peers from different higher education institutions and work jointly with local stakeholders, such as business partners, to innovate critical future sustainable business practices.

4. Community Engagement and Impact
The integration of EULab encourages higher education institutions to engage with local communities and stakeholders. This engagement leads to projects and initiatives that have a tangible, positive impact on the surrounding environment and society.

5. Addressing Sustainability Challenges on a Broader Scale
At a European level, by fostering a deep understanding of sustainability and its implications within the European context, higher education institutions prepare students to address sustainability challenges on a broader scale.

4.3.2 Challenges of Integration
The EULab heutagogical student-centred approach to learning represents a new approach that places the student at the heart of the learning process, the educator in a facilitative role, and curriculum to enhance intensive active learning through digital technologies. As our structural readiness study shows, the institutional readiness for adapting and having the system shifts into EULab differs. Not all higher education institutions are equally prepared or inclined to adopt EULab type education. This readiness can hinge on factors like available resources (funding), existing infrastructure, educators' competencies and institutional culture. The structure of the curriculum

is one key aspect, depending on a) the rigid (vs. loose) curriculum structure and possibility to integrate EuLab.

Integrating EU Lab studio-based education into the existing curriculum may also be a challenge. It necessitates a reimagining and restructuring of courses and curriculum to incorporate hands-on, experiential learning opportunities. This also includes reevaluating how credits are assigned and ensuring that assessment methods align with the new approach and those HE institutions involved in the process. Establishing appropriate rubrics that accurately measure students' learning and skills development in a EU Lab studio-based setting is crucial. This requires a departure from traditional measures in favour of project-based heutagogical student centred learning assessments.

During the project there were some identified challenges recognized for students. Recruiting students for studio-based education and ensuring their sustained intensive engagement while at the same time other courses ongoing can be challenging. Students may need time to adjust to a more active, self-directed learning style and also in time management. Students also need resources like funding if the attendance is onsite in another university.

The EULab studio-based education means a pedagogical shift for educators. Educators may need to undergo a fundamental shift in their pedagogical approach, focusing on facilitating student learning rather than traditional education means. This requires a change in mindset and educating strategies. Educators may face challenges related to their proficiency with digital tools and technology, which are integral to studio-based education. The educators need support and training for learning new ways of education and if there is lack of support educators may not have sufficient competence to act as facilitators.

EuLab studio-based education is time-intensive for preparation and during the education process. Students elaborated the challenge of managing the time effectively. Educators need to actively structure the activity, design the tasks and provide support and assistance in the online or onsite intercultural collaborations, thus educators need intensive commitment which may be a challenge if they have other commitments at the same time.

5. Conclusions

We live in a changing world of rapid technological and digital transformations. From the global pandemic such as COVID-19, we have seen how learning and education moved from traditional onsite modalities to an online mode. With the generational and technological progression, learning and education in general and higher education in specific needs a more advanced form of learning where autonomy and agency can be fostered to solve the problems of the current era. In this evolving landscape, self-determined learning 'heutagogy' can offer substantial benefits to businesses and global societies.

With the blended exchange model, through EULab, we are promoting collaborative learning with the central idea of "collective intelligence". Collective intelligence could be achieved through virtual exchange with a range of platforms such as Facebook (Passig & Zoref, 2022). The planetary challenges we are facing today, or even future challenges related to sustainability and numerous economic models such as circular economy, sharing economy, experience economy, digital economy, we need more sustainable ways of learning, adapting the dynamics, and reskilling.

In EULab, self-determined learning brings together virtual (fully online exchange) and blended exchange (short physical mobility) and place-based learning. This comprehensive approach inspires future generations through a specific mindset "agent of change" with autonomy in learning the content (which is impactful for solutions) and the process (which is transdisciplinary). The future of higher education lies in the transition from formal education to lifelong learning. How do learners get more value in their careers and contribute to society in general? This could be possible through pedagogical innovations, systems thinking and collective intelligence, as present in EULab.

Through our blended exchange pilot in Nantes, France, we discovered that the EULab has initiated a change in the thought process from linear to circular. The lab's topic was food sustainability, it became important for participants to think beyond the regular course of life, and question the assumptions of consumption, the ideas around food sustainability, the future lies in how responsible citizens become and contribute towards food sustainability. The intensity of place-based learning with enriched virtual exchange has inculcated a mindset "agent of change".

The scope of EULab is not limited to higher education, but it has expansion power to business organizations to foster a lifelong learning culture with autonomy and collective intelligence. Organizations can enhance their learning and development efforts through system thinking, design thinking, and creativity where the focus is developing lifelong competences.

From the social impact perspective, EULab helps to contextualize the learning process with place-based learning and localized solutions through global thinking. The Sustainable Development Goal 04 (SDG4) highlights the "*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*" (Qureshi et al., 2020). Challenges are everywhere, the nature of challenges vary with a range of factors, for example, socio-cultural, socio-economic, geo-political, developing world such as Africa and Asia, how can we make education more accessible, and promote pedagogical innovations in such part of the globe, and what can be learned throughout these collaborative learning projects.

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7. Glossary of terms

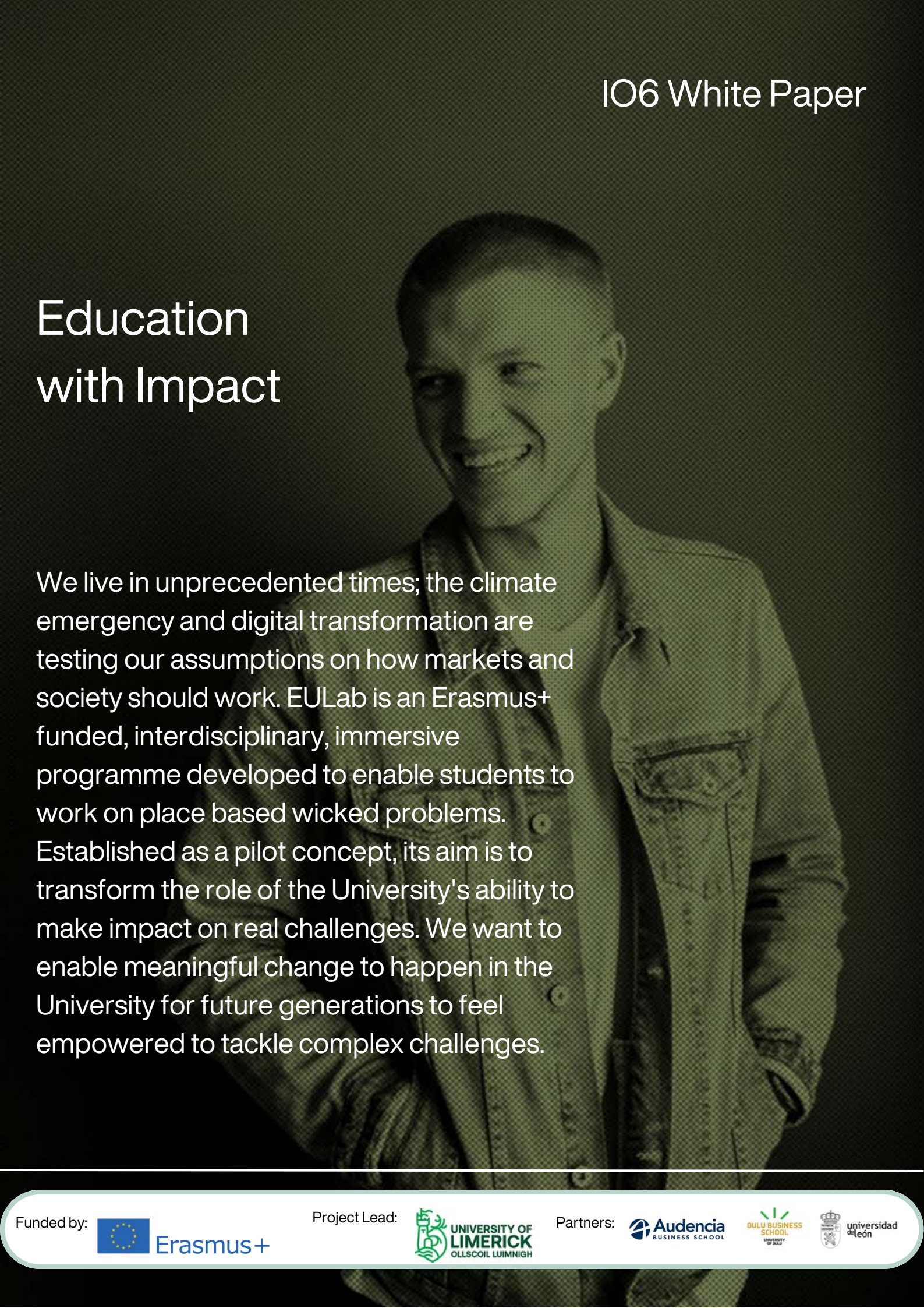
Blended mobility (BM): Blended Mobility refers to the strategic combination of phases of online learning with periods of short physical mobility. This approach to international learning has gained considerable interest in European university education in recent years due to the introduction of Blended Intensive Programmes (BIPs) in the new Erasmus+ programme. Blended Mobility is seen as offering a more accessible and inclusive form of international learning for students who may not be able to engage in long-term student mobility programmes. It also offers the opportunity of integrating periods of international collaboration more effectively into the curriculum and into classroom practices.

Heutagogy, is a student-centered instructional strategy that emphasises the development of autonomy, capacity, and capability to self-determine learning, where, learners are regarded as problem finders; they know how to find and set their destination and become increasingly independent (Hase & Kenyon, 2013). Heutagogy was introduced by Hase and Kenyon, (2000) as an extension of androgogy (study of adult learning) to describe situations where the learner becomes responsible not only for how to learn but also for what to learn. According to Agonács and Matos, (2019), the 21st Century work context requires fast learners, where knowledge and skill acquisition has become increasingly the responsibility of the individual; where learning happens ubiquitously and non-linearly; where the Internet is a primary source of information; where an excess of information is at one's disposal in a second; where most of the learning occurs through knowledge sharing; and where the role of the teacher or trainer has radically changed. Heutagogy focuses on the process of getting students to understand how they learn as opposed to getting students to learn the content (Blaschke, 2012), with a key focus on establishing an environment where learners can determine their own goals, learning paths, processes, and products. As an approach it establishes the primary role of the learner, the facilitative role of the educator, and the key role of digital technologies that offered those affordances necessary for learners to direct their own learning. We will consider virtual learning and exchange worlds from a heutagogical perspective.

Virtual exchange (VE): is an umbrella term which refers to the numerous online learning initiatives and methodologies which engage learners in sustained online collaborative learning and interaction with partners from different countries and cultural backgrounds as part of their study programmes at their home institutions and under the guidance of teachers or trained facilitators. Apart from the two basic characteristics of using technology and engaging in intercultural collaboration and exchange, this definition also highlights two further characteristics which are likely to be inherent in all types of VE: first, that the online collaboration forms part of students' study programmes and, second, that it involves the guidance of teachers or trained facilitators. The first of these is an important part of any definition of VE as it allows us to differentiate between projects which are integrated into education programmes and more informal intercultural interactions and collaborations which might take place online. For example, students often interact in online social networks with colleagues and friends from other countries. This may be beneficial for, for example, their foreign language skills and their cultural knowledge, but this should not be seen as VE. VEs differ from informal online interactions in that VE initiatives are generally integrated in some way into students' formal learning and students' participation in the project is provided with some form of academic recognition, whether it be in the form of grades, credit or badges.

IO6 White Paper

Education with Impact



We live in unprecedented times; the climate emergency and digital transformation are testing our assumptions on how markets and society should work. EULab is an Erasmus+ funded, interdisciplinary, immersive programme developed to enable students to work on place based wicked problems. Established as a pilot concept, its aim is to transform the role of the University's ability to make impact on real challenges. We want to enable meaningful change to happen in the University for future generations to feel empowered to tackle complex challenges.

Funded by: Erasmus+

Project Lead: University of Limerick Ollscoil Luimnigh

Partners: Audencia Business School, Oulu Business School, universidad de León